From Task Avoidance to Task Engagement: A Project-Analytic Perspective on the Role of Mood-Repair, Irrational Beliefs and Preference Reversal in Procrastination

by

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Abstract

The goal of this research is to examine self-regulation failure in procrastination through affect (i.e., mood-repair process) and maladaptive cognitions (i.e., irrational beliefs). Using Personal Project Analysis (PPA), specific affective and cognitive dimensions of PPA were selected from previous studies to examine mood-repair process and irrational beliefs. My dissertation research consisted of six studies that were quantitative (self-report questionnaires) and qualitative (interviews) in nature. In the first two studies, I examined the underlying factors of emotions associated with procrastination using a principal component analysis (Study 1a) and a confirmatory factor analysis (Study 1b). Results revealed a 3-factor solution consisting of a single factor of *positive affect* (e.g., happy, content), and two factors of negative emotions namely *frustration intolerance* (e.g., frustration, resentment) and *fear of failure* (e.g., stress, fear of failure). Using these three factors of emotions, I examined two time segments of procrastination in the subsequent studies – the procrastination episodes (i.e., episodes when they needlessly delayed their academic task) and the last-minute effort episodes (i.e., episodes when they started working on their academic task). In Study 2, I took a dual-process perspective to examine the interplay of emotions and cognitions during the procrastination episodes. Results of the quantitative (Study 2a) and qualitative (Study 2b) revealed strong support for the temporal mood-repair model of procrastination, and the idea that mood-repair and irrational justifications is associated with the delay of academic tasks. In Study 3, I investigated preference reversal, that is, why students move from not taking actions on their academic task during the procrastination episodes to taking actions near the deadlines, through the lens of emotions. Results of the quantitative (Study 3a) and

qualitative (Study 3b) uncovered that procrastinating students perceive their academic deadlines as signalling a threat when the deadlines are looming and as such, students chose to complete the academic tasks near the deadline. Together, the present results indicate the need for an emotion-cognitive model of procrastination given that both affective and cognitive processes are intertwined in shaping procrastination experiences.

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We make numerous choices every day. For instance, we decide what to eat for lunch or dinner, whether to eat healthy or not, which clothes or shoes to wear for work, what to buy at the grocery store, whether to go to bed early, or whether to do a task now versus later. It is this latter choice that interests me most, as the choice to delay action on an already intended task typically has important ramifications for goal pursuit and well-being.

Sometimes, we decide to strategically prioritize certain tasks and delay others to maximize our use of time and resources. This rational process of setting priorities is a fundamental life skill, and delay in this case is both rational and advantageous. At other times, circumstances limit our choices and delay becomes inevitable, for example, a flat tire delays our travel and subsequently may cause delay in other tasks scheduled that day. This type of delay is not assessed in terms of rationality even though the outcome typically undermines us in various ways. There are yet other times when people make the choice to delay an intended task despite their own recognition that they will most likely be worse off for this delay (e.g., Haghbin & Pychyl, 2015; Klingsieck, 2013; Steel, 2007). In an important sense, we might think of this as “needless” delay, as there are no compelling reasons or circumstances that necessitate the delay other than not feeling like or wanting to do the task as intended. This seemingly irrational choice is commonly known as procrastination, and it is a form of delay that is related to many deleterious outcomes (e.g., Sirois, Melia-Gordon, & Pychyl, 2003; Stead, Shanahan, & Neufeld, 2010; Steel, 2007). In fact, the deleterious outcomes of this ubiquitous phenomenon

manifest both in the short- and long-term causing not only subjective psychological discomfort such as high levels of stress, anxiety, depression, self-blame, guilt and regret (e.g., Fee & Tangey, 2000; Khazraei & Pychyl; 2014; Pychyl, Lee, Thibodeau, & Blunt, 2000; Sirois, Melia-Gordon, & Pychyl, 2003; Sirois, 2007; Stead, Shanahan, & Neufeld, 2010) which compromises task performance (e.g., Balkis, 2013; Tice & Baumeister, 1997), but also increases the risk for negative health outcomes (e.g., Sirois, 2007) such as hypertension and cardiovascular diseases (e.g., Sirois, 2015).

Given that both research and everyday experience make it clear that procrastination comes at a cost, the important question that needs to be answered is, why do people make this irrational choice to procrastinate, to needlessly delay action on a task despite the awareness that they will most likely be worse off for the delay? The decision to needlessly delay tasks has been thought to be due to self-regulation failure (e.g., Dietz, Hofer, & Fries, 2007; Tice & Bratslavsky, 2000; Van Eerde, 2000) for which there are dual explanations, both affective and cognitive. In fact, this *dual-process* perspective where the interplay of affect and cognition influence decision-making processes has been extensively discussed under different names such as controlled versus automatic processes (Shiffrin & Schneider, 1977), hot and cool model (Metcalfe & Mischel, 1999) or impulsive and reflective processes (Lieberman, 2003; Strack & Deutsch, 2004). These models provided insights into how emotions and cognitions can have different effects on self-regulatory processes when making decisions.

The interest in dual-process models is not limited to the field of psychology; behavioural economists also took interest in the dual-process perspective to explain people's choice behaviour (e.g., Loewenstein & O'Donoghue, 2004; Thaler & Shefrin,

1981). In a recent *dual-process* model, Loewenstein and colleagues (2015) from the field of behavioural economics argued that to understand choice behaviour in decision-making, both deliberative (cognitive) and affective (emotional) motivational states need to be incorporated in a model of choice. This is because these two motivational states compete with each other when making choices or decisions that leads to different outcomes (Loewenstein, O'Donoghue, & Bhatia, 2015).

The deliberative motivational state is the basis for rational decisions favouring the completion of long-term goals. For example, a person can choose to exercise for 30 minutes every day, as opposed to spending that time browsing social media, to obtain a desired longer-term reward of good health. The choice to exercise is a deliberative one as the individual is rationally thinking about future health benefits associated with investing only 30 minutes of their time now instead of giving into the much more tempting choice of browsing social media. Conversely, the affective motivational state tends to be myopic or present-oriented with a focus on immediate rewards and gratification. This affective focus of feeling good now fosters the seemingly irrational choice of neglecting long-term goals (Loewenstein et al., 2015). Extending the example above, another person might prefer social media to exercising despite the substantial benefits of exercise in the long-term, as it makes the person feel good in the short-term. Based on this dual-process account, the irrational choice in procrastination seems to be driven more by the affective motivational processes, however both come into play in understanding procrastination.

In the research literature, there are both theoretical and empirical accounts of the role of emotions *and* cognitions in procrastination, but these contrasting processes and accounts, and the supporting research have been conducted in separate studies. For

example, previous studies have established a clear link between irrational beliefs and procrastination, identifying irrational beliefs as one of the important antecedents of procrastination leading to self-regulation failure (e.g., Balkis, Duru, & Bulus, 2013; Haghbin & Pychyl, 2015; McCown, Blake, & Keiser, 2012; Silver & Sabini, 1981). Yet in other studies, an alternate explanation for the self-regulation failure leading to procrastination as described by Tice and Bratslavsky is emotion misregulation. In their review article published in 2000, these researchers described procrastination (and other self-regulation failures such as gambling, over-eating, etc.) as a *mood-repair process.* They reasoned that when people face aversive tasks, they tend to experience negative emotions. In the case of individuals who procrastinate when they experience negative emotions induced by aversive tasks, they may put their effort into feeling better temporarily by avoiding these tasks, disregarding the outcomes of their problematic delay (Tice & Bratslavsky, 2000). In fact, evidence for *mood-repair* in procrastination was found in a later study using an experimental design (Tice, Bratslavsky & Baumeister, 2001). Given this conceptualization of procrastination as an emotion misregulation problem, Pychyl and Sirois (2016) reasoned that procrastinators hold the mistaken belief (a part of a deliberative process) that they can improve their short-term emotional state by avoiding important goals, which they tend to find aversive, and pursue hedonic needs instead (an affective process).

I argue that these separate investigations of maladaptive cognitions (i.e., irrational beliefs) and emotion misregulation in procrastination need to be brought together to explain the self-regulation failure in procrastination. Only by integrating these processes into a single study can we fully understand the choice of needless delay, and this is well

demonstrated in studies in behavioural economics. For example, in explaining choice behaviour from a dual-process perspective, Loewenstein and colleagues (2015) reasoned that deliberative and affective processes continue to work together even when one motivational state becomes dominant. This implies that the emotion misregulation in procrastination is expected to work in conjunction with cognitive processes by working to actually support and even justify problematic task delay through irrational beliefs. These irrational beliefs may then further motivate the mood-repair process leading to emotion misregulation in procrastination. For example, a student who is supposed to study for a final exam coming up in two weeks finds reading the textbook an unpleasant task and gets frustrated every time he thinks about reading. To get rid of the negative emotions associated with reading and exam prep, he chooses to put off reading his textbook and plays video games to feel better instead (i.e., a mood-repair process). To justify this choice to himself, and reduce the cognitive dissonance inherent in this short-term focus, he may then explain to himself that no matter how much he studies he will still get the same grade (i.e., an irrational belief, see for example McCown et al., 2012), even though it is not true. Using this rationalization, he continues to avoid the source of his negative affect, which is generated by the reading assignment, and plays video games that make him feel good. This way, both misregulation of emotions and irrational beliefs contribute to the needless delay in procrastination.

Given this dual-process account in the literature, the purpose of my research was to examine emotion misregulation and irrational beliefs together in procrastination within the academic setting. More specifically, I investigated mood-repair process (in other words, emotion misregulation) by comparing students' experience of emotions during

procrastination on academic tasks across 4 momentary phases: 1) when they think of engaging in their academic tasks; 2) when they decide to delay these tasks (i.e., decide to procrastinate); 3) when they form an intention update of when they might work on their academic tasks; and 4) when they engage in some alternate activities while procrastinating on their academic tasks. At the same time, the specific irrational beliefs students hold about these academic tasks and the justification for their lack of action were assessed. This was done to elucidate the interplay between deliberative and affective processes that account for procrastination. Additionally, I examined preference reversal near deadlines in procrastination, that is, whether perceiving deadlines of academic tasks as a threat much closer to the deadlines play a role in reversing the decision to work on the academic tasks that were needlessly delayed.

In psychological research, it is quite challenging to capture both affective and deliberative processes within one study, and for this reason I chose a unit of analysis related to goals/projects that inherently embodies both deliberative and affective elements. I used *Personal Project Analysis* (PPA; Little, 1983) to operationalize the mood-repair process and irrational beliefs in procrastination in relation to students' projects/goals. PPA assesses the day-to-day self-expressed personal goals that people are currently working on or planning to do. These goals can range from mundane chores (e.g., taking medication, doing laundry) and leisure goals (e.g., watching TV, going on a vacation) to higher-order goals (e.g., writing a Ph.D. dissertation, getting a full-time job). Each project serves a different purpose for each individual in their life, and each is evaluated differently based on deliberative and affective appraisals. This personalized evaluation of different projects undertaken by each individual within their unique life

situations can be understood using PPA (e.g., Little, 1983; 1989). For example, two graduate students can appraise the project "writing my Ph.D. dissertation" differently. The students could differ in their cognitive and affective appraisals of this project. One student might find this project important, challenging and frustrating, whereas another student might find it important, less challenging and pleasurable. Using PPA, therefore, the unique evaluation of different academic projects that students pursue and procrastinate on can be systematically analyzed to assess the affective and deliberative processes in procrastination.

Furthermore, it is necessary to study this complex, problematic behaviour within the ecology of other tasks, goals or projects. The assumption in PPA is that projects that people take on form interacting systems with other projects, and therefore have positive or negative impacts on each other such as facilitating or impeding progress (Little & Gee, 2007). A PPA framework is an important approach to understand procrastination because people work on multiple projects (or tasks) every day, and the projects that they procrastinate on are embedded in an array of other projects which may well be what they do instead of their originally intended task. Using PPA, how people use other projects to procrastinate on academic projects can be understood more clearly. Research has shown that procrastinators use social media, watching TV, sleeping, recreational reading and even cleaning to escape aversive tasks (e.g., Demetriou & Pychyl, 2015; Kohler, 2015; Meier, Reinecke, & Meltzer, 2016; Pychyl et al., 2000). An in-depth understanding of which alternate projects with hedonic values students engage in to improve their mood and how they appraise these tasks when they procrastinate on academic tasks can be also assessed with PPA.

Most existing studies in the procrastination literature either used a quantitative *or* a qualitative method to test different models. To my knowledge, few if any procrastination studies to date have used a mixed-methods design. As such, a mixed-methods design was employed in the present study through PPA to understand how mood-repair and irrational beliefs interact with each other in procrastination. A mixed-methods design incorporates both approaches under a single investigation and, therefore, has many advantages. Of course, there are challenges to this mixed-methods design as it increases the complexity of data analysis, but one of the strengths of this analysis is that the findings can be validated using parallel assessment of qualitative and quantitative sources providing rich, comprehensive data from participants (Creswell & Plano Clark, 2011). As a result, both idiographic and nomothetic approaches can be integrated to understand the primacy of mood-repair and the associated irrationality in procrastination, and this was in fact a central goal for Little in the creation of PPA (e.g., Little, 1983).

Gordon Allport described an idiographic approach as qualitative focused research that investigates unique personal experiences, dispositions and behaviours of each individual to assess individual differences. A nomothetic approach, in contrast, focuses on quantitative inquiries of individual differences by collectively examining dispositions, experiences and behaviours of groups of people using ratings on standardized questionnaires (cf. McAdams, 2006). Using both nomothetic and idiographic approaches through a PPA perspective, an in-depth understanding of the interaction of emotion misregulation and maladaptive cognition that contribute to self-regulation failure in academic procrastination can be gained both at the level of the individual and the aggregate, within a large sample of people. Overall, I hypothesized that the interplay of

mood-repair and irrational belief in procrastination reinforces the needless delay of academic tasks.

My dissertation consists of nine chapters that will also form the structure of my dissertation. Chapters 1 through 4 are my review of the literature related to key topics. In Chapter 1, I first review the current conceptualization and theories of procrastination with particular emphasis on the models focusing on the role of cognition (e.g., irrational beliefs) in relation to procrastination. In this Chapter, I also provide an overview and evaluation of the choice-based models from the field of behavioural economics such as the expected-utility model and discounted-utility model that have been used to explain procrastination. In Chapter 2, I discuss the mood-repair model of procrastination where researchers have explained procrastination as an emotion-regulation problem. In this chapter, I also discuss the emotion-regulation literature within the context of self-regulation to understand how emotions and strategies used to regulate emotions affect the choices people make during goal pursuits. I then provide an overview of the literature on Personal Project Analysis in Chapter 3 to clearly demonstrate why it is important to focus on both emotions and cognitions to understand the self-regulation failure in procrastination within a personal project system framework.

Following this extensive literature review, in Chapter 4, I present my research with the rationale and hypotheses. My dissertation consists of four studies which are presented in Chapters 5, 6, and 7 with their method and statistical analyses. Finally, in Chapter 8, I discuss the findings of the present study and their implications. In this chapter, I also present the limitations of the present research and directions for future research.

CHAPTER 1

CURRENT CONCEPTUALIZATION OF PROCRASTINATION USING COGNITIVE MODELS

The English word procrastination originated from the Latin word prōcrāstinātus where *prō* means "forward, forth or in favour of" and *crāstinātus* means "of tomorrow." The origin of this term is rooted far back in time. Procrastination has been referenced in several historical texts (e.g., Greek, Persian; Haghbin, 2015; Steel, 2007) as well as major religious texts (e.g., Islam, Hindu, Christianity and Buddhism; Steel & Klingsieck, 2015), which demonstrate that the prevalence of procrastination has existed over the ages. This long history of procrastination eventually made this phenomenon a specific area of interest in the field of psychology more than four decades ago and continues to be an important research topic. Since then, many theories and definitions of procrastination have been proposed and tested to conceptualize and understand the underlying themes and causes of this frequently experienced phenomenon.

In conceptualizing procrastination from a social-scientific perspective, Silver and Sabini (1981) suggested that *irrationality* is central to procrastination. These theorists argued that when procrastinating, people put off their important obligations that they are supposed to take care of first by making decisions in favour of less important activities that provide more pleasure. Working on other tasks that are of low priority, to delay a task that is high on the list of priorities, is indicative of how individuals who procrastinate are rationally short in their thinking (Silver & Sabini, 1981). While supporting Silver and Sabini's notion of procrastination as *irrationally* putting off tasks, Stroud (2010) from a philosophical standpoint contested whether irrationality by itself should be used to

characterize delay in procrastination in a normative sense. Stroud views *irrationality* as the extreme end of the rational-irrational continuum and, therefore, she argued that irrationality might be too strong as a defining term to depict inactions in procrastination. She reasoned that perhaps a better way to understand procrastination is that it is a rational defect or shortcoming. This is because putting off tasks does not necessarily always mean procrastination and, therefore, cannot be considered irrational. Stroud (2010) writes, "Deliberate choice to do some things later rather than now – even when they could be done now – is an inescapable aspect of being a temporally extended rational agent, not a defect in such agency" (p. 53). What is important to consider when understanding a problematic delay like procrastination is whether the original intention to do the task is now or later, and how strong the intention is (Stroud, 2010). Stroud suggested that it is important to look for an adequate definition of procrastination that captures the irrational defect inherent in the intention-action gap, but not as the only evaluative criterion for procrastination.

Distinguishing maladaptive delays from adaptive delays has been an important area of research within the procrastination literature (e.g., Corkin, Yu, & Lindt, 2011; Grunschel, Patrzek, & Fries, 2013; Hensley, 2015; Klingsieck, 2013). Reflecting on this difference, Pychyl (2013) wrote, "all procrastination is delay but not all delay is procrastination." In fact, in investigating the psychology of delay using multiple validity studies, Haghbin (2015; Haghbin & Pychyl, 2015) found that there are specific defining elements that distinguish problematic delay like procrastination from other forms of adaptive delay. And in defining procrastination, besides the rational shortcomings of procrastination, there are also other factors to consider such as voluntary *needless* delay,

intention-action gap, *delaying despite the probable negative consequences*, and *delay accompanied by subjective emotional discomfort and poor outcomes* that are necessary to define procrastination as a specific negative form of delay. These defining characteristics have been also noted in earlier definitions of procrastination. A frequently cited definition of procrastination is by Steel (2007) who states that procrastination is "to voluntarily delay an intended course of action despite expecting to be worse off for the delay" (p. 66). Further refining this definition, Klingsieck (2013) said procrastination could be defined as "the voluntary delay of an intended and necessary and/or [personally] important activity, despite expecting potential negative consequences that outweigh the positive consequences of the delay" (p. 26). The term "voluntary" in these definitions of procrastination by Steel (2007) and Klingsieck (2013), for instance, implies that individuals who procrastinate are making a deliberate choice to delay their work even when they have the intention to act on the task. The rational defect in this delay is that this choice is made knowing that there will be serious consequences in the future. These definitions also reflect that the dysfunctional nature of procrastination does not only stem from maladaptive cognitions or irrational beliefs, but that there are other important defining elements to consider.

More recently, Anderson (2016) has succinctly captured the irrational nature of procrastination with, "culpably unwarranted delay" (p. 47). He explains that individuals who procrastinate do recognize the foolishness of their behaviour and yet they do it anyways. These individuals are guilty of serious errors in their judgement, that is, the unwarranted delay of their important tasks. As such, "…procrastination is something that can be attributed only to those who are struggling with the irrationality of their delay"

(Anderson, 2016, p. 43). This definition by Anderson (2016) is particularly different from the previously noted definitions of procrastination because not only does he account for the seemingly irrational behaviour, but he also highlights the role emotion plays in procrastination, which is also fundamental to understanding procrastination (e.g., Pychyl & Sirois, 2016; Tice & Bratslavsky, 2001). Yet if the entire procrastination literature is carefully reviewed for theories used to conceptualize procrastination, a considerable number of studies have invested time and resources to understand procrastination using cognitive-behavioural theories from the field of clinical psychology (e.g., Balkis, Duru, & Bulus, 2013; Bridges & Roig, 1997; Dryden & Sabelus, 2012; Harrington, 2005; McCown, Blake, & Keiser, 2012) and economic models of rational decision-making from the field of behavioural economics (e.g., Akerlof, 1991; Andreou, 2007; O'Donoghue & Rabin, 1999; König & Kleinmann, 2004; Silver & Sabini, 1981; Steel & König, 2006; Steel, 2007; Rueben, Sapienza & Zingales; 2015). Therefore, the main purpose of this chapter is to provide a detailed overview of the major theories of procrastination with particular focus on cognitive and economic models of procrastination.

I begin by providing a critical review of the studies that used cognitive-behavioural theories to understand procrastination. Then I review the economic models of decision-making used to explain procrastination. The review of these theories would demonstrate why it is necessary to consider both cognitive and affective aspects together to conceptualize procrastination, which is the purpose of my doctoral research.

Cognitive-Behavioural Theories Explaining Irrationality in Procrastination

To explain the irrationality in the paradoxical behaviour of procrastinators, many procrastination researchers have relied heavily on Rational Emotive Behavioural Therapy

(REBT), a form of cognitive-behavioural therapy, developed by Albert Ellis in the late 1950's (Ellis, 1962, 1991). REBT highlights the idea that unfortunate events do not directly lead to emotional disturbances, but how people evaluate these events leads to emotional disturbance. According to REBT, when personal goals are frustrated, two evaluative beliefs (or cognitions) may be activated – rational and irrational beliefs. These activated beliefs entail general evaluative philosophies of the person using which the person interprets their goals and events. Rational beliefs constitute logical and realistic explanations of events or circumstances that result in healthy emotional and behavioural responses. In contrast, irrationality is understood as beliefs that are illogical and unrealistic, and are expressed using absolute languages such as *must*, *should*, *ought to* or *have to* that pose rigid demands and commands. These distorted beliefs contribute to dysfunctional inferences of events triggering certain emotional and behavioural responses that could manifest in psychological problems (e.g., depression; Ellis & Bernard, 1985). Using this perspective, Ellis and colleagues argued that people's irrational beliefs lead to their procrastination. That is, individuals who procrastinate want certain demands to be fulfilled before initiating certain tasks, and if these demands are not fulfilled, then they engage in task-avoidance (Ellis & Bernard, 1985; Ellis & Knaus, 1977). For example, a person might demand that he or she has to be in a good mood or feel comfortable to start writing their academic paper.

In understanding irrational beliefs within the framework of REBT, initially most emphasis was placed on irrational beliefs associated with self-worth. Another concept that later became central to REBT was irrational beliefs associated with frustration intolerance making it an important distinguishing feature of this model (Ellis, 1979, 2003;

Ellis & Dryden, 1987). Subsequently, REBT classified irrational beliefs into two categories:

1) *Evaluation of self-worth* that depends on fulfilling certain conditions in an absolute manner in different situations. For example, “I absolutely *must*, under practically all conditions and at all times, perform well (or outstandingly well).”

2) *Intolerance of frustration*, an erroneous belief that in every situation all conditions should be in my favour. For example, "The conditions under which I live absolutely *must*, at practically all times, be favorable, safe, hassle-free, and quickly and easily enjoyable.”

Ellis (1979, 2003) argued that these two categories of beliefs interact with each other to influence behaviours in different situations but they also have unique relations with psychological problems. In fact, Ellis and Knaus (1977) have suggested that frustration intolerance “constitutes the main and the most direct cause of procrastination” (p. 19). In a way, this statement is basically identifying how emotion-regulation is critical to understanding the self-regulation failure in procrastination even though irrationality in thought processes is the primary focus of the proponents of REBT. Most studies that used the REBT framework to explain procrastination centered their discussion on irrational behaviour and thought processes, not the emotional aspect. In the following section, I discuss the empirical studies that were conducted to explore the irrationality in procrastination within the purview of REBT.

Empirical Studies Examining Procrastination from the Perspective of Rational Emotive Theory

To empirically test the relation between frustration intolerance beliefs and procrastination as speculated by Ellis (1979, 2003), Harrington (2005a) conducted a study using a multidimensional scale that distinguished frustration intolerance beliefs from self-worth beliefs. He used the Frustration-Discomfort Scale (FDS; Harrington 2003), which consists of four dimensions: emotional intolerance, discomfort intolerance, entitlement, and achievement frustration. The results that I found interesting because of their relevance to the present discussion are: 1) only discomfort intolerance showed a significant moderate positive relation to procrastination and task aversiveness; and 2) discomfort intolerance was a unique predictor of increased procrastination frequency. In investigating the relation between frustration tolerance with different self-control problems (e.g., procrastination, comfort eating, overspending, alcohol abuse) in a different study, Harrington (2005b) found that frustration intolerance was related to increased procrastination. Based on these findings, Harrington concluded that it is the intolerance for task difficulty that makes procrastination more likely.

Similarly, in analyzing the content of irrational beliefs, McCown and colleagues (2012) found some themes of low tolerance beliefs described by students while they procrastinated on academic tasks during real events. They wrote that,

> "Common themes we encountered were that they [procrastinating students] believed that they were "stressed too much", that tasks would "ruin my evening," would be "too much to get into," might "leave me exhausted," "hurt my brain," and the like. A theme that repeatedly emerged, though with

> many variations, was not being able to cope with the activating events of deadlines. One student typified these responses: "I'm thinking that if try to get it done, I'll just have a meltdown, so right now, as I furiously type, I'm thinking I shouldn't even try. So that's why when I finish this typing thing, I'll go online for a couple of hours" (McCown, Blake, & Keiser, 2012, p. 220).

This excerpt of students' explanation of their procrastination demonstrates that they experience negative emotions together with irrational thoughts, negative emotions perhaps precipitated by these irrational beliefs. These findings further reflect that emotion misregulation in procrastination needs to be investigated in depth as a key contributing factor to procrastinators' needless task postponement, not simply irrational beliefs alone (Note. I return to this issue of emotion misregulation more fully in the next chapter).

There are yet other studies that used REBT as a framework to investigate the relation between irrational beliefs and procrastination. Solomon and Rothblum (1984) conducted the first empirical study to understand irrational beliefs in relation to procrastination. To determine the reasons for procrastination among a student population, they investigated the relation between a students' self-report measure of procrastination and the reasons why they think they procrastinate. After factor analyzing the reasons for procrastination, two important factors emerged that students frequently identified as their reason for procrastination – fear of failure and task aversiveness – and these factors positively correlated to procrastination. Solomon and Rothblum (1984) also found a significant moderate positive relation between procrastination and general irrational cognitions measured using Ellis' Scale of Irrational Cognitions. Additionally, they found

that irrational beliefs showed a moderate positive relation to students' fear of failure and a small positive relation to task aversiveness. Based on these findings, these researchers concluded that ". . . procrastination is not merely a deficit of study habits or organization of time but involves a complex interaction of behavioural, cognitive and affective components" (p. 509).

Following these preliminary findings, other studies further investigated the link between irrational beliefs and procrastination based on Ellis's conceptualization of procrastination using REBT. Beswick, Rothblum and Mann (1988) found a significant positive relation between irrational beliefs and procrastination, but the magnitude of this relation was small unlike the moderate correlation found in Solomon and Rothblum's (1984) study. Contrary to these findings, Ferrari and Emmons (1994) found no association between these variables. However, in a later study, Ferrari and colleagues (1995) found that higher levels of irrational beliefs held by students was more likely to result in delay of intended tasks compared to students with lower levels of irrational beliefs. These irrational beliefs include over- and under-estimation of amount of time and motivation needed to complete academic tasks and being in the right mood to accomplish them (Ferrari, Johnson, & McCown, 1995).

Given these mixed findings obtained in the earlier studies, Bridges and Roig (1997) contended that the relation between irrational beliefs and procrastination in previous studies was assessed without controlling for the context in which participants completed the self-report measures. Therefore, the significant results obtained in earlier studies could be due to context effect and there might not be any actual relation between irrational beliefs and procrastination. Controlling for context by administering the self-

report measures at 2-3 weeks intervals for separate projects and using a different measure for irrational beliefs called Irrational Beliefs Inventory (IBI) that assesses specific types of beliefs, Bridges and Roig (1997) re-examined the relation between irrational beliefs and procrastination. The specific beliefs measured using the IBI were: worrying, rigidity, problem-avoidance, need for approval and emotional irresponsibility. Results showed a moderate positive relation between procrastination and irrational beliefs, but this relation was evident with the problem-avoidance subscale only. Based on their findings, Bridges and Roig (1997) reasoned that because problem-avoidance involves irrational concerns about decision-making such as fear of failure, avoidance of intended tasks in procrastination acts as a negative reinforcement mechanism to get rid of the fear of failure induced by the tasks that are being avoided.

Even though the studies summarized so far were assessing procrastination in an academic setting, the researchers in these studies used scales that measured people's general irrational beliefs about any task in everyday life instead of irrational beliefs towards specific tasks. Items in the IBI developed by Koopman and colleagues, for instance, included "I avoid facing my problems" or "I usually try to avoid chores which I dislike doing" (Koopmans, Sanderman, Timmerman, & Emmelkemp, 1994). Identifying this problem in the procrastination literature, Balkis and colleagues (2013) reasoned that to understand irrationality in academic procrastination, domain-specific measures of rational/irrational beliefs towards academic tasks should be used. These researchers also took the REBT perspective to conceptualize procrastination as a problematic delay that typically originates from irrational thoughts and conclusions. To investigate the irrational aspect of procrastination, and drawing on social learning theory, Balkis and colleagues

argued that an individual's experiences in a specific situation shape that person's expectation in that situation and these expectations then determine how that person will behave in the same situation in the future. As such, Balkis and colleagues examined students' academic procrastination in relation to their specific academic beliefs using the Academic Rational Beliefs scale (ARBS) developed by Egan, Canale, del Rossario and White (2007; as cited in Balkis, Duru & Bulus, 2013). This scale includes items such as "Good grade regardless of the quality of work" or "Teacher is responsible for how I do in class" to determine irrational beliefs towards academic tasks. Balkis et al. hypothesized that academic rational beliefs would predict academic achievement and this relation would be negatively mediated by academic procrastination and time preferences to study the night before the exam. In this study, students' time preference was assessed by asking them to rate whether they prefer to study daily, a month before the exam, a week before the exam or the night before the exam on a 1 (never) to 5 (always) Likert-type scale. Using an experience sampling design, these researchers found a moderate to large negative correlation between academic procrastination and academic rational beliefs. They also found that time preferences (i.e., preference to study the night before) and academic procrastination fully negatively mediated the relation between academic rational beliefs and academic achievement. Based on their findings, Balkis and colleagues concluded that:

> "Part of irrationality of procrastinators may be in their failure to regulate evaluating, structuring, and managing study time and study behaviors. Procrastinators may be unwilling to begin work or study for exams due to the fact that procrastinators tend to overestimate or underestimate the amount of

> time required to complete a task. On the other hand, it may conclude that procrastinators have planning fallacy or planning fallacy might be one of the causes of procrastination" (p. 836).

While the negative link between academic rational beliefs and academic procrastination in Balkis and colleagues' (2013) study is an important finding which is congruent with the findings of both previous (e.g., Beswick et al., 1988; Bridges & Roig, 1997; Solomon & Rothblum, 1984) and more recent studies (e.g., Haghbin & Pychyl, 2015), identifying time management issues as part of irrational beliefs that contributes to procrastination or the idea that procrastinators demonstrate planning fallacy is inaccurate. Similar claims were made by Ferrari et al. (1995) where they reasoned that procrastinator's unrealistic, irrational expectations include time management problems. However, a study conducted by Pychyl, Morin and Salmon (2000) showed that when making accurate study plans, procrastinators and non-procrastinators do not differ from each other. More specifically, they found that procrastinators do not demonstrate any planning fallacy (Kahneman & Tversky, 1979), that is, the optimistic biased prediction about time needed to complete a task without taking into consideration one's past experience where similar tasks were not completed in that estimated amount of time. In fact, procrastinators can accurately estimate the amount of time they expected to spend on academic work just like the non-procrastinators, and they also account for the delay they might engage in when they create their study plans which allows for the accuracy in time estimation (Pychyl et al., 2000). Nevertheless, procrastinators start working on their projects late, closer to deadlines, suffering the adverse consequences for their delay (Lay & Burns, 1991; Pychyl et al., 2000; Tice & Baumeister, 1997). Researchers have argued

that procrastination is more than just a time management problem (Solomon & Rothblum, 1984; Bridges & Roig, 1997) and the findings by Pychyl and colleagues (2000) show that procrastination is, in fact, not a time management problem related to a bias like the planning fallacy. Therefore, the inability to accurately estimate or manage time certainly should not be included as an irrational belief to understand procrastination.

An alternate explanation that should be considered in understanding the irrationality in procrastination is the emotion-focused coping problem. The needless avoidance of tasks is not only about what preconceived beliefs procrastinators have about the tasks, but also about the how they feel about those tasks. Indeed, our initial cognitive appraisal of different events can lead to specific emotional reactions to those events, but it is also possible that our preference or desire to reach a certain emotional state could shape our appraisals of situations (e.g., Gross 1998, 2013, 2014). As such, a more appropriate understanding of why people behave or act in a certain way in different situations can be obtained by examining the interplay of their emotions and cognitions together. As I have identified, there are a number of issues in understanding irrationality as inherent to procrastination from the REBT perspective. In the following section, I discuss the limitations of REBT and how this theory falls short on conceptualizing procrastination.

Limitations Associated with REBT in Understanding Procrastination

As REBT centers on the role of beliefs (rational/irrational), which have an influence on our emotions, David and Cramer (2010) reasoned that this theory falls under the “hot” cognitions of Abelson and Rosenberg’s (1958) dual-process model of “hot” and “cold” cognitions. According to David and Cramer (2010), proponents of cognitive-

behavioural theories have taken different routes to understanding how cognitions impact behaviours. Some researchers have focused on "cold" cognitions that explore how people form cognitive representations (i.e., schema, attributions, automatic thoughts) of their surroundings in human emotions; whereas other researchers have focused on "hot" cognitions that explore the role of appraisals/evaluations in human emotions which are relevant to personal well-being, that is, hot cognitions evaluate the cold cognitions. Simply stated, "cold cognitions represent what "is," whereas hot cognitions represent how desirable what we think 'is'" (David, Freeman, & Di Giuseppe, 2010, p. 203). Based on this explanation, David and Cramer (2010) argued that REBT theory falls under the premise of "hot" cognitions, because people are using their emotions to appraise or evaluate the events, they originally formed using cold cognitions.

The limitation of REBT theory is that it does not account for automatic responses where negative appraisals of cold cognitions repeatedly could create distorted cold cognitions. Put another way, REBT does not recognize the link between hot and cold cognitions and that hot cognitions driven by emotions can gain more control over cold cognitions is not considered (David & Cramer, 2010). For example, an individual who never tried yoga might have a preconceived belief that yoga is a healthy exercise based on what he or she has read or heard about yoga in the past. However, after having two separate injuries while practicing yoga, he or she might become fearful of yoga and appraise this exercise as being difficult and risky. Based on the assumptions of dual-process model of hot and cold cognitions, he or she could experience an automatic response of negative emotions (i.e., fear) the next time he or she hears about yoga, ultimately leading to avoidance of yoga. REBT theorists would explain the same example

only using hot cognitions where the negative experience during yoga is expected to generate the irrational beliefs that yoga is hard and risky, which would generate the emotional response of fear and their avoidance of yoga. David and Cramer (2010) argued that REBT theory falls short on understanding the complexity of human behaviour and as such, this theory needs to be modified to investigate the interplay of hot and cold cognitions to explain behaviour.

This line of reasoning further illustrates that the simplified understanding of cognition leading to emotional and behavioural responses as in the case of REBT model is insufficient to understand more complex behaviour such as procrastination. It is important to consider not only the irrational justification of the delay, but also the emotional states that are desirable to procrastinators, which are contributing to their delay. As a matter of fact, support for emotion-regulation problems in procrastination has been found in a recent study. Eckert and colleagues (2016) have found links between procrastination and emotions-regulation (ER) skills where procrastinators showed low ability to tolerate and modify aversive emotions among several other ER skills and were less aware of their emotions (Eckert, Ebert, Lehr, Sieland, & Berking, 2016). Based on their findings Eckert and colleagues concluded that,

> “. . . the ability to modify aversive emotions may be important for emotional processing (like awareness or sensation), whereas the ability to tolerate aversive emotions seems to be necessary for all adaptive emotional responses and processes, in order to deal with aversive or boring tasks. This is highly plausible, because individuals, who are not able to tolerate aversive emotions, will postpone or avoid aversive or boring tasks. Then they will have no

> reason to become aware of these emotional states, to understand, nor to modify them."

Eckert and colleagues (2016) also found that an online-based systematic training targeted at increasing emotional tolerance and modifying task-induced aversive emotions can reduce procrastination and increase approach behaviour towards goals. In light of these findings, it is not surprising why the results of interventions focusing on self-management strategies (e.g., goal setting, goal monitoring, time management, planning; see Schouwenburg, Lay, Pychyl, & Ferrari, 2004) or cognitive/REBT-based practice aiming to modify only dysfunctional cognitions (e.g., Burka & Yuen, 1983; Dryden, 2012) are ambiguous and have not been entirely successful in reducing procrastination. What is being neglected in these interventions is the idea that how we manage emotions can be dysfunctional too. When making choices, we may at times think without emotions but we also think with emotions. In many instances, we are not even actively aware of our emotions (e.g., Eckert et al., 2016) or the fact that we are making decisions using our emotions to feel better as in the case of procrastination (e.g., Tice, Bratslavsky & Baumeister, 2001). The reciprocal relation between the regulation of emotions and self-defeating thought processes needs to be considered together to conceptualize procrastination in order to develop effective interventions, which is lacking in the current cognitive-behavioural models of procrastination. Similar limitations are also evident in the economic models of decision-making of procrastination, which I discuss next.

Rationalistic and Economic Models of Decision-Making to Explain Procrastination

Another line of research explored procrastination using rationalistic models of decision-making are found in the field of social psychology (i.e., expectancy theory; e.g.,

Silver and Sabini, 1981) and economic models from the field of behavioural economics (i.e., hyperbolic discounting; e.g., Ainslie, 1975). Researchers in both fields of study do share a common interest to understand complex human behaviour like procrastination based on cognitive processes, but they differ in their interpretation of what drives procrastinators to avoid their important tasks. In this section, I first discuss how researchers used expectancy theory to explain procrastination. Then I discuss how mathematical models of decision-making like hyperbolic discounting have been used to conceptualize procrastination. In discussing these models, I provide a critical review of these models discussing their strengths and limitations.

Expectancy Theory of Decision-Making to Understand Procrastination

Expectancy theory explains decision-making as a rational process controlled by the agent who is making the choice. According to this theory, an agent is motivated to pursue a specific choice based on the greatest expected value and how desirable the outcome of the choice is (Vroom 1964, as cited in Oliver, 1974). Even though expectancy theory posits that an individual is making a rational choice, a choice that seems rational to the agent could easily become an irrational one if the agent does not carefully consider the outcomes of the alternate choices he or she has (Oliver, 1974). For example, when buying a new dishwasher, a person might consider buying a cheaper one that will cost less money at present and, therefore, seems to be a rational choice. However, this person ignores the point that there is a high probability that this dishwasher would last only a year. In this sense, buying a dishwasher that is cheaper might not be a rational choice, because if he or she has to purchase another one in a year then this will actually cost more money to buy the less expensive one now.

Considering this difference in rational and irrational choices, as explained in the expectancy model, Silver and Sabini (1981) stated, "procrastination is inherently irrational" (p. 218). As I mentioned earlier, these authors first introduced irrationality as a central characteristic of procrastination and to defend their claim they used different hypothetical scenarios involving delay to distinguish problematic delay like procrastination from other types of delay that are not maladaptive in nature. From their inspection of hypothetical scenarios, they summarized four characteristics that can be used to recognize procrastination: 1) less important obligations are selected to put off more important obligations; 2) minor pleasures experienced from less important obligations are preferred over substantial pleasure that can be gained from more important obligations and this choice is made based on calculations that are rationally short; 3) there is a dramatic attempt to convince self that work is being done but the task is actually being put off because it is aversive (e.g., bringing textbooks to vacation which induces a false sense of satisfaction that a step was taken but not being able to start reading); and 4) tasks are delayed because there is no set criteria to proceed with these tasks (e.g., a student needs to write an essay for a course that does not include any clear instructions from the Professor). Considering these points Silver and Sabini (1981) concluded that

> ". . . putting offs are procrastination only when they are irrational and the irrationality is caused by recognizing (or fancying) what one ought to be doing. The irrationality can be self-serving *belief* e.g., an obligation will go away if ignored, or, free-floating ulterior want, e.g., a transient desire to have a spotless house only near deadlines. Thus only agents capable of recognizing

> what they ought to do are capable of procrastinating; it is an irrationality parasitic on rationality" (Silver & Sabini, 1981, p. 211).

This definition together with the four aspects of procrastination by Silver and Sabini (1981) also explained some other important themes besides irrationality. These authors indirectly explained how procrastination is an issue of self-regulation when they discussed how procrastinators show preference for alternate obligations to obtain immediate minor pleasures while ignoring major obligations with greater rewards. Although Silver and Sabini (1981) did not make a direct reference to self-regulation failure in procrastination, they introduced the possibility by noting procrastinators' inability to delay gratification. They also discussed the role of task aversiveness in relation to procrastination, and they explained that procrastinators delay tasks that they find aversive and use other more desirable tasks to avoid these aversive tasks. These interpretations are in line with the current conceptualization of procrastination, and currently there are ample empirical findings for both self-regulation failure (e.g., Dietz, Hofer, & Fries, 2007; Tice & Baumeister, 1997; Van Eerde, 2000) and task-aversiveness (e.g., Blunt & Pychyl, 2000; Haghbin & Pychyl, 2015; Solomon & Rothblum, 1984) in relation to procrastination.

Silver and Sabini's (1981) rationalistic perspective provided some valuable insight into the conceptualization of procrastination identifying how procrastinators makes irrational decisions to avoid important tasks. However, the explanatory power of some of the assumptions to understand procrastination is questionable. One of the assumptions by Silver and Sabini explains that procrastinators always perform a rational calculation based on distorted beliefs when making a decision to delay important tasks.

The authors ignored some of the habits created through automaticity (e.g., Spunt & Lieberman, 2014). People do not always actively evaluate the choices that they make, particularly when people act on their emotional impulses to make decisions (e.g., Krieglmeyer, Wittstadt, & Strack, 2009; Lambie, 2008). This can be demonstrated in an example. Jessie has a habit of eating chocolates when she studies. Recently, she decided to go on a healthy diet and when she made this choice, she also decides to avoid chocolates when studying. However, due to her previous habits, sometimes she falls into the trap of eating chocolates when studying. Other times, she simply gives in to eating chocolates because of her love for chocolates when studying (i.e., a decision made based on emotions). In both cases, she is making a decision without weighing the pros and cons of her actions on her diet. Lambie (2008) theorized that people could make many erroneous decisions when they are impulsively made based on emotions. Only when people are aware of these emotions can they possibly change their choice to an adaptive one. This is also true of procrastination, because as Eckert and colleagues' (2016) findings demonstrated, individuals who procrastinate are less aware of their emotions but with systematic training, these individuals can become more aware of their emotions to tolerate and modify them (see discussion in the previous section). Being aware of one's emotions is important for effective emotion-regulation in problematic behaviour like procrastination.

Yet, another possibility for Jessie' chocolate consumption might be her reduced ability to inhibit chocolate when she has course readings that are intense in nature. Studies have empirically demonstrated that increased cognitive load on one task can result in self-control depletion and can reduce the ability to exert self-control on other

tasks (e.g., Baumeister, Vohs, & Tice, 2007; Friese et al., 2008; Shiv & Fedorikhin, 1999; Vohs et al., 2008). Thus, it makes little sense to presume that procrastinators are always making rational calculations that are irrationally flawed to justify their task-delay as Silver and Sabini (1981) suggested in their theoretical explanation of procrastination.

Additionally, the assumption that procrastinators take some dramatic measures to convince themselves that they are working on their important tasks when they are not (i.e., the "procrastination field") is not convincing nor supported by research, as it might not apply to all individuals who procrastinate. For example, a student procrastinating from an academic task may simply binge watch Netflix as opposed to maintaining an apparent readiness to work as part of the "procrastination field" concept.

Similarly, there is no empirical evidence to support the assumption that procrastination is more likely when a task lacks clear criteria. To understand the difference in goal-pursuit tendencies, individual differences such as conscientiousness, neuroticism, self-regulation, self-esteem and self-efficacy need to be considered to understand why a lack of guidelines would increase the likelihood for procrastinators to avoid their important tasks while non-procrastinators would pursue them. In fact, researchers have found evidence for personality traits (e.g., low conscientiousness and high neuroticism; Lay, 1997; Watson, 2001; Steel & Klingsieck, 2016) and self-related variables (e.g., self-regulation failure, low self-esteem, low self-efficacy; Klassen, Krawchuk, & Rajani, 2008; Van Eerde, 2000). An alternate explanation could be that *some* procrastinators find a lack of guidelines for tasks to be aversive in nature and this aversive quality of the tasks increases the likelihood of their needless delay. It is the task aversiveness in general that makes procrastination more likely for which researchers have

found ample evidence (e.g., Blunt & Pychyl, 2000) and not one specific aversive quality per se.

The limitations of these assumptions by Silver and Sabini (1981) seem to have resulted from assessing few hypothetical scenarios making the generalizability of these assumptions quite difficult. Moreover, the important role of time in procrastination as often encountered in the form of deadlines is not recognized in the expectancy model of choice and decision-making. Silver and Sabini (1981) discussed task deadlines only briefly to explain how the desire to accomplish other tasks (e.g., desire to have a spotless house) rather than academic tasks (e.g., writing an essay) surface when deadlines approaches. To account for the function of time, several procrastination researchers and behavioural economists have used models such as hyperbolic discounting from behavioural economics. Hyperbolic discounting postulates that in the choice between two tasks, people tend to choose the task that offers rewards sooner even though smaller in value as opposed to the other task that offers larger-later rewards. Using this theory, these researchers argued that individuals who procrastinate tend to focus on the smaller rewards available now while ignoring the important larger rewards available later. In the following section, I discuss the hyperbolic discounting in-depth and how this theory has been utilized to explain the needless deferral of important tasks in procrastination. In this section, I also review the empirical findings from studies that investigated and demonstrated the avoidance behaviour in procrastination using hyperbolic functions.

Hyperbolic Discounting to Understand Procrastination

When making choices between different options, we would think we would consider the choice with better and larger rewards. However, it is not as simple when the

options are offered at different time points, in other words, when choice also involves a temporal element. Using the notion of intertemporal choice, behavioural economists have explained how people make decisions when they have to make such choices, and they have used this concept to develop different models of decision-making.

Intertemporal choice is the process of making choices between options with different consequences that are situated at different time points. The relative values associated with these options are different, thereby, a choice is made by making a trade-off between costs and benefits (e.g., Berns, Laibson, & Loewenstein, 2007; Frederick, Loewenstein, & O'Donoghue, 2002). Intertemporal choice was originally introduced by the Scottish economist John Rae in 1834 who wanted to determine why wealth differed between different nations (as cited in Frederick et al., 2002). Interestingly, Rae took a psychological perspective and argued that savings and investment differ among countries because of "the effective desire of accumulation" (p. 353), and this desire is affected by intertemporal choice. Rae further explained that trade-offs in intertemporal choice depends on immediate *feelings* – immediate pleasure of anticipation and immediate discomfort. In this regard, the desire to accumulate wealth can be limited by the pleasure associated with immediate consumption and the discomfort associated with deferring gratification. People's ability to imagine the future and how they generally handle the pain associated with deferring gratification can alter the choice people make (as cited in Frederick et al., 2002). Taking a similar perspective, Bohm-Bawerk (1889) posited that, ". . . humans suffer from a systematic tendency to underestimate future wants" meaning it is the deficit in people's ability to imagine the future outcomes that makes them shortsighted, and they make choices accordingly (as cited in Frederick et al., 2002).

Later, Paul Samuelson (1937) developed the *discounted utility* model (also known as exponential discounting) to explain how people actually make intertemporal choices. For approximately 80 years, neoclassical economists used this discounted utility model to analyze how people made decisions about investments, savings, public policies, education, diet, exercise, health and so forth (e.g., Berns et al., 2007; Frederick et al., 2002). Discounted utility is a time-consistent model that postulates that the utility (i.e., the desire or motivation) of the future outcomes diminishes when the time required to obtain the outcomes increases. The time consistency in this model suggests that future rewards are discounted at a constant rate (decreases exponentially) with each unit increase in wait time (Frederick et al., 2002). Based on this assumption, if a person prefers the larger reward between $100 now and $150 in a year then his preference will not change (i.e., he will always choose the larger reward) if he is offered $100 in a year and $150 dollar in two years because the discount rate per year remains the same in both cases. This means that in the absence of new information, the order of preference for reward would remain the same over time. The discounting of future rewards would only depend on how long people have to wait for the reward given that the discount rate is constant.

There are a number of anomalies associated with the assumptions of a discounted utility model. Most notably, this model does not account for preference reversal and how the discount rate decreases over time during decision-making. Discounted utility models imply that “resolutions once made are never broken” (Berns et al., 2007, p. 3), then under this notion, self-regulation failure in people would be a challenging concept to understand. In a way, the perspective of behavioural economists on the decision-making

process is not surprising because there is a difference in how decision-making is understood by psychologists and behavioural economists. Whereas psychologists concentrate on different psychological mechanisms and individual difference variables (e.g., personality) to understand intertemporal choice, behavioural economists focus on building models for more general tendencies of how people make decisions. Behavioural economists derive these models based on mathematical functions and formulas to predict what generally motivates people to make certain choices and how they will make decisions in the future without probing into individual differences in behaviour. Discounted utility is one such economic model that primarily examined human decision-making through a mathematical lens ignoring the complexity of human behaviour where there is no consistency.

The limitations of the discounted utility model led to the formulation of another popular model of intertemporal choice called the *hyperbolic discounting model*, which was originally proposed by the psychologist Richard Herrnstein and focuses on preferences specific to the moment (Frederick et al., 2002). Further extending this idea, integrating learning theory and hyperbolic discounting, George Ainslie (1975, 1992) reasoned that the overall utility of future rewards is discounted more when the delay associated with obtaining future rewards increases and this pattern follows a hyperbolic curve as illustrated in Figure 1-1. In this graph, the utility of a future reward has been presented as a function of time. The shape of this curve explains that the utility to obtain a future reward is lowest at present (point A), but as the delay to obtain the reward shortens, the utility of the reward increases rapidly reaching maximum utility at the time when the reward is obtained (point B). Given this rationale, when people are given two

choices where one choice includes a smaller reward that is immediately available and the other choice is a greater reward available later, people are more likely to prefer the smaller reward now. Indeed, people could prefer the smaller sooner reward for a rational reason (e.g., they have an urgent need). However, even when people do not have any need or any rational reason, many people choose the smaller, immediately available reward. Ainslie (1975) provided a psychological explanation for this behaviour. He stated that it is the impulsive tendency of people that alters their overall utility to prefer sooner smaller rewards and discount future greater rewards. This impulsive, unpremeditated choice can be only understood using a hyperbolic function rather than an exponential one.

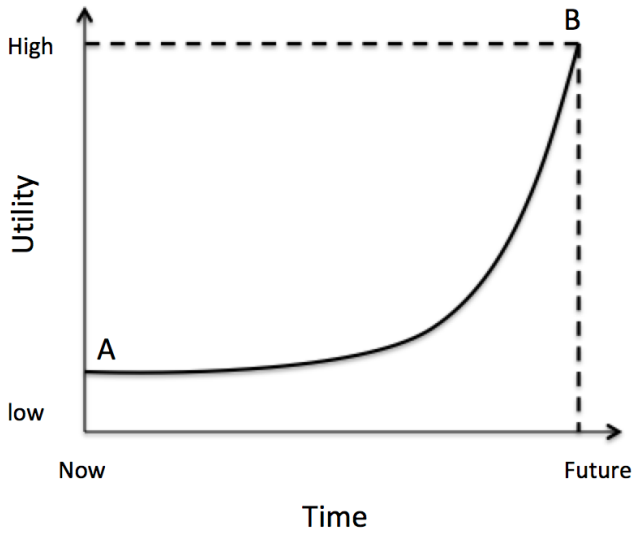


Figure 1-1

Utility (i.e., desire or motivation) of future rewards as a function of time in hyperbolic discounting (Note. Point A represents minimum utility of future reward and point B represents the maximum utility of future rewards[1])

[1] Figure 1-1 has been derived from Ainslie (1975) with some details altered to suit the present discussion.

The hyperbolic curve demonstrates that how people make decisions is actually time inconsistent unlike the discounted utility model. When people are given a choice between a larger future reward and a smaller sooner reward, if they are told now that the choices are separated by time, people are more likely to discount the future reward, but when both rewards are situated in the long-term the future reward is discounted less (Ainslie, 1975). Studies have found that when given the preference between $100 now and $110 in 30 days, many people chose the option of $100. However, when the same choice is offered in the future, that is, $100 is offered in 30 days and $110 in 31 days, people tend to prefer the $110. Thus, depending on when the choices are presented to people, the options they choose tend to change indicating inconsistencies over time (e.g., Kirby & Herrnstein, 1995), and empirical evidence actually supports this notion (Reuben, Sapienza, & Zingales, 2015). Interestingly, the same pattern of choice behaviour is also observed in animals (e.g., Ainslie, 1974; Ainslie & Herrnstein, 1981; Chung & Herrnstein, 1967). According to Ainslie (1975), this pattern of behaviour further indicates that people are impulsive when making choices in the short-term, but are more patient and rational when making the same choices in the long-term.

Hyperbolic discounting can also predict preference reversal between choices, which is an observed phenomenon in different circumstances in everyday life and yet is unaccounted for in the much simplified discounted utility model. Contrary to how choices are made in reality, the discounted utility model makes a rather simple prediction that a certain preference among different options made by a person at the moment will remain dynamically consistent over time unless there is new information about the choices (Ainslie, 1975; 2016; Berns et al., 2007). For example, a once made resolution to

quit smoking will continue unless there is new information to change this decision. What the discounted utility model disregards is that it is possible for a person to alter or modify his preference at any time. Experiencing preference reversal is fairly common. In different circumstances people change or discontinue their plan that was made earlier.

It is also possible for a person to mistrust their future-self at some point and make a choice that is present-oriented, despite the dire consequences of that mistrust which hyperbolic discounting takes into consideration (Ainslie, 2016). For example, a person who decided to quit smoking could relapse. When people have to make decisions among different options that are separated by time, initially they might actually choose distal rewards, which are of greater magnitude than the other proximal options. However, this preference could change as the delay shortens for the proximal ones compared to the distal rewards. Figure 1-2 illustrates an example of how hyperbolic function accounts for preference reversal. In this example, lets say Logan is driving and he is approximately two hours away from home. He realizes that it is almost time for dinner. On the one hand, he has the option of having fast food, which is quite unhealthy but is only one hour away. On the other hand, he can wait two hours because he is not that hungry and can have an already prepared good healthy meal at home. The two curves in Figure 1-2 represent two different choices. The solid curve represents having dinner at home and the dotted curve represents having fast food. In this graph, t_1 and t_2 shows the time at which the maximum utility of fast food and dinner at home can be obtained, respectively. Initially, Logan valued (greater utility) the decision to go home to have a healthy dinner more than having fast food even though he has to wait longer (as demonstrated by the solid curve being higher than the dotted curve initially). However, as time passed and he was closer to the

restaurant, the value of eating fast food despite being an unhealthy option is discounted much less than the delayed rewards of eating healthy dinner at home. The utility function of eating fast food is more likely to crossover the utility function for eating at home demonstrating a reversal in preference for food.

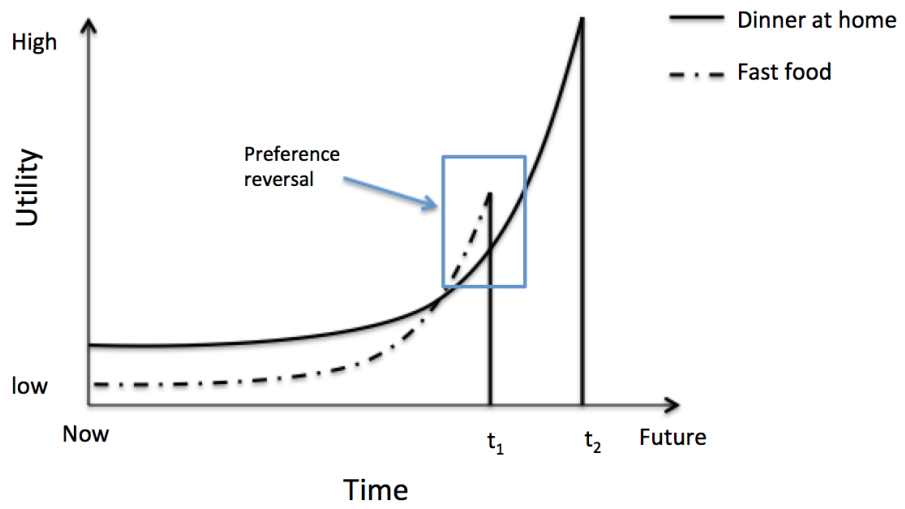


Figure 1-2

Preference reversal between two choices. (Note. The two choices are having dinner at home (solid curve) and having fast food (dotted curve), presented as a function of time in hyperbolic discounting. t_1 and t_2 shows the times at which the maximum utility of fast food and dinner at home can be obtained, respectively. The blue box indicates the reversal of preference between the two choices)

From the principle of hyperbolic discounting, people tend to choose the smaller reward more often when there is a bargain between a small reward now and a larger future reward, thus limiting people's choice to be more present-focused and less future-oriented. Simply stated, people want their rewards now as opposed to later because

rewards situated in the future seems to be less appealing than rewards that are available now. Ainslie (1975) referred to this temporary attractiveness of smaller rewards as *specious*. The superficial attractive appearance of small rewards can make people succumb to impulsively choose these rewards demonstrating a breakdown of self-regulation.

Researchers have used hyperbolic discounting to explain self-regulation failure in drug addiction, alcohol abuse and gambling where individuals discount future outcome at a much greater rate. Procrastination is another such instance of self-regulation failure and it is not surprising that researchers have attempted to explain this self-defeating phenomenon using hyperbolic discounting (e.g., O'Donoghue & Rabin, 1999; Steel, 2007). Using Ainslie's theory, Pychyl and colleagues (2000) explained that procrastination can be construed as a choice between two tasks – immediately available enjoyable tasks and aversive tasks with better rewards in the long-term. In procrastination, the preference tends to be for the specious rewards, which act as a reinforcement to avoid the aversive long-term goal (Pychyl et al., 2000).

Ainslie (1975, 1992) claims that discounting future rewards during decision-making is a natural tendency for both humans and nonhumans. This natural spontaneous tendency can be changed through learning to exert self-control to select the larger long-term rewards over the tempting inferior rewards in the short-term (Ainslie & Haslam, 1992a). Under this argument, the preference for long-term rewards is a rational choice, which is or can be learned. Strategies such as precommitting to the long-term goals can be learned to reduce the ambivalence towards short-term goals. Through this self-commitment to the future-self, people can reinforce specious rewards to be undesirable

(Ainslie, 1975; 1992). However, certain emotions experienced during goal pursuits can also contribute to people choosing smaller immediate rewards over important future goals and inhibiting such emotions through precommitment is also important (Ainslie & Haslam 1992b). This is consistent with Tice and Bratslavsky's (2000) claim that inability to regulate emotions contributes to self-regulation failure in various life goals (e.g., diet, exercise, education, health). Based on this rationale, Pychyl and colleagues (2000) explained that the negative affect experienced by procrastinators during the pursuit of unpleasant academic tasks can shift their focus towards specious competitors to receive temporary relief from the negative affect (Pychyl et al., 2000).

To understand procrastination within this hyperbolic framework, economist Akerlof (1991) provided a different psychological explanation focusing on the role of *salience* or *vividness* of rewards. He derived this explanation using one of the principles of cognitive psychology that people are more attentive to salient events than nonsalient events. The saliency of the events makes people more perceptive of those events. Based on this notion, Akerlof stated "Procrastination occurs when present costs are unduly salient in comparison with future costs, leading individuals to postpone tasks until tomorrow without foreseeing that when tomorrow comes, the required action will be delayed yet again." The unwarranted salience of present rewards can possibly make procrastinators lose sight of the gain from the long-term goals, which leads to their discounting of future rewards. Akerlof (1991) further argues that this error in judgement in procrastination is repeated many times meaning procrastination is not simply one instance of self-regulation failure but many. With each error, procrastinators pay a small cost (e.g., losing valuable time to work on the task), but if the cumulative effect is

considered, the consequences are quite serious when the deadline approaches (e.g., pulling an all-nighter to complete the task). Another possibility for procrastinators' ignorance towards a future course of actions is that they are unable to realize the small cost they are paying each time when they are delaying their important future goals. It is then understandable why procrastinators are unaware that their utilities for present and future rewards are changing (Akerlof, 1991).

Like Akerlof (1991), O'Donoghue and Rabin (1999) also considered the self-control issues in procrastination and analyzed these in relation to procrastinators' present-biased preferences. However, they argued that the inclination to give in to immediate gratification in procrastination not only depends on whether the choices involve immediate costs or immediate rewards, but also on people's level of sophistication (i.e., degree of awareness of their future self-control problems). O'Donoghue and Rabin (1999) argued that in describing procrastinators Akerlof (1991) supposes that procrastinators are *naïve* individuals, that is, people who fail to foresee any future self-control failure. Naïve individuals think that their future selves will make a better decision than their present selves without recognizing they might not behave how they predicted. O'Donoghue and Rabin (1999) argued that people can be *sophisticated* who can actually foresee their future self-control failure. The timing of task rewards together with people's level of sophistication better explain how people anticipate their future preference would be, ultimately affecting their goal pursuits and procrastination.

O'Donoghue and Rabin (1999) explain that when a task is unpleasant, a naïve person is more likely to procrastinate. Given the unpleasantness of the task, a naïve person would irrationally think that they will work on it tomorrow without recognizing

that they will make the same decision tomorrow where the task will be postponed. In contrast, a sophisticated individual will behave differently because they are well aware that if they delays the task today, they might delay it again tomorrow. Knowing how costly task delay can be, a sophisticated person is more likely to work on the task today. However, when it is about resisting temptations, a sophisticated person's behaviour might not be consistent. This is because a sophisticated person can anticipate how their future self will behave and if this person thinks that their future self is more likely to give in to temptations then they will not try to resist his temptation at present. In this case, a sophisticated person under this circumstance is likely to procrastinate. As a result, Akerlof's (1991) reasoning is not entirely true because both naïve and sophisticated people show present-biased preferences and can procrastinate (O'Donoghue & Rabin, 1999).

In reality, when we make decisions, it is not always a choice between two options. There are times when we have multiple options to choose from. In other research articles, O'Donoghue and Rabin (2001a, 2001b) discussed how people choose which task to do and when to do it during goal pursuits when there are multiple choices to consider. Ideally, given the assumption of a rational agent, a task with the highest benefits will be chosen, when this task will be completed depends on the availability of alternate immediate tasks. For example, a person who is supposed to work on a long-term goal postpones this task because he or she finds an alternate seemingly more lucrative task to do now. However, after the person starts to work on this second task, if he or she realizes that this new option is increasingly onerous and he or she is unable to keep up with the demands of the task (i.e., need to exert more self-control than initially anticipated), the

person will procrastinate. He or she is more likely to choose a third option that has more benefits and less cost associated with it at present. O'Donoghue and Rabin (2001a, 2001b) also speculated that people would procrastinate on important tasks more than unimportant tasks. Important tasks tend to appear more attractive temporarily to a person and make the person more ambitious to take on this opportunity. However, important tasks can come with the cost of requiring more effort, which a person does not necessarily realize, and this could result in their procrastination.

Complexity during goal pursuits could also arise when tasks involve multiple stages that need to be successfully accomplished in order to complete the tasks (O'Donoghue & Rabin, 2008). Not all tasks involve one simple step that can be completed right away once started. Certain long-term projects include steps that need more work at the beginning, but the later stages require relatively less effort. Other long-term tasks need more effort in the later stages and not so much at the beginning. O'Donoghue and Rabin (2008) argue that naïve individuals working on projects that require more effort in the first stage can finish the whole task if they can get past the first stage, but if they are unable to exert sufficient effort on the very first step, then they are likely to procrastinate. Similarly, in projects with a more intense last stage, naïve people could finish the initial stages successfully, but they might avoid working on the later stages of their project. This is because they need to put in a lot of effort to finish this final stage, which they fail to do. As a result, they procrastinate. The partial completion of their projects does not yield the rewards or benefits that they expected they would receive if the projects were completed.

Taken together, O'Donoghue and Rabin (1999, 2001a, 2001b, 2008) discussed some important aspects of why people procrastinate. They highlighted that economic models should bring together both task characteristics (e.g., costs, rewards, aversiveness) and psychological factors (i.e., awareness or "sophistication" of self-control problems) to understand people's decision-making processes as it allows for a better understanding of problematic behaviours like procrastination. However, the studies discussed so far only provided some interesting theoretical insight into how hyperbolic discounting can explain the problematic task delay in procrastination.

In response, some authors have contested that without empirical evidence it is difficult to assert that the seemingly irrational delay is actually due to the discounting of desired long-term goals compared to immediate specious goals (e.g., Dewitte & Schouwenburg, 2002; Koch & Kleinmann, 2004; Schouwenburg & Groenewoud, 2001). These authors formulated some testable hypotheses to validate whether the underlying assumptions of hyperbolic discounting model actually explains procrastination. In the following section I discuss these hypotheses and the findings from these studies to demonstrate how researchers explained procrastination using hyperbolic discounting.

Empirical studies examining procrastination using hyperbolic discounting model. Based on the principles of hyperbolic discounting, Schouwenburg and Groenewoud (2001) examined whether study motivation under different social temptations follow a hyperbolic discounting pattern prior to an exam. Using mental simulation, these researchers asked students to imagine that they have an exam at the end of their 12-week long semester and report how they think their study motivation would be during the semester. Student's hypothetical study motivation was measured in three

ways: 1) general level of motivation towards studying; 2) level of resistance to temptations; and 3) number of hours spent studying each day during a week. Schouwenburg and Groenewoud (2001) used the following formula to estimate the general discounting mechanism:

$$Perceived\ value = \frac{nominal\ value}{1+k \times delay} + constant \qquad (1)$$

In this equation, the perceived value is the actual study motivation experienced during a given time point, the nominal value is the ideal study motivation, and delay is the amount of time a person has to wait. Parameter *k* represents the rate of discounting of nominal value (higher values indicate steeper discounting; see Equation 1). Ainslie (1975) explained utility discounting as a universal characteristic for all human beings that can be modified through learning. Value of *k* could, therefore, vary among people due to individual differences which is why Schouwenburg and Groenewoud (2001) expected that procrastinators would have a higher *k* value than non-procrastinators in general meaning procrastinators are inherently inclined to discount future rewards more than non-procrastinators. The constant in this equation was added to obtain a visually best-fit curve on the data points.

Plotting the perceived motivational value of studying as a function of time (i.e., number of days across the semester) generated a hyperbolic pattern. Based on this single hyperbolic curve, Schouwenburg and Groenewoud (2001) concluded that students were less willing to resist temptations to study for the exam when it was early in the semester, but they started to resist their temptations more as the exam approached. However, it is important to note that contrary to a typical hyperbolic pattern that shows a steep curvature

closer to deadline, the pattern obtained in this study was more gradual. Schouwenburg and Groenewoud (2001) also plotted the amount of time spent studying as a function of number of days across the semester and found a hyperbolic pattern similar to the hyperbolic pattern obtained for general motivation towards studying and willingness to resist temptation. Their results also showed that procrastinators significantly differed from non-procrastinators on the hours of time spent studying, but did not differ on general motivation for studying or in resisting social temptations. In terms of delay discounting, procrastinators discounted future rewards more than non-procrastinators as demonstrated through higher *k*-value which was consistent with the assumption of hyperbolic discounting.

Based on these findings, Schouwenburg and Groenewoud (2001) concluded that procrastinators do not have any motivational deficits or problems in resisting temptations. Instead, procrastination reflects a problem with the behaviour as opposed to a problem with the intention. This is because procrastinators do not differ from non-procrastinators in terms of intentions to work on their tasks; they differ in terms of behaviour, which is acting on their intentions to complete their tasks. Because the results did not entirely match their prediction, these researchers speculated that mental simulation possibly did not capture how people actually behave during goal pursuits.

For this reason, in a subsequent study, Dewitte and Schouwenburg (2002) assessed students' actual study behaviour for 11 weeks prior to their exam. The results from this study did not entirely replicate their previous results. For instance, in this study procrastinators did not differ from non-procrastinators in terms of their level of discounting of future rewards unlike the previous findings. Although the findings showed

that procrastinators failed to act on their intentions even when their original intention was not to study less or study later, contrary to previous findings, the reason for the delay in action on exam preparation was their inability to inhibit fun, distracting alternate activities. Again, a hyperbolic pattern was obtained for the number of hours studied everyday over the course of 11 weeks. Additionally, the results showed that low conscientiousness predicted procrastination and this relation was mediated by perseverance. Dewitte and Schouwenburg (2002), therefore, drew the conclusion that procrastination might not only be a problem of task initiation but is a problem that is guided by lack of perseverance too. Vulnerability to temptations plays a role in why they are unable to maintain their intentions. In fact, to compensate for this vulnerability, procrastinators form more intentions, but they are unable to keep up with their intentions and consequently, end up delaying them. The results of this study, although interesting, need to be interpreted carefully. Due to a small sample of 21 participants, this study has very low power and so the reliability of these results and the associated conclusions drawn have to be considered carefully.

Schouwenburg and Groenewoud (2001) and Dewitte and Schouwenburg (2002) took an important step towards understanding the function of hyperbolic discounting in procrastination, however these studies included important limitations, which need to be discussed. First, these researchers demonstrated hyperbolic discounting by plotting only the perceived utility for studying or the actual study behaviour and did not provide the utility function for alternate tasks. This is problematic because in hyperbolic discounting it is the relative utility of the target task and competing alternate tasks that are temporally separated that predicts which task will be pursued. In the absence of alternate activities,

the relative utility cannot be compared and as such the mechanism of preference reversal is not quite clear.

Second, the idea of plotting the actual time spent studying as a function of time makes little sense because the discounting in this model, in principle, concerns perceived value of specific choice behaviour across time and not the actual behaviour. Put another way, individual difference variables (e.g., impulsiveness, discounting rate) and temporally where the competing tasks are situated determine the perceived utility or motivation of which task will be chosen and carried out. In this sense, it is not clear what the hyperbolic curve represents when actual time spent on studying was plotted across time in Schouwenburg and colleagues' study and how it really relates to the model of hyperbolic discounting. Utility can vary over time but cannot achieve a value of zero because the theory of hyperbolic discounting takes into account only those tasks that will be pursued (Frederick et al., 2002). When actual behaviour is concerned it can attain a value of zero because when no action is taken, behaviour has not been enacted. In fact, in another study, researchers also examined the actual number of hours studied before an exam across time and claimed that they found a hyperbolic pattern. What this graph really showed is that students invested little or no time studying for their exam for a long time and then showed a sudden peak in study time only before the deadline (e.g., König & Kleinmann, 2005). The findings of this study regarding actual study behaviour did not really attain a hyperbolic pattern like the authors claimed. Instead the graph showed a pattern which reflected a period of no study behaviour followed by intense period of studying closer to the deadline as there is not much time left – a typical pattern that procrastinators are quite familiar with.

Lastly, the no significant difference in general study motivation observed between procrastinators and non-procrastinators in Schouwenburg and colleagues' (2001) study raises the question of whether procrastination can be solely explained using a mathematical model like hyperbolic discounting. No obvious motivational deficits in procrastinators compared to non-procrastinators violates the underlying assumption of hyperbolic discounting which primarily uses the concept of utility maximization to explain choice behaviour during goal pursuits. The empirical evidence is actually suggesting that procrastination is *not* simply a utility problem and should not be conceptualized as such.

In a similar line of research where procrastination is assumed to be a time management problem, another group of researchers made testable propositions that time management behaviour will follow a hyperbolic pattern over time (e.g., Koch & Kleinmann, 2002; König & Kleinmann, 2004, 2007). Koch and Kleinmann (2002) hypothesized that in time management problems, the perceived utility of an important long-term goal with greater rewards will be discounted more than a short-term unimportant goal with smaller rewards if temporally the long-term goal is further away compared to the short-term goal. But if this temporal distance is reduced so that the long-term reward is temporally close to the short-term reward, then the utility of pursuing the long-term goal will be high, possibly showing no preference reversal. These propositions were tested in a later study by König and Kleinmann (2007) where they experimentally manipulated discounted utilities and temporal distance of tasks in different time management situations. The goal was to understand how participants make decisions on which task to pursue in these situations. Supporting their hypotheses König and

Kleinmann (2007) found that people are more likely to choose the short-term distracting tasks with small rewards over the long-term tasks with larger rewards when temporally these rewards are far apart. But closer to the deadline of a long-term task, participants discounted the larger reward less and they were more inclined to work on this task.

In another study, König and Kleinmann (2004) compared *choice bracketing* of procrastinators and non-procrastinators when making time-management decisions. Choice bracketing is the process by which people mentally group information of the tasks at hand into sets about which they have to make decisions (Read, Loewenstein, & Rabin, 1999). When the temporal distance between short-term and long-term goals is small, people tend to bracket their decisions together; when the short-term and long-term goals are further apart in time, choice bracketing becomes unlikely. Read and colleagues differentiated two types of bracketing that people use during decision-making processes. When people consider information about all tasks together during decision-making, it is referred to as *broad bracketing*; in contrast, when people assess information of each task in isolation when making decisions, it is called *narrow bracketing*. When choices are bracketed broadly, people demonstrate preference for improvement meaning long-term goals are preferred over short-term goals. This is because the bracketed decision shifts the positive time discounting of long-term goals (i.e., long-term goals are discounted more) to negative time discounting (i.e., long-terms goals are discounted less). König and Kleinmann (2004) expected that procrastinators would show less preference for improvement than non-procrastinators and would demonstrate negative time discounting. Results supported their hypothesis. Because procrastinators discount long-term goals more steeply than non-procrastinators (e.g., Ainslie, 1975; Schouwenburg &

Groenewoud, 2001), König and Kleinmann (2004) also predicted that if procrastinators are taught to use broad bracketing then it will shift their positive time discounting to negative time discounting, but this shift is less likely to be effective compared to non-procrastinators. Supporting their hypothesis, the results showed that procrastinators' discounting of long-term goals did not decrease much compared to non-procrastinators even when they were taught to use broad bracketing when making choices, possibly because of procrastinators' steep discounting of long-term goals (i.e., higher *k* parameter) compared to non-procrastinators.

Understanding how choice bracketing could play a role in delay discounting to affect procrastination is important, however conceptualizing procrastination as a time management problem is inaccurate. As I have discussed in the previous section, researchers have found empirical evidence that procrastinators and non-procrastinators do not differ in their planning to work on their tasks. When it comes to taking actions, while non-procrastinators take actions on time, procrastinators delay taking actions despite having a plan to work on their tasks (e.g., Pychyl, Morin & Salmon, 2000). If the plan is to work today, then procrastinators would say "I don't feel like working on it today" or "I will do it tomorrow." When tomorrow arrives, they shift their intention to work to the following day and keep doing so until it is too close to the deadline. Realizing that there is only little time left to do the work, procrastinators finally take action. Also, based on their findings, König and Kleinmann (2004) proposed that if people are made aware of their choice bracketing and are taught to set a broader time horizon for themselves, then they can lessen their time management issues. This strategy is less likely to be successful because there is consensus across disciplines (e.g., behavioural economics, psychology,

neuroscience) that procrastinators tend to be more present-oriented individuals noticing salient features of temporally closer rewards and they see their future-self as a stranger (e.g., Blouin-Hudon & Pychyl, 2015; Hershfield, Wimmer, & Knutson, 2009; O'Donoghue & Rabin, 1999). Even if a broader horizon is set, the distinction between present and future rewards is likely to remain fuzzy for procrastinators, as they are unable to visually imagine themselves on the time continuum further into the future.

Even in the absence of this empirical evidence, a careful examination of the hyperbolic graph itself reveals more problematic features and shows how it actually does not explain choice behaviour. In the hyperbolic graph, only tasks that have firm deadlines can be illustrated using a hyperbola. Alternate competing tasks are then compared against this deadline to demonstrate their immediacy using other hyperbolic curves. However, it is not clear how tasks that do not have discernable deadlines such as health behaviours can be illustrated using a hyperbolic curve. For instance, eating fast food everyday for a long period of time can make people ill, but there is no firm deadline that on a certain day a person will get ill. With time, a person might gradually become ill (i.e., having high blood pressure), or suddenly it could be an imminent threat to life (e.g., having a heart attack). Another obvious problem associated with a hyperbolic curve is that it is not clear why the utility of the target (future) task following the consumption of immediate rewards gradually increases. Certainly, in the case of procrastination it makes little sense because procrastinators' actual behaviour shows that they invest minimal or no time for studying until the deadline is very close and then they invest most of their time to the task (e.g., Konig & Kleinmann, 2005). Yet, another problem of hyperbolic discounting as a general model for choice behaviour is that it fails to explain all forms of delay. For

instance, when a person faces an inevitable delay, he is less likely to make a choice based on reward immediacy, rather because it is necessary in the moment to make that certain choice. The utility of the target task is high but is not pursued because of external circumstances. It is not clear how such delay can be interpreted using a hyperbolic graph or the hyperbolic equation, and how this type of delay can be distinguished from irrational delay like procrastination or purposeful delay which is another form of delay that people uses to strategically manage a number of goals that needs to be completed.

Both conceptually and empirically, understanding a complex behaviour like procrastination using a mathematical function like hyperbolic discounting is rather problematic. The inconsistencies in the results between studies and the corresponding conclusions outlined by researchers shows how this model is not appropriate for understanding procrastination. Of course, hyperbolic discounting answers some aspects of this behaviour that are consistent with the findings of psychological studies such as how procrastinators tend to see salient attractive features of temporally close rewards more than the future rewards and thus tend to be more present-oriented. To an extent, these aspects explain why procrastinators are unable to resist temptations and demonstrate a discrepancy between intention and action. But the notion that perceived relative utilities of different tasks over time coupled with few individual difference factors such as high impulsivity and steep discounting of rewards can fully explain the procrastination problem is misguided; this model is too simple in nature and therefore, insufficient to capture the complexity of this problem.

Despite the lack of empirical support that procrastination is a utility problem, Steel (2007) proposed the *Temporal Motivation Theory* (TMT) as a model for

procrastination which integrates hyperbolic discounting and some features of expectancy theory, cumulative prospect theory and need theory from the field of psychology. This model was originally developed by Steel and König (2006) who contested that these four theories share some common characteristics and, therefore, can be consolidated to form a general framework like TMT to understand a wide variety of choice behaviour such as consumer behaviour, addictive behaviour, health behaviour, procrastination and so on. Merging ideas from different fields of study in a theory like TMT to explain choice behaviour can offer a common language that can be used to exchange knowledge among disciplines. These researchers also argued that novel hypotheses can be formulated and tested using this theory (Steel & König, 2006). Following the development of TMT, this model was first applied to procrastination by Steel (2007) to understand why people delay taking actions despite their intended goals even when they know that the consequences of this delay will be severe. In particular, the goal was to combine temporal discounting with different psychological aspects to answer why people procrastinate on important tasks. Although Steel (2007) did not directly test this model, he explained TMT in relation to procrastination after conducting a comprehensive meta-analysis of procrastination studies. He identified different psychological determinants of procrastination and then categorized them under the components of the TMT equation.

Steel (2007; Steel & König, 2006) expressed TMT using a mathematical equation (see Equation 2). The numerator of this equation includes *expectancy* and *value* from motivational theories in psychology. Expectancy is the probability of whether a goal will be accomplished; value represents the perceived desirability of the outcomes once the goal is completed. The denominator of the formula, derived from the hyperbolic

discounting approach, explains to what extent the perceived outcome of a given goal will be discounted and consists of the components: *sensitivity to delay* and *delay*. Sensitivity to delay constitutes degree of impulsiveness, and delay explains the magnitude of delay meaning temporally when the outcome is available. The components in this equation can then be used to determine the utility to pursue a goal.

$$\text{Utility} = \frac{\text{Expectancy} \times \text{Value}}{\text{Sensitivity to delay or } \Gamma \times \text{Delay}} \tag{2}$$

While Steel's (2007) meta-analysis is an important contribution to the procrastination literature, TMT as a model for procrastination has many serious limitations. One important limitation that is relevant to the current discussion is that TMT includes the major limitations associated with hyperbolic discounting discussed earlier. Steel (2007) used the notion of utility maximization to explain procrastination even though empirical evidence is lacking in the literature. Similar to the studies discussed earlier, using a hyperbolic discounting graph, Steel (2007) also attempted to explain how change in utility affects academic task completion in the presence of competing alternate tasks. In his illustration, Steel (2007) used a hypothetical example of a student who has a deadline for an essay at the end of the semester. The utility for essay writing was demonstrated using a hyperbolic curve where the utility of writing essay is high only closer to the deadline. Despite this deadline, this student put off writing the essay and chooses to socialize with friends. Steel demonstrated the utility of socializing as being constant which is contrary to the hyperbolic discounting model where the graph for immediate alternate tasks also has hyperbolic pattern. Having a fixed utility for

socialization in erroneous because in reality motivation to continue an activity might not always stay constant. For instance, if the student gets into a conflict with one of his friends for any reason, the utility to socialize might diminish. Given that the utility of essay writing shows a hyperbolic increase, ideally the diminished utility of socialization should then result in essay writing. However, procrastinators do not behave this way; they find another enjoyable activity to delay their target activity. This further shows that the behavioural complexity of procrastination cannot be captured using hyperbolic discounting.

Besides the general drawbacks of discounting models discussed so far, another caveat of contemporary rational economic theories of decision-making is that these theories share the principle that most rational choices are *transitive*. This means that utilities of different choice options assessed based on important characteristics and contexts are fixed. The options, therefore, can be ordered according to their value from most preferred to least preferred choices, which then helps with the decision-making process. For example, if a person prefers option x over y and option y over z, then according to transitive preferences, he must prefer option x over z (e.g., Andreou, 2007; Regenwetter, Dana, & Davis-Stober, 2011). Departing from this mainstream view of economic theory, Andreou (2007) explained that choices can be *intransitive* meaning they cannot be always ranked from least preferred to most preferred. That is, a person might prefer z over x despite the initial ordering of x to y and y to z, and this could form an arbitrary preference loop based on the person's assessment of the choices. To clarify the circularity in arbitrary preference, Andreou provided an example where a person is contemplating between which laptop to buy when there are multiple options to consider.

This person might prefer a heavy laptop to a medium laptop and a medium laptop to a small laptop because the weight differences between the adjacent laptops are not so much. But when he compares the small laptop to the large one, the difference in weight is quite prominent and thinks that a smaller laptop will be convenient to carry because it is much lighter. As a result, this person might choose the small laptop over the large one creating a circularity in his choice.

Andreou (2007) took this approach where she used intransitive preferences together with discounting-induced preference reversal to explain irrational task postponement in procrastination. Drawing on Silver and Sabini's (1981) discussion of how procrastinators indulge in immediately gratifying "ephemeral pleasures" or even "ephemeral chores" to get away from important long-term goals, Andreou (2007) explained how procrastinators make a series of moment-to-moment decisions like these that seem rational at the moment but are the ones that they regret later. These series of choices form an intransitive preference loop (see Figure 3). Using a similar diagram of preference loop, as depicted in Figure 1-3, Andreou explained that procrastinators have multiple time periods to work on their important tasks until the deadlines and at each time period they have the choice to work on their task now or later. But when the time comes to work on the task, despite their preference to work on the task now, procrastinators always prefer the option to postpone it. Consequently, they are caught in a preference loop of not working until the deadline is nearby (Andreou, 2007). Now, consider a person who has an exam in a week on Friday and she thought of studying for this exam every day during that week but each day she postponed it to the next day. On Thursday, this person realizes that she has only a day left to study for the exam and regrets her decisions

to delay thinking she should have preferred to have started earlier. As such this individual falls into the trap of an intransitive preference loop.

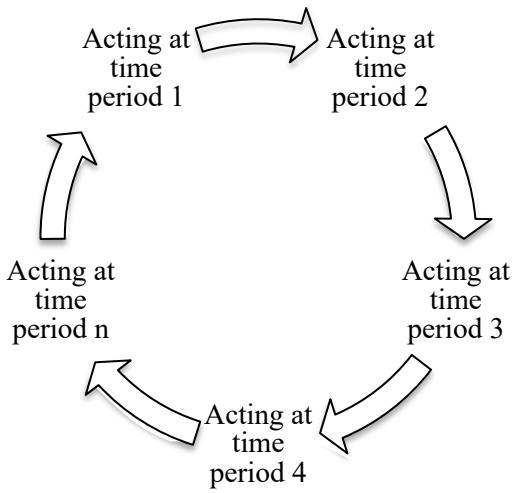


Figure 1-3

Intransitive preference loop of working on a task now versus working later at different time periods

Like Akerlof (1991), Andreou (2007) argued that procrastinators do not realize the consequences of their momentary decisions right away. At each time period when procrastinators prefer the later time period, they perceive that they are not significantly impeding their ability to achieve their goals. But the consequences of each decision to delay can add up resulting in cumulative serious consequences. Andreou (2007) explained these cumulative consequences using the example of smoking. A person, who knows how smoking can be bad for health, expresses the desire to quit smoking. But the person keeps putting off quitting because at each instance of smoking he thinks that one

cigarette will not affect his health. The individual instances of smoking, according to this person, is not bad for his health but what he is ignoring is the cumulative impact of all the cigarettes on his health which is life-threatening.

Furthermore, similar to O'Donoghue and Rabin's (1999) point of view and unlike Akerlof's (1991), Andreou (2007) explains that procrastinators are not completely naïve individuals – they are aware of their self-regulation problem. They also hold the global preference that their future self will behave differently than the present self. Despite this awareness, they choose to indulge in temporary pleasures that are in the way of accomplishing their more important goals. Andreou acknowledges that procrastination is not an easy problem to solve simply by having implementation intentions. She wrote "Apparently, implementation intentions that are not supplemented with significant penalties for making adjustments or exceptions leave too much room for problematic preference structures to cause trouble. Hence we find the use of costlier commitment devices" (p. 192). To solve the procrastination problem Andreou recommended that strategies such as creative commitment devices and self-imposed deadlines could help procrastinators to work on their important long-term goals in a timely manner. For example, a person who has the desire to save money for her retirement but always ends up spending her savings on short-terms rewards that seems rational in the moment can sign up for a savings plan (i.e., a commitment device) that automatically deposits money into retirement funds every month. This way the person only has to make a decision, that is, the decision to have a commitment device, which will relieve her from making choices about savings and spending every month. One problem with this rationale is that individuals who procrastinate are more likely to delay their decision to sign up for a

savings plan with automatic deposit system. The same is likely to be true with self-imposed deadlines because individuals who procrastinate will postpone on creating separate deadlines for themselves which will delay their tasks even more.

As I have argued earlier, one crucial aspect that tends to be missing in the behavioural economics research, which is a well-known concern among economists too (e.g., Frederick et al., 2002), is the psychology behind the behaviour. Even when psychological aspects are considered within a mathematical equation, selecting specific variables based on convenience to conceptualize a psychologically complex behaviour like procrastination as a utility problem is unconvincing, as Steel's meta-analysis demonstrates. It is not surprising that researchers claiming procrastination as a utility problem failed to provide sufficient evidence. The notion of utility maximization is a rational, deliberative decision-making process (e.g., Loewenstein et al., 2015), but procrastination is an irrational choice that has been widely recognized in the mainstream procrastination research, which I have discussed in detail in the previous section. What has been missing in the discussion of procrastination for quite some time is the role of emotions and some procrastination researchers have started paying increased attention to this aspect of human choice and procrastination in particular. These researchers argued for an emotion-regulation model for procrastination focusing on how momentary emotions can alter procrastinators' task preferences to lean towards immediate pleasure rather than their important long-term goals resulting in self-regulation failure. Procrastinators' intransitive irrational choices that favour immediate gratification over long-term goals in Andreou's (2007) model can be well explained by these momentary

emotions and the desire of the present-self to feel good now. In the following section, therefore, I transition to discuss the mood-regulation model of procrastination.

CHAPTER 2

FROM EMOTION MISREGULATION TO SELF-REGULATION FAILURE: A MOOD-REPAIR MODEL OF PROCRASTINATION

Instead of understanding procrastination primarily through a cognitive lens, some researchers have taken a different perspective and argued for a theoretical model that highlighted the role of emotions to understand the self-regulation failure in procrastination (e.g., Baumeister & Heatherton, 1994; Pychyl & Sirois, 2016; Sirois & Pychyl, 2013; Tice & Bratslavsky, 2000). When people procrastinate, they often postpone their tasks by saying "I don't feel like working on it today, but I will feel like it tomorrow." Such statements reveal procrastinators' use of emotion-focused coping strategies leading to their task avoidance, and researchers have found empirical evidence to support this notion (Baumeister & Heatherton, 1994; Tice, Bratslavsky & Baumeister, 2001). Tice and Bratslavsky (2000) stated that "we give in to feel good," and it is this tendency to feel good that increases the likelihood of delayed actions on important goals, which then contribute to the breakdown of self-regulation in procrastination. These researchers first theorized that procrastination is an emotion-regulation problem that involves a mood-repair process.

In this chapter, I begin with a brief discussion of the popular theories of self-regulation. Then I discuss how emotion-regulation relates to self-regulation and how this relation affects the choices people make when pursuing goals. Following this discussion, I provide a summary of the mood-repair model discussing how the choices made during procrastination are consequences of emotion misregulation. Lastly, I discuss the existing empirical studies from the procrastination literature that provide support for this model.

Theories of Self-Regulation

During goal pursuits, our ability to control behaviours, thoughts, feelings and actions dictate whether a goal will be achieved or it will be postponed. This ability, commonly known as self-regulation, is a quintessential characteristic of human action (e.g., Forgas, Baumeister, & Tice, 2009) that helps us to override our impulses or natural tendency in favour of a better choice (Tice & Bratslavsky, 2000). Essentially, self-regulation helps us to act in accordance with the long-term eudaimonic goals that we strive to accomplish in the presence of other short-term hedonistic goals (e.g., Fishbach & Trope, 2005). Long-term goals can be achieved when people make clear, well defined self-regulatory objectives of how they will accomplish these goals (Forgas, Baumeister, & Tice, 2009).

In the self-regulation literature, different theories have been proposed to explain how self-regulation operates. One such theory is the *limited resource model* of self-regulation which speculates that self-regulation requires considerable resources, effort and energy when making deliberative choices, because the self has to override pre-potent responses that are in the way of important long-term goals (Baumeister, Tice, & Vohs, 2018; Baumeister, Vohs, & Tice, 2007; Vohs et al. 2008). The resources available for self-regulation, however, are limited and making choices can deplete these resources resulting in insufficient regulatory resources to make future choices (e.g., Baumeister, Vohs, & Tice, 2007). Support for this model has been found in empirical studies where results showed that when people have to make choices, they deplete their regulatory resources to perform subsequent tasks. The results also showed that recent choices made

by the self can deplete more regulatory resources compared to forming mere preferences among options or implementing choices that were made by others[2] (Vohs et al., 2008).

Another influential theory of self-regulation is the *control theory*. According to this theory, self-regulation consists of three important stages – setting *goal standards*, *goal monitoring*, and *goal strength*, and these components operate in a feedback loop to help sustain goal-directed behaviour (e.g., Carver & Scheier, 1981, 1982, 1998). Control theory operates with the assumption that people start by setting standards of what should be the expected or desired outcomes of the goals they are pursuing. *Goal Standards* are ideals, values and norms that people create based on their experiences with past goals, and they refer to these standards when they carry out current or prospective goals. When there is a discrepancy between the existing standard and perceived standard of the intended goals, people attempt to reduce the discrepancy by conforming to the pre-set standards when pursuing intended goals allowing them to maintain self-regulation (e.g., Powers, 1973). However, maintaining self-regulation could become quite challenging when the initial standards are ambiguous to begin with. The second stage, *goal monitoring*, involves paying attention to the goal steps that are being carried out and assessing goal progress. Lastly, *goal strength* refers to the ability to reduce discrepancies during goal pursuit. This is accomplished by resisting or overriding the undesired state or impulses that are in the way of long-term or higher-order goals, and make the self comply to the standards originally set (e.g., Carver & Scheier, 1981, 1982; 1998). From the perspective of control theory, whether a person would succeed or fail in pursuing an

[2] Note that there is a recent controversy surrounding the replication of these results in a meta-analysis where some researchers (de Ridder, Lensvelt-Mulders, Finkenauer, Stok, & Baumeister, 2012) have argued that the discussion of goal attainment should not be centred on effortful self-control.

intended goal will essentially depend on whether the goal stages have been successfully achieved. In this sense, self-regulation *failure* may result when unclear, conflicting standards are set with inadequate or no monitoring of the goal stages and/or the desire to choose the short-term goals are too strong even when there is a long-term cost associated with that decision (e.g., Carver & Scheier, 1981, 1982, 1998; 2016).

Overcoming hedonistic impulses or actions is certainly challenging which is why there is abundant research in different domains of psychology to demonstrate how inadequate self-regulation leads to many self-defeating behaviours and impulse-control problems such as gambling, cigarette smoking, substance and alcohol abuse, inability to maintain healthy diet, obesity, eating disorders, failure to save for retirement, impulsive shopping and procrastination (e.g., Baumeister, Heatherton, & Tice, 2004; Duckworth & Seligman, 2005; Forgas, Baumeister, & Tice, 2009; Mischel & Ayduk, 2004; Tangney, Baumeister, & Boon, 2004; Tice and Bratslavsky, 2000). The most recent perspective of researchers on self-regulation failure during different goal-directed behaviours emphasizes the point that the breakdown of self-regulation may not be a simple case of lack of goal standards, monitoring, strength or a limited resource issue as speculated in previous frameworks. To have a more comprehensive understanding of self-regulation failure, researchers have shifted their focus towards the emotion-regulation literature to obtain a better explanation for how self-regulation operates.

Emotions are essential and salient aspects of human experience and, therefore, it is imperative to understand the role of emotions in self-regulation (Gross, 1998, 2014). In fact, researchers have noticed that emotion-regulation is similar to self-regulation in many respects. For instance, emotion-regulation involves the same components such as

standards, monitoring and strength like self-regulation. Researchers are reasoning that emotion regulation runs parallel to self-regulatory processes and, therefore, may affect goal-directed behaviour (e.g., Carver & Scheier, 2016; Gross, 1998, 2013, 2014; Koole 2009a; Tice & Bratslavsky, 2000). Based on this account, it is important to discuss emotion regulation together with self-regulation to understand the choices people make when pursuing goals (Baumeister, Vohs, & Tice, 2007; Koole, 2009a; Tice, 2009; Tice & Bratslavsky, 2000).

Emotion Regulation within the Context of Self-Regulation

Emotion regulation refers to the processes by which people regulate their emotions and it can operate to promote or impede goal-oriented behaviour similar to self-regulation (Koole, 2009a). To understand the process of emotion regulation, Lazarus (1991) made an important observation. He explained that people first have an immediate emotional response to a given situation and these emotions tend to be unregulated. These emotional responses are likely when the situation involves personal goals. These goals can be of different nature – biological (e.g., taking precautions to prevent heart diseases), social (e.g., participating in charity work) or self-focused (e.g., getting a university degree; Sheppes & Gross, 2014). Following this primary emotional response, people have a secondary emotional response which then regulates the primary emotional response. Primary and secondary emotional responses are, therefore, different in important ways. The first delineates the emotion generation aspect and the latter explains emotion regulation (Lazarus, 1991; Sheppes & Gross, 2014).

Koole (2009a, 2009b) explained that the primary emotional responses that people experience can be understood as *emotional sensitivity*, that is, the ease with which

emotions reach their maximum level in a given situation. He describes a number of factors that could impact emotional sensitivity – personal characteristics, quality of stimuli and broader events. Personal characteristics could influence people's emotional states; for example, people who are more neurotic can experience negative emotions more quickly than a person who is less neurotic. Quality of the stimuli is another factor that could influence people's emotional state where more arousing stimuli can cause the emotional state to peak more quickly than with less arousing stimuli. Major events such as a tornado or a recession can influence people's emotional sensitivity leading to experiencing negative emotions more easily or quickly. Koole explains that emotion regulation follows emotional sensitivity (in other words, the primary emotional responses) where regulatory strategies are utilized to increase the emotional response (*up-regulation*), keeping the emotional response steady over time (*maintenance*) or decrease the emotional response (*down-regulation*). This is also true for goal pursuits where activation of relevant goals could either up- or down-regulate the magnitude and duration of the emotions that was generated by the goals (Gross, Sheppes, & Urry, 2011). Koole (2009b) also argues that like emotional sensitivity, emotion regulation can also be affected by personal characteristics (e.g., venting may provide temporary relief from negative experience but not entirely), quality of stimuli (e.g., emotions generated due to personally meaningful events may be harder to regulate) and major events (e.g., negative emotions caused by inability to find a job can be difficult to down-regulate).

Emotions generated during the pursuit of active goals can differentially affect whether the goals will be approached or avoided (e.g., Loewenstein et al., 2015). The distinction lies in the anticipated versus immediate emotions. Anticipated emotions are

those that are expected to be experienced in the future due to a decision or choice that will be made regarding a future goal. This type of emotion facilitates deliberate processes to make an informed choice that will yield positive emotions in the future upon goal completion. Immediate emotions, in contrast, are experienced when a decision is being made and, therefore, can have an influence on the decision (e.g., Loewenstein & Lemer, 2003; Loewenstein et al., 2015). This experience of immediate emotions that precede self-regulation may result in self-defeating choices and behaviours that favour short-term hedonistic goals over long-term ones (Baumeister, Vohs, DeWall, & Zhang, 2007).

Besides immediate versus anticipated emotions, researchers have identified how the valence of emotions (i.e., positive or negative emotions) is also expected to have an impact on self-regulation during goal pursuits, particularly in assessing whether a goal will be approached or avoided. Both self-regulation and emotion regulation is thought to have their own feedback loop, which runs concurrently and, therefore, can affect each other (e.g., Carver & Scheier, 2016). Specifically, exerting self-control can generate specific emotional responses which dictate whether an intended goal will be approached or avoided. When people experience little or no discrepancies in the components (i.e., goal standard, goal monitoring or strength) of the feedback loop of self-regulation, positive emotions are generated in relation to intended goals, which are then more likely to facilitate goal approach behaviour. Conversely, large discrepancies in the components of self-regulation can induce experience of negative emotions towards intended goals making goal avoidance more likely resulting in self-regulation failure (e.g., Carver & Scheier, 1998, 2016).

Baumeister and colleagues (1994) reasoned that the discrepancy in standards, monitoring and strength leading to self-regulation failure during goal pursuits could be due to two reasons – underregulation and misregulation (Baumeister, Heatherton, & Tice, 1994). In underregulation, people do not exert sufficient self-control to sustain their important long-term goals when confronted with other impulses. Alternatively, in misregulation, people use strategies that are ineffective and therefore are unsuccessful in exerting self-control to pursue important long-term goals, particularly when they have other immediate alternate rewards that they can give in to. Later, Tice and Bratslavsky (2000) noted that when people prioritize emotion regulation over other forms of self-regulation that can actually help in successful completion of their important long-term goals, this could be understood as a misregulation. Emotion misregulation mobilizes self-defeating behaviours because people undermine their important goals in favour of activities that are more emotionally stimulating in the moment (Tice & Bratslavsky, 2000).

Tice and Bratslavsky (2000) also provided explanations for how emotion misregulation might be linked to self-regulation failure. One possibility is that exerting self-control could induce negative moods. Another possibility is that having negative moods can lead to the inability to exert sufficient self-control to continue certain behaviours or take specific actions. In this way, emotions could set up *negative spirals* undermining one's ability to exert self-control. For example, a person who is on a diet may resist from having a slice of chocolate cake. Exerting self-control to resist this temptation may then induce negative affect and, to feel better, the person may end up eating the cake. Being unable to maintain the initial diet plan could induce even more

negative affect (e.g., feelings of guilt or shame) leading to consumption of another slice of cake in another attempt to improve mood, thereby making it difficult for the person to exercise self-control. Basically, regulating negative mood states to feel better becomes a priority, which comes with the cost of not being able to exert self-control necessary to pursue long-term goals (Tice, 2009; Tice & Bratslavsky, 2000). As Tice and Bratslavsky label it, "giving in to feel good."

In this sense, it is not surprising then why sometimes people are not able to maintain their self-regulatory good intentions. This is because they want to reduce negative, aversive feelings. People are more motivated to work on pleasurable tasks that will immediately relieve them from negative moods, favouring short-term gains and pleasures that are hard to ignore. Aversive emotions also tend to impair people's ability to be attentive to relevant information (Tice, 2009). In fact, empirical results have shown that when participants in a negative mood are asked to evaluate the dollar prize between10 thousand dollars and 10 million dollars, they successfully choose the larger dollar prize as it can significantly improve their life. However, when the evaluation is done in terms of probabilistic odds such as 1 in 10 thousand and 1 in million, participants experiencing negative emotions were unable to assess the difference because of their inability to pay sufficient attention (Loewenstein, Weber, Hsee, & Welch, 2001).

The role of emotion-regulation in self-regulation failure has also been studied in a variety of impulsive and self-defeating behaviours (e.g., gambling smoking, alcohol and drug abuse, chronic dieting) using experimental designs. These studies used various mood induction procedures such as writing about a negative life event, reading negative statements about self, or exposure to an image, music or movie clips that involves some

negative stimuli to induce negative affect in participants (cf. Wagner & Heatherton, 2014). The findings showed that the mere induction of a negative mood in the laboratory setting can lead to increased smoking and substance cravings in substance users (e.g., Fox, Bergquist, Hong, & Sinha, 2007), relapse in alcohol abusers (e.g., Marlatt & Gordon, 1985), and overeating in dieters (e.g., Heatherton, Striepe, & Wittenberg, 1998) compared to participants who were in positive or neutral mood. Induction of negative mood in participants in laboratory settings has also been shown to increase unhealthy eating behaviour such as more snacking on cookies (Tice, Bratslavsky, & Baumeister, 2001). What these studies collectively show is that emotional distress may turn people towards substance and alcohol abuse, smoking and unhealthy eating, as they believe that these activities can help them escape the negative mood and perhaps improve their mood – all clear examples of the misregulation of emotion.

To understand how emotions generated from active relevant goals are regulated, Gross (1998, 2014; Gross & Thompson, 2007) proposed an information-processing framework called the *process model* of emotion regulation. This model posits that emotions are generated in a sequence of four stages, and emotion regulation is possible at each of these stages resulting in different consequences. The stages in this process model are *situation, attention, appraisal* and *response,* and these stages temporally occur in this specific linear sequence. The first stage of the process model, *situation*, involves two steps: *situation selection* and *situation modification*. People encounter certain situations relevant to their goals that can trigger specific emotional responses and, therefore, people can choose to be in a different situation to regulate their emotions, which is *situation selection*. However, if the situation that triggered the emotions is actually unavoidable

then people can choose to modify that situation which is *situation modification*. The second stage, *attention deployment,* explains that people may not be aware of the specific features of the emotions they are experiencing and so they redirect their attention from the emotional stimuli. The third stage involves *cognitive appraisals* where people reinterpret the situation to alter the initial emotional responses. The fourth and last stage is *response modulation*, which refers to changing the initial emotional response which was generated by the situation, and this is achieved by changing the behavioural, experiential and/or physiological response of the emotions (Gross, 1998, 2014; Gross & Thompson, 2007).

This process model has provided a systematic and logical platform for understanding emotion-regulation strategies and when they can be employed during the emotion generation process. Initially, the process model operated under the assumption that intervening earlier in the emotion elicitation stage triggered by specific situations is more effective to regulate emotions than intervening in the later stages (Gross, 1998). However, empirical evidence contradicted this assumption and demonstrated that emotion-regulation strategies such as cognitive reappraisal tend to be more effective after the emotions have been elicited by a given situation (Urry, 2009). In line with these new empirical findings, the assumption of the process model that emotion-regulation strategies are more effective when intervened earlier was modified to incorporate the idea that emotion generation and emotion-regulation processes compete with each other at all stages of the information processing (Gross, 2014; Gross & Thompson, 2007; Sheppes & Gross, 2014).

Another problem of the process model, as identified by Koole (2009a), is the temporal linearity of emotion generation and regulation processes with a fixed cycle from situation to attention to appraisal to response modulation. Based on past research findings, Koole (2009a) argued that "…the order in which emotion responses are generated is in fact variable. Attention, cognitive appraisals, or behaviour may each occur early or late in the emotion generation process" (p. 12). The sequencing of the stages of the process model in a specific order also does not take into account the anticipated emotions where emotion is generated as a result of the expected outcome of a future goal before the goal is attained (Loewenstein et al., 2015). Studies have also demonstrated that bodily movements can trigger specific emotional responses which is not accounted for in the process model (Niedenthal, Barsalou, Winkielman, Karuth-Gruber, & Ric, 2005).

In light of these limitations in the process model, Koole (2009a) reasoned that it would be more beneficial to discuss the *targets* and *functions* of emotion regulation. Situations that are relevant to goals can trigger specific emotions and goal specific emotions are generated through different emotion-generating systems. Among the many emotion-generating systems, Koole (2009a) particularly discussed *attention*, *knowledge* and *bodily expressions*, which are the targets of emotion regulation. *Attention* allows people to selectively process certain aspects of an event while ignoring other incoming information pertaining to that event (e.g., Fan, McCandliss, Forella, Flombaum, & Posner, 2005). The emotion generating system, *knowledge,* includes cognitive appraisals (i.e., subjective evaluation of goal-related events that trigger emotions) and attributions (i.e., causal explanation for the emotion triggering events whether it is relevant to self or others, can be controlled or not; Lazarus, 1991). Lastly, Koole (2009a) discussed *bodily*

expressions of emotions, which is another emotion generating system that unfolds through voluntary or involuntary facial expressions and bodily postures and movements (e.g., Mauss & Robinson, 2009). The other emotion-generating systems, attention and knowledge, can influence the bodily expressions of emotions.

Among the functions of emotion regulation, Koole (2009a) emphasized goal-, person-, and need-oriented functions. The goal-oriented function of emotion regulation facilitates achievement of goals. Koole and Aldao (2009) discussed how emotion regulation is governed by *cognitive control* (e.g., Posner & Snyder, 1975) that helps to override the hedonic or inappropriate action tendencies that interfere with the goals a person is supposed to carry out. These hedonic or inappropriate action tendencies tend to be emotionally driven behaviour, which are managed by cognitive control processes (e.g., cognitive reappraisal) to help attain the cognitively driven goal-directed tendencies. Basically, when conflict arises between goal-directed and alternate tendencies, cognitive control processes attempt to resolve the conflict by forcing the regulatory processes to act towards the goals that are important to be attained. Koole and Aldao (2009) drew on Webb and colleagues' (2012) action control perspective to further emphasize how emotion regulation plays a key role in goal-directed activities. From the action control perspective, the goal-oriented function of emotion regulation involves multiple subtasks. First, it is important to identify whether there is a need to regulate emotions. This task involves assessing whether the emotions generated during a goal pursuit is derailing the person away from the intended goal. Second, it is important to decide whether or how to engage in emotion regulation. Last and most importantly, after deciding on the emotion-regulation strategy appropriate for a given situation, it is essential to enact the emotion-

regulation strategy to maintain the goal directed behaviour (Webb, Schweiger-Gallo, Miles, Gollwitzer, & Sheeran, 2012).

Compared to the goal-oriented function which has a comparatively narrower focus (i.e., on the goal), Koole and Aldao (2009) argued that the person-oriented function of emotion regulation takes a humanistic approach to understand the person as a whole. Koole (2009) reasoned that Kuhl's (2000) personality systems interactions theory (PSI) could explain the person-oriented function of emotion regulation. PSI theory postulates that there are two major ways emotion regulation can facilitate personality functioning. First, personality functioning may become flexible as emotion regulation could prevent people from being trapped in specific motivational-emotional states enabling them to focus on their global personality functioning. This way people are able to change their emotional responses (i.e., their responses are dynamic) depending on what the situation demands. Thus, emotion regulation becomes context dependent and is adjustable by people making emotional functioning more flexible. Second, the dynamic emotional responses over time can strengthen the ability to have a deep understanding of the emotional experiences that people have which can then promote coherence in personality functioning as well as personal growth.

Goal-oriented and person-oriented emotion regulation may come into conflict with the third function of emotion regulation, which is the need-oriented emotion regulation (Koole, 2009b). A conflict can arise between these two regulation strategies specifically when negative emotions need to be tolerated. In dealing with emotional stimuli, the need-oriented function of emotion regulation places its effort to serve the hedonic needs which coincides with one of the fundamental assumptions of emotion

regulation that people regulate their emotions primarily to promote pleasure and reduce pain (e.g., Gross, 2014; Larsen, 2000). Koole (2009b) argues that negative emotional states can arise when attempting to pursue challenging goals. However, attempting to regulate these negative emotional states can lead to expending both physical and mental resources (Sapolsky, 2007). Alternatively, focusing on hedonic needs requires less cognitive resources and operates at a non-conscious level of information processing (Panksepp, 1998). As a result, people may prioritize their hedonic need fulfillment over their goal pursuits, as it is more adaptive in nature requiring less effort and harness less resources. Koole (2009b) also referred to Tice and colleagues' (2001) work to describe how the need-oriented functions of emotion regulation have an impulsive quality that serve the purpose of fulfilling immediate gratification.

The emotion regulation literature briefly summarized in this section highlights why researchers are keen on understanding emotion regulation within the context of self-regulation. Certain adaptive emotion-regulation strategies can promote self-regulation to ensure that sufficient effort and investments are made to initiate and maintain long-term goals. But maladaptive emotion-regulation strategies could direct people's focus towards short-term alternate goals that have hedonic characteristics instead of towards their important goals. As Gross (2013) stated "Cultivating emotions that are helpful—and managing emotions that are harmful—is one of the central concerns of the field of emotion regulation" (p. 359). It is, therefore, not surprising that maladaptive emotion-regulation strategies are central to many health related (e.g., substance abuse, smoking, obesity) and finance related (i.e., lack of savings) self-regulatory problems (Larsen, 2000). Similarly, individuals who procrastinate use maladaptive emotion-focused coping

strategies that lead to their goal avoidance, and Tice and Bratslavsky (2000) have demonstrated this emotion misregulation in procrastination using a mood-repair model. More recently, Pychyl and Sirois (2016) have used the *process model* by Gross (2014) and *functional approach* by Koole (2009a) to build on this mood-repair model and provide further insight into the emotion misregulation in procrastination. In the next section, I discuss the mood-repair model of procrastination by Tice and Bratslavsky (2000) and how Pychyl & Sirois (2016; Sirois & Pychyl, 2013) have revisited this model to understand the self-regulation failure in procrastination from an emotion misregulation perspective.

A Temporal Mood-Repair Model of Procrastination

The important role that emotion regulation plays in procrastination was first discussed by Tice and Bratslavsky (2000). These researchers explain that individuals who procrastinate focus on regulating their moods temporarily instead of focusing on their important long-term goals. This temporary mood regulation leads to the self-regulation failure and the needless delay of the intended long-term goals. Tice and Bratslavsky (2000) reasoned that it is not an underregulation of emotions that diminishes the capacity to exert self-control to sustain long-term goals. Instead, it is the use of ineffective emotion-regulation strategies, in other words, emotion misregulation, that leads to the breakdown of self-regulation in procrastination.

Tice and Bratslavsky (2000) elaborated that the misregulation of emotions can be understood using a short-term mood repair process. The long-term goals people take on tend to be difficult or challenging in nature. These goals are mostly time consuming that require much effort, energy and commitment to sustain their pursuits. As a result, often

people find these goals aversive and engaging in these goals can evoke negative emotions such as frustration, anxiety or boredom. Tice and Bratslavsky (2000) explained that individuals who procrastinate avoid these negative emotions by avoiding their intended goals, and they choose to engage in alternate tasks that will make them feel better in the short-term. These individuals are using a mood-repair process that helps them feel better now but at the cost of not working on their important goals. The mood-repair model of procrastination essentially captures the moment-to-moment negative feeling states of individuals when they engage in their important goals which are followed by misappropriate regulation of these emotions (i.e., seeking immediate pleasure from other more enjoyable tasks) that leads to their undesirable procrastinating behaviour (Tice & Bratslavsky, 2000).

In an earlier longitudinal study, Tice and Baumeister (1997) found that procrastinators tend to experience less stress and less physical symptoms of illness in the short-term by avoiding academic tasks but more stress and more physical symptoms of illness as the deadlines of their important goals approach. Considering the mood-repair model of procrastination proposed by Tice and Bratslavsky (2000), it is not surprising that the level of stress is low earlier in the semester with fewer illness symptoms as procrastinators are more invested in feeling better in the short-term by seeking pleasure from alternate tasks while avoiding their important academic goals. Individuals who procrastinate are taking short-term perspective on regulating negative emotions triggered by their important goals and neglecting the pervasive unavoidable long-term consequences that include last-minute task completion under tremendous pressure with more emotional distress (Tice & Bratslavsky, 2000).

More than a decade later, Sirois and Pychyl (2013) revisited the mood-repair model of procrastination and suggested that it is important to investigate the role of temporal disjunction in procrastination. In their theory article published in 2013, these researchers contended that individuals who procrastinate experience a temporal disjunction between their present and future selves. This temporal disjunction makes these individuals focus on the need of the present-self more than their future-self. Specifically, when these individuals find their important goals aversive, they immediately focus on their present-self making erroneous decisions, that is, how to relieve the present-self from the negative emotions caused by the important goals they were supposed to carry out, leaving the burden of completing these goals on the future-self. Such errors in choice indicates that individuals who procrastinate hold a temporally myopic perspective that blinds them from seeing the good outcomes the future-self could receive if they started working on their important goals now (Sirois, 2016). Instead, they rely on the mood-repair process to receive immediate pleasure (Sirois & Pychyl, 2013).

The temporal disjunction between present- and future-self in relation to procrastination has been demonstrated empirically. Researchers have found that procrastination has a negative correlation to future time perspective (i.e., striving to achieve long-term goals) and positive correlation to present-hedonistic (i.e., focus on pleasure and gratifications that are immediately available) and present fatalistic time orientation (i.e., having helpless and hopeless attitudes; Díaz-Morales, Ferrari, & Cohen, 2008; Ferrari & Díaz-Morales, 2007; Jackson, Fritch, Nagasaka, & Pope, 2003). Findings from another study (Blouin-Hudon & Pychyl, 2015) revealed that individuals who experience lower future-self continuity (i.e., feel less connected to their future self) are

more likely to procrastinate and leave academic tasks for the future self to complete. However, students who feel more connected to their future self in 2 months or 10 years are less likely to procrastinate. Blouin-Hudon and Pychyl concluded that individuals who procrastinate view their future-selves as a stranger and fail to properly comprehend that the burden of task completion in a very short time will fall on the future-self due to their present inactions on their important tasks.

Recordings of event-related potentials (ERP) also documented procrastinators' preference for present rewards over future rewards during intertemporal choice tasks (Wu et al., 2016). More recently, Blouin-Hudon and Pychyl (2017) showed that decreasing the gap between present- and future-self at least partly could reduce procrastination and this can be achieved by training people to make an empathic connection to their future self by vividly imagining the future self at present. Together, these empirical findings emphasize Sirois and Pychyl's (2013) suggestion that the mood-repair process and temporal disjunction should be understood together to learn more about the emotion misregulation strategies used during procrastination.

The discussion of emotion-regulation in procrastination was further extended by Pychyl and Sirois (2016). Supporting the mood-repair model proposed by Tice and Bratslavsky (2000), Pychyl and Sirois (2016) wrote "…procrastination becomes the strategy of choice when people mistakenly believe that they can achieve their desired emotional state through avoidance rather than goal pursuit" (p. 183). This mistaken belief in procrastination that Pychyl and Sirois (2016) are referring to is the mistaken belief that negative emotions caused by the unpleasant long-term goals can be down-regulated by avoiding those goals and positive emotions can be up-regulated by engaging in some

other pleasant tasks. In this sense, "procrastination provides a hedonic shift in the emotions experienced when the decision to delay a task is taken" (Pychyl & Sirois, 2016, p. 164) – a strategy that provides brief bouts of relief but is essentially an emotion-focused coping strategy that is inherently maladaptive (Tice & Bratslavsky, 2000; Sirois & Pychyl, 2013).

Sharing the same theoretical perspective as Tice and Bratslavsky (2000), Pychyl and Sirois (2016) concluded that procrastination should be conceptualized as an emotion-regulation problem. However, they brought other models of emotion regulation such as the *process model* by Gross (1998; 2014) and the *functional approach* of emotion regulation by Koole (2009b) into the discussion to understand the poor regulation of emotions in procrastination. First, Pychyl and Sirois (2016) described how the key components of the process model, situation-attention-appraisal-response, can be used to explain procrastination. As discussed in the previous section, the process model begins with *situation selection* and this stage explains that specific situations can evoke certain emotions and people can alter the emotions by choosing to be in a different situation (Gross, 1998, 2014). Pychyl and Sirois (2016) argued that individuals who procrastinate perceives their goals or situations to be aversive generating negative emotions and they down-regulate these emotions by choosing not to pursue the goal associated with these negative emotions and participate in more enjoyable, pleasant tasks or situations instead, just to feel better. The second stage of process model, *attentional deployment*, explains that when people are not completely aware of their emotional experience in a situation, they may redirect their attention from the original emotional stimuli to alter their initial emotional response (Gross, 1998, 2014). Pychyl and Sirois (2016) explained that use of

distraction to feel better now is a common attentional deployment strategy in procrastination.

Pychyl and Sirois (2016) argued that the third and fourth stage of the process model, *cognitive appraisal and response modulation*, pertain to the discussion of how effective interventions can be developed. *Cognitive appraisal* involves altering the appraisal of the tasks or situations that caused the emotions (Gross, 1998, 2014). Interventions aimed to reduce procrastination can use cognitive appraisal strategies to change the initial perception of the aversive nature of the tasks or situations. Similarly, *response modulation* attempts to modify the emotion generated by the goals or situations by changing the behavioural, experiential and/or physiological response of the emotions (Gross, 1998, 2014). In procrastination, the emotions generated in response to aversive tasks can be modified using interventions. Therefore, the necessity to repair mood through goal avoidance or by procrastinating can be changed using effective emotion-regulation strategies such as cognitive appraisals and response modulation (Pychyl & Sirois, 2016).

Pychyl and Sirois (2016) reasoned that Gross' process model captures some aspects of the emotion misregulation in procrastination and so integrating Koole's (2009) *functional approach* of emotional regulation to this discussion can shed more light on this discussion. Specifically, among the three functions of emotion regulation (i.e., goal-, person-, and need-oriented functions) discussed in the previous section, Pychyl and Sirois identified the need-oriented function of emotion regulation to be more relevant to the discussion of procrastination. Recall that the primary focus of need-oriented function of emotion regulation is to choose goals or tasks that have hedonic qualities over important

goals because these hedonic tasks require less cognitive resources to carry out (Koole, 2009a, 2009b). Drawing on this discussion, Pychyl and Sirois argued that hedonic need fulfillment is in conflict with the goal-directed behaviour in procrastination. This conflict arises when important goals elicit negative emotions and the conflict is resolved by giving in to pleasant tasks that serves the hedonic needs of up-regulating positive emotions.

Here is an illustration of the conflict between goal- and need-oriented functions of emotion regulation. A student who has to write a 12-page psychology essay due in 3 weeks (i.e., goal-oriented behaviour) can find this task quite challenging. To write a good essay, the student needs to complete a number of steps. He or she needs to find a course-relevant essay topic, search for research articles relevant to that topic, read the articles and create a good research question or thesis statement, following which the student needs to write the essay that presents a coherent argument supporting his research question. The challenges associated with essay writing can elicit emotional distress (e.g., anxiety, stress, frustration) in the student every time he or she attempts to start the task. Instead of writing the essay, he or she has the option to do other more enjoyable tasks such as watching movies, playing videos games or using social media (i.e., serving hedonic needs). In this way, the goal-oriented behaviour of essay writing is in a conflict with hedonic needs. Because less cognitive resources are required for hedonic need fulfillment (Koole, 2009b) that can operate at a non-conscious level of information processing (Panskepp, 1998), Pychyl and Sirois (2016) reasoned that the hedonic need fulfillment can be automatically preferred over important goals in procrastination without much cognitive processing that will support goal pursuits. Therefore, in the essay-writing

example, if the student procrastinates, then he or she is likely to choose one of the alternate tasks to improve their short-term mood and reduce the distress of essay writing until it is too close to the deadline.

Koole (2009b) stated that need-oriented emotion-regulation strategies might include interpretive biases which help reduce anxiety. Pychyl and Sirois (2016) noted that such interpretive bias is evident in procrastination and they mentioned downward counterfactual thinking as one example. *Counterfactual thinking* involves constructing alternative outcomes for an event that has already occurred (e.g., Roese & Olson, 1995). When the outcome of the past event is compared with a better alternative outcome that could have happened if an appropriate action was taken, it is referred to as *upward counterfactual thinking.* In upward counterfactual thinking, a person would use a statement like "if only" (Roese, 1994). For example, receiving a bad grade on an essay can make a student think, "if only I would have put more effort into the essay, I could have received a better grade." Upward counterfactuals can generate negative emotions, but these negative emotions can serve to improve the future actions taken in a similar situation to obtain better outcomes (Roese, 1997). *Downward counterfactual thinking*, in contrast, involves comparing the outcome of past experience to a worse outcome that could have happened, and it involves statements such as "at least" (Roese, 1994). For example, receiving a bad grade on an essay a student may think "at least I received a passing mark" or "at least I didn't fail." Use of downward counterfactual thoughts can help reduce the negative emotions generated due to the poor outcomes of the past event, restoring a positive sense of self (Roese, 1994; Sanna, Turley Ames, & Meier, 1999).

Sirois (2004) conducted a study to investigate the relation between procrastination and counterfactual thoughts. In this study, participants had to read two anxiety-provoking scenarios and were asked to imagine the events depicted were happening to them. The purpose of these scenarios was to induce negative mood (e.g., anxiety). After reading the scenarios, participants were instructed to generate counterfactual thoughts based on the scenarios they had read. The findings showed that procrastinators used more downward counterfactual thoughts relative to upward counterfactuals. Based on her findings, Sirois (2004) concluded that procrastinators use negative counterfactuals to alter their negative mood induced by the anxiety-provoking scenarios and restore their positive mood. To explain how such mood repair process can lead to self-regulation failure, Sirois (2004) writes:

> "…procrastination is associated with mood-regulating trade-offs (Blunt & Pychyl, 2000; Tice et al., 2001) suggesting that a preference for downward counterfactuals may contribute to a lack of motivation to change procrastinating behaviour. For example, if a negative outcome occurs because an important task was delayed, focusing on how things were not as bad as they could have been not only makes the procrastinator feel better about the negative outcome, but also engenders a sense of satisfaction and complacency that may result in less thought about how to act in a more timely manner in the future. By not engaging in affective assimilation of the possibility of worse outcomes, procrastinators may not receive the "wake-up call" that their behaviour needs to be changed. This trade-off of immediate affective benefits for loss of preparative insights for future behaviour and decreased motivation change may, in the case of procrastinators, perpetuate

the very self-regulation difficulties that characterize these individuals" (Sirois, 2004, p. 280).

In sum, Sirois (2004) highlighted some important points about the mood repair in procrastination. The use of downward counterfactuals by individuals who procrastinate can be construed as an attempt to repair mood, which is a dysfunctional mood regulation strategy, to deal with the negative emotions as well as the outcomes of an event. Such mood regulation strategies could help restore the positive sense of self, but can also blind procrastinators from seeing that they need to prepare in a timely manner next time in order to avoid negative outcomes in a similar situation. Thereby, counterfactual thoughts used for the purpose of mood-repair can create temporal disjunction in the present- and future-self in procrastination (Sirois & Pychyl, 2013) and lead to more dependence on need-oriented emotion regulations which involves attending to hedonic needs and avoidance of goal-oriented behaviour (Pychyl & Sirois, 2016).

In this section, I have provided the conceptual and theoretical summary of mood-repair model from the procrastination literature to highlight why it is an important topic of discussion that should be investigated further. However, it is also important to review the empirical findings that researchers have found in support of mood-repair model in procrastination, which I discuss next.

Empirical findings on mood-repair model in procrastination

In 2001, Tice, Bratslavsky and Baumeister conducted a series of studies to examine the mood-repair model. The goal of these studies was to examine how emotional distress can lead to the use of poor emotion-regulation strategies subsequently resulting in self-regulation failure. These researchers investigated the mood-repair process in

procrastination in their third study where they examined a three-way interaction effect of mood conditions, appeal of alternate tasks and mood changeability on procrastination. First, participants in this study were randomly assigned to one of the two mood conditions, good or bad mood. These specific mood states were induced by asking participants to read emotion-eliciting scenarios that happened in real-life. In the bad mood condition, for instance, participants read about a protagonist who drove through a red light and accidentally killed a child, whereas in the good mood condition, the protagonist saved the child's life. In both conditions, participants were asked to imagine themselves in the protagonist's situation and describe the emotions they experienced after reading the scenario.

After manipulating the mood of the participants in their respective groups, participants were told that they would take an intelligence test that consisted of a series of math problems. Participants were told that they would have the opportunity to practice for this test for 15 minutes adding that practice tends to enhance performance on this math test. If participants did not want to practice for the test, they had the option to engage in alternate activities. The quality of the alternate tasks was manipulated to be fun (included challenging puzzles, video games and popular magazines) or boring (included preschool level puzzle, out-of-date journals). Besides the manipulation of mood conditions and alternate task quality, Tice and colleagues (2001) also included a mood-freezing paradigm to manipulate the participants' expectation of whether their mood was frozen or changeable. In the mood freezing condition, participants were either told that their mood was frozen by the aromatherapy candles or their mood was changeable. The level of procrastination was measured by noting the amount of time participants spent on

alternate tasks as opposed to practicing for the math test. Tice and colleague (2001) hypothesized that participants in negative mood states would procrastinate on practicing for the math test more by engaging in alternate activities and when their mood was changeable compared to participants in a good mood state. However, procrastination will be only evident when the alternate activities are fun or exciting.

The results supported Tice and Colleagues' (2001) prediction demonstrating that participants who were induced to have a bad mood procrastinated more on practicing for the math test compared to participants in the good mood. However, in negative mood condition participants procrastinated more only when they believed that their mood was changeable and when they were provided with more appealing alternate tasks. Participants in a bad mood who were given a boring alternate task option did not procrastinate more than participants in the good mood condition. Even more interesting is that participants who were told that their mood was frozen spent more time practicing for the test than procrastinating, even when the fun alternate tasks were offered (Tice, Bratslavsky, & Baumeister, 2001).

Although this study has limitations such as procrastination was measured simply based on time spent on alternate tasks instead of using a procrastination self-report questionnaire, and participants might not have found the math test important, the findings of this study are important in understanding the process of emotion misregulation in procrastination. It shows that people procrastinate because they adopt emotion-focused strategies to improve their mood, which is accomplished by avoiding the important tasks and giving into hedonic needs by engaging in alternate activities of appealing nature.

Based on their findings, Tice and colleagues (2001) presented an important argument that needs to be carefully considered. They argued that the causal relations procrastination has with other important psychological variables such as self-handicapping, low self-efficacy, low self-esteem, fear-of-failure or personality variables as demonstrated in previous studies are definitely important to understand procrastination. However, if these causal variables were the only determinants of procrastination, then whether participants were given the choice of exciting versus boring alternate tasks should not have mattered. It would be expected that to protect their sense of self, individuals who procrastinate would even choose the boring tasks over practicing for a test. The fact that only exciting or interesting tasks were chosen to delay practicing for the math test under the changeable mood condition indicates that individuals who procrastinate use short-term mood repair strategies that leads to self-regulation failure affecting future goal achievements.

Chapter Summary and Conclusion

Together, the theoretical discussion and empirical findings summarized in this chapter demonstrate that procrastination is an emotion-regulation problem which involves the utility of emotion-focused coping strategies to avoid instrumental goals as opposed to adopting proactive, practical problem-solving strategies to facilitate goal-directed behaviour. This is because individuals who procrastinate hold a mistaken belief that escaping their important tasks will reduce their task-related negative emotions and engaging in pleasant alternate tasks will repair their mood providing emotional reliefs (Pychyl & Sirois, 2016; Tice & Bratslavsky, 2000). These individuals are selecting situations that will serve their hedonic needs to feel better. Although this emotional relief

is short-lived, they still give into these hedonic needs which in turn pushes initiation and completion of important tasks closer to deadlines in a very limited time, sometimes even the night before the deadlines (Pychyl & Sirois, 2016). The present-self's decision to needlessly delay the intended tasks to repair mood then becomes the future-self's burden to keep up with the deadlines (Sirois & Pychyl, 2013). And, quite ironically, because of this primacy of mood regulation, "Often they [procrastinators] end up feeling worse even though affect regulation was their top priority" (Baumeister & Heatherton, 1996, p. 11).

As Pychyl and Sirois (2016) noted, it is imperative to frame procrastination from an emotion-regulation perspective to understand the self-regulation failure in this self-defeating behaviour. However, to understand the misregulation of emotions in procrastination, researchers need to investigate which tasks are being avoided and which tasks are chosen to serve the hedonic needs in this problematic behaviour together with how people feel and think about these tasks and how they regulate these emotions. It is a dynamic process, which is difficult to examine empirically because it is best done with the real tasks in people's lives, not experimental tasks such as "intelligence tests" which may hold little value to the experimental participants.

One avenue to capture the real tasks in people's lives and the emotion-regulation processes theorized to be the cause of procrastination is with the use of Little's (1983) *Personal Project Analysis* (PPA). A personal project is a middle-level unit of analysis in personality psychology (Little, 1983, 2001, 2015) that can be used to learn about people's goals that they are carrying out on a day-to-day basis as well as how they appraise these goals from affective and cognitive perspective. In the next chapter, I discuss the

background of PPA and how PPA was previously used in procrastination literature to establish why this unit of analysis was appropriate for my thesis.

CHAPTER 3

PERSONAL PROJECT ANALYSIS TO UNDERSTAND PROCRASTINATION

On a day-to-day basis, we pursue many personal goals. Each goal has a different meaning to us and serves a different purpose. As individuals, we decide which goals are meaningful to us that we want to pursue. These meaningful goals can be as small as "feeding the dog" or as large as "fighting for human rights." Little (1983) described these goals as *personal projects* of individuals and introduced *Personal Project Analysis* (PPA) as a method to examine goal pursuit in daily life.

There are many types of personal projects people carry out every day that require varied amounts of time, energy and resources to accomplish. Some of these projects are higher order goals, which we strive to accomplish such as becoming a professional tennis player, completing law school, or becoming a journalist. Whereas other types can be leisure goals (e.g., reading a novel, painting a portrait), everyday chores (e.g., cooking dinner, taking the bus or driving to work), health related goals (e.g., exercising, losing 15 pounds, getting enough sleep) or interpersonal goals (e.g., having dinner with family, maintaining good relationship with colleagues; e.g., Little 1983, 1989; 2015; Little & Gee, 2007).

Research on personal projects has demonstrated that when individuals pursue their meaningful projects that are manageable, supported by others and are not exceedingly stressful, they report to have a better quality of life (e.g., Little, 1989). Moreover, perceiving a sense of efficacy during these project pursuits (i.e., perceived control over projects) predicts well-being and happiness (McGregor & Little, 1998), and

goal integrity (i.e., whether the project aligns with one's self-identity) predicts elevated meaning (i.e., having a purpose in life; McGregor & Little, 1998).

Given that I used project as a unit of analysis and PPA as a method for my analysis in my thesis research, in this chapter, I discuss personal goals from Little's (1983) perspective of personal projects. I begin my discussion with how Little (1983, 2007) defined personal projects, why PPA was developed, what PPA entails and how this method is used to understand people from a middle-level unit of analysis in personality psychology (Little, 1983, 2001, 2007). Then, I briefly discuss studies that used PPA in the procrastination literature. In this section, I show how projects have been used as a unit of analysis to investigate important antecedents and correlates of procrastination, and in developing interventions for procrastination. Finally, I explain the significance of using PPA in relation to my thesis, as well as how I used this method to operationalize emotion misregulation and irrational beliefs in the self-regulation failure we know as procrastination.

The Origin of Personal Projects Analysis

Little (1983) originally defined personal projects as "a set of interrelated acts extending over time, which is intended to maintain or attain a state of affairs foreseen by the individual" (p. 276). Later, he refined this definition further to describe personal projects as "…extended sets of personally salient action in context" (Little, 2007, p. 25). He elaborated on each component of this definition to explain the significance of personal projects in people's lives. In this definition, *extended* means that personal projects are not momentary actions or behaviours, but they typically extend over time. Personal projects occur in *sets*, that is, people carry out many projects on a given day and

they tend to be interrelated. These projects tend to be *personally salient* as they have idiosyncratic meaning to the individual who is carrying out the projects. Because the individual defines these projects, they are, therefore, able to foresee whether these projects should be attained, maintained or avoided (Little, 2007, 2015). These projects stand out compared to all other tasks an individual carries out every day. *Actions* need to be taken to implement these projects, and Little explained that these actions an individual takes are intentional and volitional. Lastly, personal projects are dependent on *context,* such as the physical, social, cultural and temporal context (Little, 1983; 2007; 2015).

To further understand this definition, it is important to consider an example of a personal project. Among many other personal projects (e.g., exercising, getting a good night sleep), an individual might have a specific project of "maintaining a healthy diet." In this case, this project is extended over time to maintain good health. The importance of having a good diet to an individual can be related to reasons such as the person has high level of cholesterol and a poor heart condition which might be addressed with a change in diet. Besides the medical reasons, this project can have unique meaning to the individual where the individual wants to stay healthy to avoid being dependent on others and wants to ensure that their health does not interfere with their other personal projects such as getting a promotion at work or taking care of my family. Therefore, the individual takes actions accordingly to have more healthy foods such as fruits and vegetables in their diet and less fast food or any unhealthy snacks. In this sense, investigating personal projects of people can provide meaningful insights into who they are particularly by examining how they think and feel about their projects, how they manage these projects and how their projects shape their behaviour (e.g., Little, 1983, 1989, 2007, 2015).

The development of PPA as a method is rooted in the field of personality psychology. Little's (1983) theoretical framework and research on personal projects stem from Henry Murray's (1938) idea of "serials" which are actions or projects people take that continue over time under different spatial contexts. Murray (1938) argued that people could set these projects aside when they need to and can come back to them to continue working on them. Based on how the projects are progressing, people can also decide to complete or abandon these projects. He reasoned that such behaviours could not be understood using stimulus-response theory that posits that individuals always act in response to a stimulus. Instead, individuals act on these projects as these projects are meaningful to them and, therefore, they internally aspire to complete these projects, and not simply as a response to some stimulus. Murray (1938) referred to these pursuits as "proactive" as they are stimulus free. As Little (2001, 2007, 2015) argues, it is the temporal aspects of these projects that can provide more information on the enduring pattern of behaviour of individuals and, therefore, a better understanding of people's personality (known as "personology" at the time) can be obtained.

Another aspect of Murray's (1938) work that also contributed to the development of PPA and what type of data can be collected using PPA is how Murray took an interdisciplinary approach to studying the personality of individuals. Murray analyzed human personality by forming an assessment panel of researchers from diverse disciplines. The goal of this interdisciplinary discussion was to create a comprehensive portrait of an individual's personality by taking into consideration the different contributing factors such as psychology, biology, philosophy, humanism, chemistry and cultural aspects. A traditional assumption of personality theory was that stable personality

traits determine human behaviour which remains consistent over time and across situations. Murray argued otherwise stating that it is not just the genetic and neurophysiological underpinnings of traits that researchers should pay attention to. He voiced concerns that the environment plays a significant role in the underlying motives of human conduct, which received relatively little attention. Whether individuals have supportive or non-supportive environments, can determine whether project achievements will be facilitated or frustrated. Because of these within-person and environmental factors, Murray (1938) reasoned that personality development involves dynamic processes, and, therefore, a holistic approach should be taken to unravel how these biological, psychological and social factors are playing their respective roles in personality development (cf. Little, 2007).

Similar concern with the trait approach to understand behaviour was raised by another prominent personality psychologist, Gordon Allport (1937; 1960). He argued that trait theory of personality resembles a closed system from the second law of thermodynamics where the system has little or no transactions with the environment. Much like this closed system, personality trait theorists have restricted the explanation of why individuals act or behave in a certain way to the traits individuals possess, and have largely ignored the role of environment. To highlight this limitation of personality theories from the trait perspective, Allport (1960) wrote,

> "They [most theories of personality] allow interchange of matter and energy, and recognize the tendency of organisms to maintain an orderly arrangement of elements in a steady state. Thus they emphasize stability rather than

> growth, permanence rather than change, "uncertainty reduction" (information theory), and "coding" (cognitive theory) rather than creativity" (p.304).

Allport strongly argued for a theory that takes into consideration both the person and the situation the person is in, to understand the person as a whole. It is not just the traits but different environments, situations and social interactions can also shape individuals' abilities, attitudes, and motives and therefore, can affect what they do and how they behave. Allport's (1960) analogy of personality theories to the closed system of thermodynamics basically underscores trait psychologists' narrow perspective on how human behaviour should be analyzed. Allport (1937, 1960) suggested that human personality should be understood through the lens of different disciplines (e.g., traits, cognitions, motivation, social system) for which an appropriate unit of analysis was needed.

Later, in 1968, Mischel heavily critiqued the trait approach as a unit of analysis to understand human conduct. His investigation of the empirical studies in personality psychology revealed that individuals' behaviours across situations were in fact inconsistent which contradicted the traditional trait assumption. He determined that situations play a substantial role in the actions individuals take and situations should not be considered as noise or anomaly in the findings, as trait psychologists were apt to do. He contested that human behaviour and actions are a product of their traits *and* the situations they are in, not traits alone (Mischel, 1968). The limitation associated with the early trait theory as identified by these personality researchers (i.e., Allport, 1960; Murray, 1938; Mischel, 1968) that people's behaviours can be determined simply by their personality traits created a controversy that PPA addresses, at least in part.

Although, Murray (1938) made some important observations about how people plan and implement important idiosyncratic projects and how these projects could facilitate the understanding of person interacting with the situation, there were no specific methods available at that time to assess the "person by situation" interaction that affects people's behaviour. While an interdisciplinary vision on personality to understand individuals' interaction with the environment is important, Little (2007) noted that the process of having researchers from different disciplines come together as well as having a common language to discuss the findings of personality research from these disciplines is very difficult and challenging, if not simply impossible.

In searching for a unit of analysis with which to study personality, Little (1983) published his pioneering article on Personal Project Analysis proposing a method that can examine how the person interacts with the environment through personal projects they carry out every day. In his first published paper on PPA, Little (1983) wrote,

> "…personal projects might serve the purpose of providing an integrated unit for personality research. Further, projects are natural interactional units of analysis (Argyle and Little, 1972) that typically (though not necessarily) involve active commerce with the environment over extended periods of time. As units, personal projects place individuals in context at the very outset, both spatially and temporally" (p. 276).

Little's (1983) PPA framework shares the same philosophy as George Kelly's (1995) repertory grid technique. Kelly (1955) introduced the concept of "personal construct" based on which the repertory grid technique was developed. Kelly (1995) viewed each individual as a lay scientist who actively create and test hypotheses, and

revised these hypotheses based on their life experiences. He explained personal constructs as the way people idiosyncratically view themselves, others and the world, which provides the context of their daily life. The repertory grid technique is used to identify the way individuals interpret their experiences. While having a similar philosophy, Little's (1983) PPA framework included a different strategy where individuals were understood based on the personal projects they are involved in, not simply their constructs. The central assumption of PPA is that the projects individuals undertake and how they perceive and manage these projects can account for their daily experiences to explain their personality. In this sense, Little argues that personal projects are unique middle-level units of analysis in psychology situated between broad, general traits and highly specific personal narratives. Moreover, his PPA approach provides access to project appraisals tapping, at least to some extent, how people construe their projects.

Little (2001) explained that in personality research the first level of inquiry includes the "having," a concept originally proposed by Allport (1937) that means what stable traits individuals *have*. Little (2001) referred to the Big Five personality traits – conscientiousness, agreeableness, neuroticism, openness and extraversion, when explaining stable personality traits. Using PPA, researchers can determine specific personal projects undertaken by individuals to understand the "doing" aspect of their personality, a term also proposed by Allport (1937). In this sense, projects can be considered as middle-level units of analysis (Cantor, 1990). Projects are embedded in specific contexts and therefore, context specific information can be obtained. Additionally, how individuals evaluate or appraise their projects from cognitive,

affective, motivational, conative and behavioural aspects over time can be assessed. Individuals' evaluation of these projects can explain how they are functioning in the environment. What is particularly unique about PPA is that a deep understanding of human flourishing, creativity and excellence is possible by the unfolding the projects of individuals conducted in different contexts (Little, 2007). As such, similar to Murray's interdisciplinary approach, disparate perspectives to understand personality can be taken using PPA, but the assessment and application of this method is simple and more efficient.

To demonstrate how personal projects can be used to understand human personality, taking a similar perspective as Murray (1938), Little (2007) explained that stable personality traits are not abstract but they become specific, concrete, even salient when people engage in their personal projects. Because personal projects are typically extended over time, learning about the specific projects people attain, maintain and execute can provide important information on each individual's personality (Little, 1983, 1989, 1993, 2007, 2015).

However, instead of considering personality as dispositions that stay stable across life and where each individual holds a specific position on the continuum of the stable personality traits, Little and colleagues took a multidimensional view to understand personality. They argued that individuals can hold multiple positions on the personality continuum (Little, 2008; Little & Joseph, 2007; Sheldon, 2007). Sheldon (2007) reasoned that individuals can exercise their agency over stable personality traits by integrating their needs, goals, possible selves, and cultures into their traits. Similarly, Little (1996, 2008) noted that although individuals are born with stable personality traits, they do not

necessarily always act in concert with these traits. Little proposed the *free trait* theory, which is fundamentally a social ecological framework of personality, to explain these inconsistencies in why people behave differently from that of their predispositions. He defined "free traits" as strategic tendencies or choices that are adopted by individuals to advance core projects (Little, 1996, 1999, 2000, 2008, 2015; Little & Joseph, 2007). These tendencies are in effect when biogenic, sociogenic and idiogenic sources interact with each other during goal pursuits. In a very real sense, free traits lie at the intersection of the having and doing aspects of personality and address Mischel's notion of person and situation.

Biogenic sources include individuals' genetic predisposition to specific traits that can influence human conduct without awareness. Sociogenic sources are the societal and cultural norms and scripts people internalize from socialization experiences that can determine certain actions. Sociogenic scripts are likely to be relatively stable but can be changed by internalizing different cultural values and norms. In contrast, idiogenic sources are the individual-specific values and self-reflections that determine which projects individuals will pursue, and the enactment of these projects involves some level of conscious deliberation (Little, 1996, 2008; Little & Joseph, 2007). Little (2008) reasoned that when executing core projects to fulfill idiogenic aims, individuals sometimes implement sociogenic scripts, which do not always align with the biogenic dispositions. In such instances, free traits enable individuals to override their biogenic traits in favour of sociogenic scripts to facilitate project implementation.

To understand the interplay of biogenic, sociogenic and idiogenic sources in enacting core projects, let us consider an example. A student, who is an introvert based

on their biological dispositions, might choose to act like an extrovert during a class presentation to conform to the sociogenic script of their class that presenters should be cheerful, friendly and sociable to easily interact with others in public appearances. In this case, he or she is making a choice to override their natural tendencies, which typically include seeking solitude to avoid too many social interactions and escaping spotlights. In this sense, he or she is acting out of character by enabling their free-traits to deliver a successful presentation on a topic he or she is passionate about to fulfill one of their core projects.

As Little (2008; Little & Grant, 2007) wrote, central to human flourishing is the sustainable pursuit of core projects. In this regard, to facilitate the progress and completion of core projects, it is not uncommon for people to act out of character in everyday life (Little & Joseph, 2007). However, extended dissonance between biogenic nature and free traits may result in strain, psychological discomfort and stress affecting physical and mental well-being. Such dissonance can be mitigated by restorative resources that allow individuals to act in accordance to their biogenic tendencies (Little, 2008; Little & Joseph, 2007). For example, if the introverted student in the previous example has to participate in frequent class presentations, then to restore his biogenic nature, he needs to be in solitude or a place with reduced stimulation. Little (2008) argued that personal projects form the link between fixed and fluid personal features in our lives. As such, an inquiry into people's core projects using the PPA (i.e., what projects are being pursued, progress on the projects, how people appraise these projects and the context in which projects are carried out) can inform researchers about the idiogenic origin of these projects and how these projects bridge their stable personality

traits and the sociogenic environment affecting human flourishing and well-being (Little & Grant, 2007; Little & Joseph, 2007).

As a method, PPA not only provides insights into people's personality and internalized societal norms, but can also inform researchers about the unique situation in which individuals are carrying out these projects. Indeed, societal prescriptions and proscriptions can influence people's choice to pursue certain projects but not others (Cantor, 1994). For example, graduate students who are aiming to be researchers are required to follow certain academic norms, that is, they need to focus on which research projects they take on, the number and quality of the research papers they publish, how they collaborate with other researchers and complete coursework, etc. What PPA can capture is the unique personal context in which each graduate student is conducting their projects. Each individual's specific context can facilitate or impede the progress of any particular project (Little, 1983; Little 2007; Little & Gee, 2007; Little & Joseph, 2007). For example, findings from a study by Wallenius (1999) revealed that people experience greater efficacy during project pursuit when they perceive that they have adequate support from the environment to continue their projects. Furthermore, people carry out multiple projects every day, and these projects form an interacting system. Within this interacting project system, projects can have positive or negative impact on each other (Little & Gee, 2007). For example, a graduate student who has a goal to complete their Ph.D., but also has a sick parent to take care of has two important personal projects that conflict each other. Taking care of a sick parent requires effort, commitment, time and responsibilities that could slow down the progress of their academic work. Therefore, the interacting projects also create unique context for each individual given that different

individuals have different projects to carry out everyday under quite different circumstances (Little & Gee, 2007).

Given the unique contexts in which each individual carries out their projects, Little (1983) argued that it is important to address the narrative identities of individuals, that is, how people make sense of who they are, how they construe their identity and sense of self. This important discussion was initiated by Allport (1937) who made a convincing argument of why it is important to take an idiographic (i.e., narrative) approach to study personality and not just a nomothetic (i.e., psychometric) one – a view that Murray (1938) and Kelly (1955) also supported. With an idiographic approach, the inquiry is about each individual's specific experiences and dispositions that make him or her unique. A nomothetic approach concerns research findings on dispositions people share with others to establish group norms (McAdams, 2006). Allport (1937) expressed concern that traits investigated nomothetically cannot capture the life experiences, multiple contextualized selves (i.e., how the same person behave and act differently in different contexts) and personal characteristics that are peculiar to each individual. Little (1983) shared a similar view as Allport's, and he placed a strong emphasis on investigating the "being" aspect of personality which concerns each individual's narrative in addition to the "having" (i.e., the stable personality traits individuals have) and the "doing" (i.e., the project pursuits and the evaluation of the projects in context) of personality. Little (1983) developed PPA as a tool that can be used for both idiographic and nomothetic approaches making PPA a compelling assessment instrument where individuals' every personal project within the social ecological framework serve as the unit of analysis.

In the present study, my main goal was to collect data by employing both idiographic and nomothetic approaches to obtain a comprehensive understanding of the interplay of mood-repair interacts and irrational beliefs in procrastination when students engage in needless deferral of their academic tasks, for which the PPA is an ideal instrument. Nomothetically, the general experience of emotions and the types of thoughts people commonly have when procrastinating can be examined by analyzing PPA data across a large sample of participants; whereas ideographically, each individual's account of how he or she feels and thinks during procrastination within their unique situation can be understood. Using both idiographic and nomothetic approaches inherent in PPA, information on the academic projects individuals carry out was gathered first followed by how individuals appraise these projects from emotive, cognitive and motivational perspectives. Discerning how individuals appraise their projects is a fundamental step to the PPA method and as such I discuss and summarize this aspect of PPA in the next section to elucidate how project-related data are typically collected and analyzed.

Personal Project Analysis

PPA is a multi-modal assessment tool comprised of four basic modules: 1) an Elicitation Module; 2) an Appraisal Module; 3) a Hierarchy Module; and 4) a Cross-Impact Module (Little, 1983; 1989). The *Elicitation Module* involves having individuals list their current personal projects, planned or ongoing, in short phrases (e.g., finish statistics assignment, finish painting the kitchen) from which individuals are asked to choose 10 core projects that most accurately capture their life at the moment. In this module, the core personal projects individuals note in their own language and provide

researchers with the answer to the question of, “What’s up?” (Little 1983, 2015; Little & Gee, 2007).

The array of projects that individuals list can be quite diverse. It can involve projects that are mundane (e.g., attend psychology class) to projects that individuals are passionate about (e.g., writing Ph.D. thesis). Furthermore, the projects listed can be individual-oriented including self-focused goals or other-oriented where the projects are done for others (Little, 1983, 1989, 1993). Based on the specific research purpose, the projects listed can be categorized under different domains to simplify the process of data analysis such as interpersonal, academic, work, intrapersonal, recreational/leisure, health, maintenance and other (Little & Gee, 2007). The categories can then serve as indexes for both nomothetic (between individuals) and idiographic (within individuals) for different analytic purposes (Little, 2015; Little & Gee, 2007).

At the project elicitation stage, PPA is flexible not only because individuals can elicit their salient projects from all different domains of their lives, but the focus can be also narrowed down to projects from a specific domain. Researchers can select the work domain, academic domain, health domain, cultural domains, interpersonal relationship domain or any other domains depending on the type of research questions they want to explore. For example, Dowden (2004) investigated the specific projects that entrepreneurs carry out in the entrepreneurial domain. Although researchers can lose the important details of the overall project system of individuals by funneling the elicitation of projects to a specific domain, the different and yet specific types of projects people are conducting within each domain can be investigated more thoroughly. Additionally, individuals can be asked to list and rate the extent to which they approach and/or avoid

their goals (Elliot & Friedman, 2007), an aspect that is key to the present investigation where participants were asked to list their current academic projects, the projects they are procrastinating on the most and the extent to which they procrastinate on those tasks.

The second module of PPA constitutes the *Appraisal Module* where participants are asked to rate (or appraise) some or all of the projects they noted in the elicitation module on a number of standard and *ad hoc* dimensions (Little, 1983, 1989, 1993; Little & Gee, 2007, Pychyl & Little, 1998). In an informal tone, this module is basically asking the individuals "How's it going?" in terms of the projects they mentioned. The projects and the dimensions are presented to individuals in a *j* by *k* matrix where the *j* projects are listed in rows and the *k* dimensions are listed in columns (see Appendix C). Respondents appraise all of their projects on all dimensions on a 0-10 Likert-type scale. The data obtained in the matrix can be analyzed at the level of the individual as well as at the group level.

The original or standard appraisal matrix is comprised of 17 cognitive dimensions asking individuals about "what they think" about the ongoing or planned personal projects they have listed. These standard dimensions were included in the PPA due to their practical and theoretical relevance to the general characteristics of personal projects (Little, 1983, 1989; Little & Gee, 2007; Little Lecci, & Watkinson, 1992). For example, the dimension "absorption" has been added to determine the issues of flow during project pursuits (Little & Gee, 2007) and the dimensions "value congruency," "stress" and "time adequacy" were added to PPA due to their relevance to life satisfaction, physical and mental health (Little, 1983, 1999). Similarly, Little provided a rationale for each of the other dimensions that were included in the PPA (see Little, 1983, 1989, 1999 Little &

Gee, 2007). In contrast, the purpose of the *ad hoc* dimensions is that any other dimensions can be added or removed, thereby making PPA a very flexible method not only at the elicitation stage but also at the appraisal stage. Researchers can be selective in choosing the dimensions to suit the specific hypotheses they formulated or the research questions they have (Little, 1983, 1989). To show how dimensions can be added to PPA, under *ad hoc* dimensions, Little and colleagues included some affective dimensions asking individuals "how they feel" about these personal projects (Little & Gee, 2007; Pychyl & Little, 1998). The standard and a selection of *ad hoc* dimensions by Little and Gee (2007) are presented in Table 3-1.

Table 3-1
A List of the Standard Cognitive Appraisal Dimensions and Some Examples of Ad Hoc Affective Appraisal Dimensions (Note. These Dimensions are from the Appraisal Module of the Personal Project Analysis by Little and Gee, 2007)

Standard cognitive dimensions	Ad hoc Affective dimensions
1. Importance	1. Sad
2. Enjoyment	2. Fearful/Scared
3. Difficulty	3. Full of love
4. Visibility	4. Angry
5. Control	5. Happy/with enjoyment
6. Responsibility	6. Hopeful
7. Support	7. Stressed
8. Time adequacy	8. Uncertain
9. Outcome/Likelihood of success	9. Depressed
10. Self-identity	10. Other emotions[3]
11. Other's view	
12. Value congruency	
13. Progress	
14. Challenge	
15. Absorption	
16. Autonomy	
17. Competence	

[3] Under the ad hoc affective dimensions, researchers can add any other emotions that they prefer based on their specific research questions.

Based on theoretical postulations and exploratory factor analyses, Little (1999; Little & Gee, 2007; McGregor & Little, 1998; Pychyl & Little, 1998) suggested that the cognitive and affective dimensions can be summarized under five major themes: project meaning, manageability, community/support, positive affect and negative affect. Dimensions such as self-identity and absorption are nested under project meaning. Manageability captures project structure and efficacy and, therefore, includes dimensions such as control and likelihood of success. Community/support is comprised of dimensions such as visibility and other's view. Positive affect and negative affect are the two orthogonal factors where dimensions such as happy and full of love are included under positive affect, whereas dimensions like fearful and sad are included under negative affect (Little & Gee, 2007). In addition to the cognitive and affective dimensions, two open columns are provided for individuals to answer "With whom" they are engaging in these projects as well as "Where" the projects are being conducted to understand the aspects of the social ecology in which individuals are pursuing their projects (Little 1983; Palys & Little, 1983).

Personal projects progress through different stages, and Little (1983) explained that the progress of individuals' projects through these stages can be also analyzed using the PPA. According to Little (1983; Little & Gee, 2007), personal projects progress through four stages: *inception, planning, action* and *termination*. The *inception* stage involves being aware of the projects and making decisions whether to take the projects on or not. When individuals decide to take on a project, it moves to the next stage that involves planning. At the *planning* stage, individuals take into consideration the social and temporal aspects of the projects and assess how much time, effort, and resources are

required to implement the projects. Once individuals create their plans for their projects, they implement these projects by taking actions. At the *action* stage, individuals begin working on the projects to achieve the outcomes they expected from these projects and also engage in post-evaluation of whether the outcome has been obtained as anticipated. Once the anticipated outcome of the projects is achieved, the projects proceed to the *termination* stage where the projects are wrapped up to signal completion.

Besides analyzing the progress of projects across stages, an additional benefit of PPA which further contributes to its flexibility is that researchers can solicit information about contexts in which projects are progressing (Little, 1983, 1989, 1993; Little & Gee, 2007; Little, Lecci, & Watkinson, 1992). Different projects are conducted in different contexts and the contexts can shape how the project is perceived (Little & Gee, 2007; Pychyl & Little, 1998). To discern how individuals feel and think about their projects in these social ecologies, Little (1983; Little & Gee, 2007; Pychyl & Little, 1998) explained that researchers can choose specific *ad hoc* cognitive, affective, motivational and behavioural appraisal dimensions that capture the specific essence of the context or setting. The choice of dimensions based on the contexts can provide more relevant information about how the projects are really going which will otherwise not be possible and this has been demonstrated in empirical studies. For example, Phillips, Little and Goodine (1997) recruited federal government managers from different domains of public service (e.g., administration, financial management) to rate their personal projects (included both personally salient projects and formal work projects) on different PPA dimensions. These researchers included some *ad hoc* dimensions (e.g., commitment, sense of self-worth) to specifically capture how the work environment facilitated or

frustrated project progress and how it was related to well-being. Their findings showed that while both male and female managers were committed to their projects, women found projects of managing-people as more enjoyable, producing more of a sense of self-worth than men, but also perceived them to be more challenging and difficult and having less control compared to men. In contrast, men experienced more frustration than women when work environments did not support their project pursuits. This study reflects the flexibility of PPA, that is, researchers can choose relevant PPA dimension to try and capture how individuals think, what motivates them and what makes them behave in a certain way within a specific context.

The third module in the PPA is the *Hierarchy Module* which provides the means to assess the hierarchy of personal projects ranging from subordinate, schedulable goals (i.e., projects at the molecular level) to superordinate goals or higher order goals (i.e., projects at the molar level; Little, 1983; 2015; Little & Gee, 2007). Analyzing the location of each project based on their hierarchy in the PPA was adapted from the laddering procedure by Hinkle (1965) in repertory grid method (cf. Little, 2015). The process of laddering in the hierarchy module involves asking individuals iterative questions about why they engage in each of their projects ("why" laddering) and how they engage in each of the projects they have mentioned ("how" laddering). The "why" laddering assesses the hierarchical superordinate reasons for conducting each project in the project system of each individual; the "how" laddering examines a set of schedulable actions that individuals need to take to attain their superordinate goals (Little, 1983,1989; Little & Coulombe, 2014).

The fourth and the last module which is the *Cross-Impact Module* was created under the assumption that the personal projects individuals are undertaking or planning to work on form an interacting system meaning that each project individuals have on their list can facilitate and/or frustrate their other projects (Little & Gee, 2007; Salmela-Aro & Little, 2007). At any particular moment, people can work on only one project while placing other projects on hold. However, on a given day, individuals work on multiple projects, which can affect each other either positively or negatively. Taking into consideration the synergistic or conflicting relations among projects, Little (1983) included the cross-impact matrix to systematically investigate people's perception of whether they think their projects are working in harmony or they are in conflict with each other. The cross-impact matrix may render the identification of projects that are facilitating or are interfering with the core projects that people have. For example, the project "eating healthy" can facilitate one of the other meaningful projects like running a marathon.

In the present research, the *Elicitation Module* and the *Appraisal Module* of PPA were used to examine the mood-repair model of procrastination within the academic context. Using PPA, the goal was to examine the specific positive and negative emotions students experience and how they appraise these emotions across four momentary phases – when they attempt to do academic tasks they typically procrastinate on, making a decision to needlessly delay those tasks, forming intention updates to work on those tasks later and engaging in some alternate activities with hedonic qualities. The difference in the experience of positive emotions as well as the difference in negative emotions across these momentary phases can further explain the process of mood repair in

procrastination. In this case, increased negative affect and decreased positive affect when attempting academic tasks they procrastinate on can explain why these tasks are perceived as aversive and thus, avoided. In contrast, increased positive affect and decreased negative affect when making a decision to needlessly delay those academic tasks, when forming intention updates to do them later and when engaging in alternate activities can demonstrate how these subsequent momentary decisions are the means to provide emotional relief during procrastination. The conflict among academic tasks that students procrastinate on and the alternate activities they tend to carry out when procrastinating were also assessed to determine the extent to which these conflicts contribute to their mood-repair process as well as procrastination.

The specific affective dimensions I selected in the present investigation were based on the findings from previous studies on procrastination (e.g., frustration, boredom, resentment). I also created dimensions that reflect irrational beliefs based on past studies to determine the extent to which students have these thoughts when they procrastinate on their academic tasks. Some of the standard cognitive dimensions from the PPA were also included in the present investigation.

It is important to note that some of these studies from which I chose the dimensions also utilized PPA as an analytic method to study procrastination. In these studies, researchers have used the standard dimensions of PPA and some *ad hoc* dimensions to examine important antecedents of procrastination such as task aversiveness and intention-action gap and also, investigated how individuals who procrastinate cognitively appraise their academic tasks and the specific emotions they experience during procrastination (e.g., Blunt & Pychyl, 2000, 2005; Lay, 1990). I turn now to a

review of these studies in the next section to discuss the specific affective, cognitive and motivational dimensions that were included in my dissertation to study the interplay of affective (i.e., mood-repair model) and cognitive (irrational beliefs) processes in procrastination.

Personal Project Analysis as an Analytic Unit in Procrastination Research

Procrastination is a popular topic in academic settings. Even when students are provided with sufficient time and guidance to complete their academic projects successfully, many students still report procrastinating (e.g., Schouwenburg, 1995; Van Eerde, 2003). The context in which these students are completing their tasks involves pulling all-nighters accompanied by panic and stress (e.g., Lay 1986; Tice & Baumeister, 1997; Pychyl et al., 2000). In four decades of procrastination research where understanding this problematic delay in academic settings has received considerable focus, only a few researchers used the PPA as a method to investigate procrastination.

Using PPA, researchers (Blunt & Pychyl, 2000, 2005; Lay, 1990; Pychyl, 1995; Little & Pychyl, 1998; Pychyl & Binder, 2004) have examined the underlying reasons and consequences of the self-regulatory failure in procrastination. Lay (1990), in his study, examined the effects of task aversiveness and likelihood of failure on trait procrastination. The participants in this study were university students who were asked to evaluate 12 ongoing projects that they are more likely to engage over the next month on a number of PPA dimensions. Participants were asked to appraise their projects on four specific dimensions. *Adequacy of time spent on a project* was used as a dimension to understand procrastination behaviour where lower scores indicated higher levels of procrastination behaviour. The dimension *enjoyment in working on a project* was used to

determine task aversiveness where low score on this dimension reflected greater task aversiveness. Likelihood of failure was measured using two dimensions – *likelihood of successful outcome* and *likelihood of completion* where low scores on these dimensions indicated increased chance of failure on a project. Participants completed PPA questionnaires at period 1 of this study and also completed some follow-up questionnaires after 3 weeks (period 2), 6 weeks (period 3) and 12 weeks (period 4). During these time periods, they reported whether these projects were completed, ongoing or abandoned and also rated their degree of adherence to these projects on a 3-point scale –1 (behind schedule), 2 (on schedule) or 3 (ahead of schedule). Additionally, at time period 4, participants completed a measure of trait procrastination.

Lay (1990) found that trait procrastination negatively predicted time adequacy, and task aversiveness added unique variance above and beyond trait procrastination to negatively predict time adequacy. Lay concluded that procrastinators tend to spend less time on their projects and they spend less time particularly on projects they find aversive. The dimension likelihood of failure on projects did not predict time adequacy. For projects without deadlines, however, procrastination interacted with likelihood of failure to predict time adequacy where individuals who scored high on procrastination and expected to fail on their projects, spent more time on those projects; whereas individuals who scored low on procrastination and expected to fail on their projects, spent less time on those projects. Individuals who scored high on procrastination reported to be on schedule on their projects that were more likely to fail, whereas individuals scoring low on procrastination were on schedule with projects that they thought would succeed. Lay (1990) interpreted the findings using self-handicapping behaviour. He explained it is

possible that individuals who score high on procrastination are using self-handicapping where they are putting effort on tasks that are more likely to fail despite the effort to protect and maintain their self-worth.

In another study, Blunt and Pychyl (2000) also investigated task aversiveness in procrastination using PPA where projects were appraised on different dimensions across the four stages of project development (i.e., inception, planning, action and termination). They expected that task aversiveness would vary across the stages of project development and at each stage task aversiveness would show positive relations to procrastination. Participants in this study were asked to appraise 10 personal projects that represented their life at present on 30 PPA dimensions. The dimensions comprised of a combination of the standard (e.g., importance, difficulty) and *ad hoc* (e.g., boredom, frustration, uncertainty) dimensions from PPA. Both task aversiveness and procrastination were measured by representing these constructs as dimensions. Task aversiveness was measured by asking participants the extent to which they do not want to engage in a project; procrastination was measured by asking the participants the extent to which they feel that they should work on their project but they avoided the task. Participants' projects were grouped based on the stage at which each project was and mean score for each project dimension was calculated by taking an average of the dimension scores across the 10 projects.

After conducting a series of principal component of analyses where task aversiveness was used as a marker variable, Blunt and Pychyl (2000) found that at all four stages of project development, *boredom*, *frustration* and *resentment* dimensions positively loaded with task aversiveness. Other affective dimensions such as *enjoyment,*

fun, pleasure and *passion* negatively loaded on task aversiveness at the inception, planning and termination stages; *stress* loaded positively with task aversiveness at the inception and termination stages whereas the dimension *negative emotion* loaded positively on task aversiveness at the inception and planning stages. Among other dimensions, *lack of autonomy* positively loaded with task aversiveness dimension at the inception, action and termination stages, and the dimension *initiation*, *control* and *uncertainty* negatively loaded on task aversiveness at the action stage only. Supporting their hypothesis, results also revealed that task aversiveness has small to moderate relations with procrastination at all four stages of project development.

Based on their findings, Blunt and Pychyl (2000) concluded that when engaging in boring tasks, individuals who procrastinate may be unable to continue working on these boring tasks and therefore, engage in alternate actions that are relatively less boring. Also, drawing on the findings from another study by Pychyl and colleagues (2000), Blunt and Pychyl (2000) reasoned that frustration (or other negative emotions) elicited by certain aversive projects can lead to task avoidance and by engaging in less frustrating activities individuals who procrastinate try to relieve themselves from these negative emotions. Thereby, the negative emotions (e.g., frustration, boredom, stress) contribute to the inability to enact intended actions when competing alternatives are presented to individuals who procrastinate contributing to their poor self-regulatory functions. Blunt and Pychyl (2000) explain that the positive emotions, pleasure and enjoyment, reflect the personal meaning associated with the project that is being conducted. Aversive projects lack such personal meaning, thereby, are less likely to be pursued. This may explain why

the pleasure and enjoyment dimensions did not load on task aversiveness at the action stage of the PPA.

In a different study, Blunt and Pychyl (2005) investigated the intention-action gap that is a key element to the definition of procrastination. In this study, they used the PPA method to investigate whether state-oriented and action-oriented individuals appraise their personal projects differently based on the standard dimensions and some *ad hoc* affective dimensions of the PPA. According to Kuhl (1984), state-oriented individuals are those who are unable to regulate their emotions, thoughts and behaviours to enact intended actions; conversely, action-oriented individuals are those who are able to regulate their emotions, thoughts and behaviours to enact intended actions.

Participants were asked to report the 10 projects they were undertaking at that time and they appraised them based on the dimensions provided. Mean scores for each dimension were calculated by taking an average of the dimension ratings across the 10 projects. In this study, Blunt and Pychyl (2005) measured procrastination at the project level using a single dimension of PPA to examine the difference in the level of procrastination between state-oriented and action-oriented individuals. They hypothesized that state-oriented individuals would score higher on dimensions that impede project completion and lower on dimensions that facilitate project progress and completion compared to action-oriented individuals.

Blunt and Pychyl (2005) found support for their hypothesis. They found that state-oriented individuals procrastinate more than action-oriented individuals indicating that despite having the intention, individuals who procrastinate needlessly delay to take actions. State-oriented individuals also self-reported more project boredom, frustration,

guilt and uncertainty and less absorption and control compared to action-oriented individuals. Furthermore, state-oriented individuals scored low on the PPA dimensions of outcome, progress and self-identity dimensions than action-oriented individuals.

The findings of these studies with respect to the affective dimensions provide some interesting insight into which specific emotions people feel during procrastination as their projects progress. It is not surprising, specifically from the mood-repair standpoint, that individuals experience more negative emotions and less positive emotions in the initial stages of their projects and their aversive feelings relate to their problematic needless delay of projects. In fact, Blunt and Pychyl's (2000) conclusions based on these findings reflect the mood-repair process in procrastination, although they did not articulate it as such at that time.

Based on these findings exploring procrastination from a project-analytic perspective (i.e., Blunt and Pychyl, 2000, 2005), I investigated the specific negative emotions individuals experience when they procrastinate on their academic tasks. I incorporated the affective dimensions of boredom, frustration, resentment and stress to assess negative emotions, and included enjoyment, fun, and pleasure dimensions to assess positive emotions.

PPA was also used in a more clinically-oriented study by Pychyl and Binder (2004) that involved the development and investigation of a cognitive-behavioural intervention for academic procrastination. The goal of this intervention was threefold: 1) change the irrational thoughts that students hold during procrastination; 2) help reduce the experience of negative paralyzing emotions such as anxiety and guilt; and 3) teach students how to breakdown large academic projects into smaller goals to manage their

academic workload and to avoid feeling overwhelmed in managing academic projects. In this study, PPA was not used in the treatment intervention itself but was used to measure the outcome of academic procrastination along with other measures of subjective well-being (i.e., life satisfaction and the experience of positive and negative affect) and measures of academic procrastination. Student participants were divided into three groups: 1) those who received 2 hours of cognitive-behavioural training in six workshop sessions (treatment group); 2) those who did not receive any intervention and completed all measures including PPA (comparison group 1); and 3) those who did not receive any intervention and completed all other measures excluding PPA (comparison group 2). Participants who received the cognitive-behavioural intervention worked in groups with a certified counsellor.

Results of the one-way analysis of variance showed that students in the treatment and comparison groups did not differ in their desire to reduce their procrastination behaviour. Results also revealed that receiving six sessions of intervention significantly reduced students' procrastination compared to both comparison groups and this result was also evident at a follow-up session held 2 weeks after the treatment sessions were completed. Students in the two comparison groups did not differ in their procrastination. In analyzing the ratings on the PPA dimensions, Pychyl and Binder (2004) categorized the 17 standard PPA dimensions into five factors based on Little's (1989; Pychyl & Little, 1998) previous findings – meaning (e.g., enjoyment, value congruency, importance), structure (e.g., control, time adequacy), community (e.g., visibility, others' view), efficacy (e.g., progress, outcome) and stress (e.g., challenge, difficulty). Students receiving treatment experienced significantly more structure, reported more project

community and more self-efficacious (i.e., greater sense of control) in handling projects after they participated in the treatment program compared to pre-treatment state (Pychyl & Binder, 2004). There results were not observed in the comparison groups that is, students' appraisal of their project on the PPA dimensions did not differ before and after the program.

Although the studies described so far involved undergraduate or college students to examine their procrastination behaviour (i.e., Lay, 1990, Blunt & Pychyl, 2000, 2005; Pychyl & Binder, 2004; Pychyl & Little, 1998), Pychyl (1995) found evidence for the pernicious presence of procrastination in doctoral students as well. He investigated whether context-specific dimensions that are alternative to Little's (1983) standard PPA dimensions would predict students' subjective well-being. Pychyl (1995) used both idiographic (i.e., interviews) and nomothetic (i.e., regression analyses) approaches in his studies. In study 1, he interviewed doctoral students and took a grounded theory approach to review each student's interview transcript. First, participants were asked to report their current ongoing projects following which they were interviewed to explain what each project entailed and how it was going. Pychyl (1995; Pychyl & Little, 1998) found 11 context-specific dimensions where time pressure, time conflict, anxiety, guilt, financial stress, uncertainty, social support, passion, commitment, positive effects of mood and procrastination were salient dimensions that helped him understand doctoral students' lives as seen through their projects.

These 11 context-specific or *ad hoc* dimensions were then used in study 2 to determine whether these dimensions accounted for variance above and beyond the contributions of personality and the standard PPA dimensions in the prediction of

students' subjective well-being. Regression analyses on students' PPA data showed support for Pychyl's (1995; Pychyl & Little, 1998) hypothesis where context-specific dimensions predicted life satisfaction accounting for 33% unique variance when students' academic projects were considered. Among the 11 context-specific dimensions, procrastination showed a moderate negative relation to project progress, and the dimension *commitment* accounted for 36% variance in project success. Given these findings, Pychyl (1995; Pychyl & Little, 1998) argued that dimensions pertaining to context should be administered together with the standard PPA dimensions making the project analysis more attuned to the context rather than investigating the whole project system under a general context. While a nomothetic approach to collecting PPA data by calculating project dimension means can be useful in research, Pychyl provided evidence that refining the PPA method to include more specific *ad hoc* dimensions that reflect the social ecology of the participants can provide more precise answers to how individuals are negotiating with the context and how the intended actions are really affecting their lives. In fact, Pychyl (1995; Pychyl & Little, 1998) reasoned that an idiographic approach could be a more suitable avenue to obtain a clear picture of the projects in the environment that explain people's lives and speaks to their well-being.

In his study, Pychyl (1995) noted that doctoral students delayed both writing their dissertation and preparing for their Ph.D. oral examination for different reasons such as inevitable circumstances, conflict with other projects, time inadequacy or procrastination. Students who reported delay in their Ph.D. dissertation or oral examination due to procrastination mostly referred to the irrational thoughts they held during project pursuit such as working better under pressure or how it takes too much time and effort. In this

sense, these doctoral students sounded more like the undergraduates discussed earlier (e.g., McCown et al., 2012). However, the doctoral students also referred to experiencing negative emotions such as feeling scared, overwhelmed, anxious and stressed when they tried to work on their dissertation which then led to avoiding their academic tasks. In fact, one student noted that alternate activities such as watching TV, sleeping, hanging out with friends or even complaining about the tasks *made him feel better* than working on his dissertation (Pychyl, 1995, p. 72-73). This is an important point that is worthy of discussion with respect to the present investigation, because this subtle explanation is indicative of a mood-repair process. The use of emotion-focused coping strategies where the priority to feel better is justified using irrational thoughts seem to be contributing to this student's procrastination behaviour.

In this regard, Pychyl and Binder (2004) also provided preliminary evidence that targeting and altering irrational thoughts and behaviour together with teaching students to minimize task-related anxiety in interventions can be effective in reducing procrastination. These earlier investigations of procrastination using PPA as the analytic approach also highlight the importance of investigating both irrational beliefs and emotion misregulation. The flexibility of PPA in adding and removing dimensions and selecting specific projects makes this method particularly suitable for the present studies. The interplay of how students feel and think when it comes to needlessly delaying their academic tasks can be assessed by selecting dimensions that are theoretically and empirically relevant to procrastination based on previous studies. Additionally, how the projects within each student's project system impact each other to affect procrastination can be analyzed. In my dissertation research, I conducted my investigation both

ideographically and nomothetically, and therefore, I discuss the details of the present studies in the next section.

CHAPTER 4

THE PRESENT RESEARCH: RATIONALE AND HYPOTHESES

The theories and empirical evidence reviewed in the previous chapters demonstrate that both cognitive and affective aspects of procrastination have been studied, but they were examined in separate studies. On the one hand, a considerable focus has been placed on how irrational beliefs play an important role in procrastination (e.g., Balkis, Duru, & Bulus, 2013; McCown et al., 2012; Solomon & Rothblum, 1994). On the other hand, researchers have successfully demonstrated that procrastination is also a case of emotion misregulation, which leads to self-regulation failure (e.g., Pychyl & Sirois, 2016; Sirois & Pychyl, 2013; Tice & Bratslavsky, 2000; Tice, Bratslavsky, & Baumeister, 2001). However, I argue that it is important to examine the interplay of cognitions and emotions together instead of examining them separately to understand the self-defeating nature of procrastination. As Pychyl and Sirois (2016) reasoned, individuals who procrastinate hold a mistaken belief that avoiding important goals that they find aversive will help them get rid of their negative mood state and engaging in tasks with hedonic qualities will improve their mood state, an assumption that Tice et al. (2001) label the misregulation of emotion. Essentially, this reasoning explains that both cognitions and emotions are at play in procrastination where the mistaken belief about the priority of mood repair explains the irrationality in procrastinators' thinking, and the mood-repair process explains the utility of task avoidance as a maladaptive emotion-regulation strategy. As such, the purpose of this dissertation research was to understand how irrational beliefs and mood-repair process in procrastination contributing to the needless delay of intended goals.

Outside of the research literature on procrastination specifically, the interplay of emotions and cognitions has been discussed in many dual-process models, and researchers have identified that both emotions and cognitions play distinct roles in our decision-making processes (e.g., Baumeister & Bargh, 2014; Loewenstein, et al., 2015; Shiffrin & Schneider, 1977; Thaler & Shefrin, 1981). Goals or projects can trigger certain emotions, and emotion regulation that involves cognitive processing serves to control these emotions (Sheppes & Gross, 2014). The emotion-regulation strategies can be adaptive ones where goal- or person-oriented strategies are used to sustain long-term goal pursuits even when alternate hedonic options are available, or they can be maladaptive ones where the focus is mostly on hedonic need fulfillment and not goal-directed behaviour (Koole, 2009a, 2009b), as in the case of procrastination (Pychyl & Sirois, 2016). Given this frequently discussed interplay of what we feel and how we regulate these feelings in dual-process models, it is important to understand which emotions are generated and how these emotions are misregulated through the mechanism of irrational beliefs associated with the needless avoidance of intended task in procrastination.

As I have discussed in Chapter 2 of my dissertation, some behavioural economists and psychologists are invested in understanding procrastination as a utility problem meaning that individuals who procrastinate have low motivation to complete their tasks (Dewitte & Schouwenburg, 2002; Steel, 2007; Steel & König, 2006). These researchers argued that this utility problem in procrastination is best understood as an aspect of delay discounting; meaning when people are given a choice between tasks with rewards at different time points (i.e., intertemporal choice), individuals who procrastinate show higher preference for tasks with sooner (typically smaller) rewards as opposed to their

distal goals that provides later (larger) rewards. Through the process of delay discounting, the subjective value of future goals is discounted more which results in the task avoidance of procrastination (e.g., Dewitte & Schouwenburg, 2002; Schouwenburg & Groenewoud, 2001). The problem with this rationale is that only cognitive processes received focus, whereas the role of emotions has been ignored. Empirical support for the mood-repair model highlights how maladaptive regulatory functions of emotions interfere with objective decision-making about long-term goals (e.g., writing an essay) shifting procrastinators' focus towards specious rewards to feel good in the short term (Pychyl & Sirois, 2016; Tice, Bratslavsky, & Baumeister, 2001). Recognizing the problem with understanding procrastination as a utility problem, Pychyl and Sirois (2016) argued that,

> "…procrastination is not so much about the perceived utility of the long-term goal and preference reversal as proposed by a utility account of procrastination (Steel, 2007). People recognize the utility of their future goals, however they have mistaken beliefs about the utility of short-term mood repair. These mistaken beliefs about emotional utility support the misregulation of emotion which makes a hedonic emotion shift the priority."

In this sense, the reason for choosing an earlier reward in procrastination is embedded in the discussion of emotional utility to feel better now that steers the attention away from important long-term goals towards immediate hedonic, specious rewards.

This reasoning that emotions can mislead people to prefer sooner rewards over important later rewards has been an important topic in the emotion-regulation literature more recently. Researchers (both behavioural economists and psychologists) are now

arguing that the interplay between emotions and cognitions should be investigated to understand why immediate rewards are preferred over future rewards in delay discounting (Loewenstein et al., 2015; Miller, Rodriguez, Kim, & McClure, 2014). Miller and colleagues (2014) argued that both affective and cognitive processes serve specific roles when it comes to making choices. Undoubtedly, the number of choices we make on a daily basis is too many to make deliberation over each choice reasonable. Careful deliberation in every decision-making process would be exhausting and goal accomplishments would become difficult. Some choices, therefore, need to be made based on *affective processes*, which are quick and reflexive to preserve self-control for more important tasks. In contrast, goal-directed decisions can be made using *deliberative processes* (in other words, cognitive processes) that are relatively slow but require individuals to exert more self-control (Loewenstein et al., 2015; Miller et al., 2014). However, when affective processes are inappropriately recruited to deal with goal-directed behaviour, the implication of such choices can be debilitating in certain instances because it becomes more likely that these important goals will be delayed or avoided (Miller et al., 2014). It is this affectively charged state that facilitates the negligence of greater future rewards in delay discounting in favour of smaller hedonic rewards that can be accessed now (Loewenstein et al., 2015; Miller et al., 2014).

This account of the role of emotions in delay discounting where future rewards are discounted to meet the current emotional need is particularly interesting as this explanation is consistent with the mood-repair model of procrastination where priority is given to satisfying the present emotional needs over the need to successfully accomplish instrumental goals (e.g., Pychyl & Sirois, 2016; Sirois & Pychyl, 2013; Tice &

Bratslavsky, 2000). In particular, the temporal proximity of many tempting or hedonic rewards in the environment relative to the instrumental goals makes adaptive emotion regulation difficult as individuals who procrastinate rely on these hedonic rewards to relieve themselves from the aversive feeling state initiated by instrumental goals (Sirois & Pychyl, 2013).

Empirically, the role of emotion regulation in temporal discounting has been investigated by Augustine and Larsen (2011). In a two-part study, these researchers examined how priming with affective information (using positive or negative affect words) or mood induction (using images), affective state (after viewing the prime) and personality (i.e., neuroticism) together influence temporal discounting. The results of study 1 showed that for participants who scored high on neuroticism, a large negative affective reaction to priming with negative affective words (e.g., depressed, sad) predicted greater temporal discounting. In study 2, a mood induction paradigm was used instead of priming with affective words where positive or negative affect was induced by showing affective images to participants. Results of study 2 were consistent with the results of study 1 demonstrating that a more negative reaction to negative mood induction in participants with high neuroticism scores predicted higher temporal discounting. Together, these results illustrate that emotional instability can contribute to inappropriate regulation of emotions (in other words, emotion misregulation) by making poor choices where larger future rewards are discounted, and sooner smaller rewards are selected to feel the pleasant emotions associated with the more immediate reward.

Neuroscientific studies have also provided support to show that brain regions are differentially activated in decision-making depending on whether the choice favours

immediate versus delayed rewards. In a functional Magnetic Resonance Imaging (fMRI) study, participants were provided two monetary choices where one of the choices involved receiving an immediate smaller monetary reward and the other choice involved a delayed monetary reward of larger value. Results showed that when participants chose the immediate rewards, the brain regions associated with affective processing, the *nucleus accumbens* (NAcc) and portions of *ventromedial prefrontal cortex* (vmPFC), were activated more. Alternatively, when participants preferred delayed rewards, the brain regions related to cognitive/deliberative processing, the *dorsolateral prefrontal cortex* (dlPFC) and *dorsal anterior cingulate cortex* (dACC) were activated (McClure, Laibson, Loewenstein, & Cohen, 2004). Specifically, the dACC shows increased activity when conflict arises between goal-directed behaviours and other alternate tasks. This brain region monitors the likelihood of errors that need control and activates dlPFC to exert control (Kerns et al., 2004). The dACC plays an essential role in steering the decision towards future goal-oriented behaviour by modulating the dlPFC and vmPFC (Figner et al., 2010). Higher activity in the dACC and dlPFC is related to better perceptual decision-making (Philiastides, Auksztulewicz, Heekeren, & Blankenburg, 2011).

It is also important to note that the affective and cognitive processing in the brain does not occur in isolation, there is an extensive interplay between them when making decisions, which is particularly relevant to the discussion of my dissertation. Brain systems involved in emotion generation are also involved in emotion regulation (i.e., cognitive processing; Ochsner et al., 2009) indicating that these processes are intertwined (Thompson, 2011). Studies have found that the dACC shares a reciprocal connection with

the amygdala both structurally and functionally and this reciprocity can foster or impede purposive behaviour (Feng, Feng, Chen & Lei, 2014; Schlüter et al., 2018).

Another fMRI study of interest is research conducted by Hare and colleagues (2009) who have investigated the interaction of affective and cognitive processing in the brain to learn about people's ability to self-control when making a choice between healthy (e.g., broccoli) and unhealthy foods (e.g., potato chips). In this study, based on the type of food they choose, participants were first categorized into *self-controllers* (i.e., they made decisions based on health and taste) and *non-self-controllers* (i.e., they made decision based on taste only). Results showed that activity in the vmPFC, associated with affective processing, was correlated with choice of food, however the activation was related to both taste and health in self-controllers and only to taste in non-self-controllers. Furthermore, participants who demonstrated self-control had greater activity in the dlPFC associated with cognitive processing when participants chose to neglect the unhealthy food option, even if they liked it. Findings also revealed that self-controllers showed significantly higher activity in the dlPFC than non-self-controllers at the time of the choice indicating this brain region's specific role in the controlled decision-making. For self-controllers, when it comes to liked and unhealthy food, increased activity in the dlPFC was related to reduced activity in the vmPFC. This study provided support for how brain regions related to affective and deliberative processing influence each other during decision-making. More specifically, the vmPFC plays a critical function integrating affective and cognitive processing to influence choice-behaviour (Hare, Camerer, & Rangel, 2009). Other studies have also found similar results using fMRI showing that areas of the prefrontal cortex (i.e., brain structure responsible for cognitive processing)

become more active and activity in the amygdala (i.e., brain structure responsible for emotion generation) decreases during emotion regulation, particularly when emotions are down-regulated (Ochsner & Gross, 2014).

More recently, Hu and colleagues (2018) investigated the neuroanatomical substrates of procrastination using a voxel-based morphometry (VBM) method in two independent groups of participants. These researchers found that the volume of gray matter in the orbital frontal cortex (OFC) is positively related to procrastination, whereas gray matter volume in the middle frontal gyrus (MFG) and dlPFC showed a negative relation to procrastination (Hu, Liu, Guo, & Feng, 2018), again providing evidence at the neural level that both emotions *and* cognitions are related to procrastination. The OFC is the region of the brain that plays an essential role in emotion processing (e.g., processes aversive emotions and meaning of emotions) and emotion-regulation (e.g., involved in reappraisal of emotional stimuli); more volume of gray matter in the lateral OFC is related to more emotion dysregulation (Petrovic et al., 2015). Given this association of the OFC and emotion dysregulation, and the fact that individuals who reported to procrastinate more showed more volume of gray matter in OFC, Hu and colleagues (2018) concluded that it is not surprising that procrastinators inappropriately regulate their negative emotions by avoiding their important tasks and prioritize their need to feel better. In contrast, the brain regions of the MFG and dlPFC are important for executive functions and, therefore, are critical regions for self-control abilities. The negative association between procrastination and low grey matter volume in the MFG and dlPFC, at the neuroanatomical level, illustrates that procrastination is an instance self-regulation failure.

In another recent study, Schlüter and colleagues (2018) found that state-oriented individuals who show increased tendency to procrastinate on important tasks compared to action-oriented individuals (Blunt & Pychyl, 2005) demonstrate higher amygdala volume and less functional connectivity between amygdala and the dACC, where emotions are favoured more than cognitions or deliberative processes. Based on their findings, the researchers of this study concluded that the weaker functional connectivity between the amygdala and the dACC in these individuals might be insufficient for recruiting adaptive emotion-regulation strategies resulting in poor regulation of negative emotions when they encounter certain tasks to be aversive. Poor emotion-regulation abilities can, therefore, hinder the implementation of actions and increase avoidance of important tasks that these individuals are ought to do (Schlüter et al., 2018).

Based on these research findings, I argue that the interplay of emotion (mood-repair) and cognition (irrational beliefs) would provide better explanations for why people engage in self-defeating behaviour like procrastination knowing that their needless delay will be followed by serious consequences. Both psychological and neuroanatomical research suggest that it is pertinent to discuss the emotion generative process and how these emotions are regulated, as well as what deliberative processes are used to understand the myopic behaviour (or temporal discounting) in procrastination.

As such, the goal of my dissertation was to investigate the interplay of the affective and deliberative processes in procrastination. However, capturing mood-repair and specific irrational beliefs associated with academic procrastination can be empirically challenging, so I used Personal Projects Analysis (PPA) in the present investigation. As noted in chapter 2, research to date investigating the mood-repair process in

procrastination has utilized only experimental designs (Tice, Bratslavsky, & Baumeister, 2001; Baumeister & Heatherton, 1994). By artificially inducing negative, positive or neutral mood, the researchers of these studies provided causal evidence for the mood-repair process in procrastination. Although these studies maintained high internal validity by controlling for extraneous variables, one important limitation is the low external validity making it difficult to extrapolate these results to everyday situations. To maximize the external validity in the present studies, PPA was used to demonstrate the interplay of mood repair and irrational beliefs when students procrastinate in everyday life.

As mentioned earlier, an important benefit of PPA is that both idiographic and nomothetic approaches can be implemented using this unit of analysis. Using an idiographic approach and PPA, the unique narrative of each individual's experience of specific emotions, the regulation of these emotions and the associated irrational beliefs they have when procrastinating on certain tasks can be identified providing important data on individual differences in the experience of procrastination. A nomothetic approach, in contrast, can provide data on people's experience of their emotions and irrational beliefs during procrastination at the group level increasing generalizability of findings. Together, a comprehensive examination of how people feel and think, and regulate their emotions when they procrastinate on important tasks in everyday life is possible. In the present investigation, I specifically focused on academic tasks and procrastination on these tasks. Using PPA, students reported their current academic projects on which they procrastinate following which they reported their affective (positive and negative affect) and cognitive (irrational beliefs) appraisals of these tasks

based on several project dimensions. The alternate projects students engage in when procrastinating on their academic tasks was also examined in conjunction with their affective and cognitive appraisals of these tasks.

Mood-repair in procrastination was measured in two ways. First, I examined the difference in negative affect ratings across four momentary phases during procrastination; 1) how students feel when they try to engage or thought of engaging in academic tasks they procrastinate on; 2) when they make the decision to needlessly delay (or procrastinate) on these academic tasks; 3) when they form an intention update to do the task later; and 4) when they engage in alternate tasks instead of the academic tasks. In these momentary phases, lower negative affect during decision to needlessly delay academic tasks, forming intention update to do the academic tasks later and engaging in alternate tasks compared to higher negative affect when students are trying to attempt their academic tasks which they procrastinate on would indicate down-regulation of negative emotions. Similarly, higher positive affect elicited by decision to needlessly delay academic tasks, forming intention update for academic tasks, engaging in alternate tasks compared to low positive affect when students try to engage in the academic tasks that they procrastinate on would indicate up-regulation of positive emotions.

The irrational beliefs associated with the academic tasks that students procrastinate on was also determined by examining relevant PPA dimensions. Past studies have used an irrational belief scale that assesses irrational beliefs about life in general (e.g., Bridges & Roig, 1997; Solomon & Rothblum, 1984) or used an irrational beliefs scale related to academic context with poor reliability scores (e.g., Balkis, Duru, & Bulus, 2013). Given these limitations in previous studies, I used PPA dimensions to

capture the irrational beliefs of students associated with procrastination. The advantage of using PPA dimensions is that only irrational beliefs that are actually relevant to the participants' projects and procrastination were selected based on previous findings to accurately capture the irrationality in procrastination.

The Present Research: Research Methods, Rationale and Hypotheses

In the present investigation, I conducted four studies. In study 1a and 1b, positive and negative emotions associated with procrastination identified from previous studies were factor analyzed to reduce the number of items and to confirm the factor structure.[4] In study 2 and 3, a mixed methods approach was employed to obtain a more thorough understanding of the mood-repair process together with the role of irrational beliefs in procrastination. Given that the overall goal of my studies was to understand the interplay of emotions and cognitions in procrastination by using PPA and also taking both idiographic and nomothetic approaches, a mixed methods approach is an ideal method to collect data. A mixed methods design integrates or combines qualitative and quantitative research techniques together in a single study to answer research questions (Creswell & Plano Clark, 2011; Creswell, Plano Clark, Gutmann, & Hanson, 2003; Johnson & Onwuegbuzie, 2004). More specifically, I used the *concurrent triangulation approach* where both qualitative and quantitative data are collected simultaneously. In this approach, both qualitative and quantitative methods receive equal priority and therefore, allowed me to collect complementary data using two distinct methods. The findings from both methods can be corroborated or cross-validated to interpret the results (Creswell &

[4] The dimensions of irrational beliefs were not factor analyzed as there can be significant variation in how students justify their procrastination. As such, an average of all the irrational beliefs dimensions used in this dissertation was obtained to proceed with the statistical analyses.

Plano Clark, 2011; Creswell, Plano Clark, Gutmann, & Hanson, 2003). Qualitative and quantitative methods when used on their own have limitations, however these limitations can be surpassed using a mixed methods concurrent triangulation approach, because the strength of one method can help overcome the limitations inherent to the other method in this design.

I used *narrative inquiry* as the qualitative research design in both study 2 and 3, which involves the first-person accounts of people's experience, behaviour, and actions told in the form of stories (e.g., Merriam & Tisdell, 2016). These narratives or stories from students was obtained by conducting interviews using PPA data as a starting point and specific open-ended questions that participants discussed about their projects and appraisals. The goal was to examine the interview transcripts in-depth to identify themes that account for the mood-repair process and irrational thoughts when students needlessly delay their intended academic tasks during procrastination. In addition, I used regression/correlations and quasi-experimental designs to examine the quantitative data that were gathered using PPA and standard questionnaires for the different constructs discussed earlier that is included in this study. The details of the research designs and analyses are provided in Chapter 5 (for study 1a and 1b), Chapter 6 (for study 2) and Chapter 7 (for study 3) of this dissertation.

Given that I used factor analyses and a mixed methods design in both studies of my dissertation research, in the following sections, I provide a brief explanation of the purpose of the four studies, and how a mixed methods design (i.e., both qualitative and quantitative approach) was employed in these studies. Following these explanations, I provide the hypotheses for the qualitative and the quantitative approach as well as the

rationale for these hypotheses.

Study 1a and 1b: Factor Analyses of Emotions Associated with Procrastination

The purpose of Study 1 was to summarize the number of items of positive and negative emotions that students experience when they procrastinate on their academic tasks. As mentioned earlier, these emotions were identified from previous studies (e.g., Blunt & Pychyl, 2000, 2005; Pychyl, 1995; Pychyl & Binder, 2004; Pychyl et al., 2000). Students tend to have a good insight into their procrastination problem that has been demonstrated in previous studies (e.g., Haghbin & Pychyl, 2015; Pychyl et al., 2000). Therefore, presenting emotions identified in previous studies to the student sample in my study would provide further understanding of how these emotions are structured. Within Study 1, I would carry out two studies. In Study 1a, I would use a principle component analysis (PCA) to reduce the number of observed items of emotions to determine the factor structure and examine internal consistency of positive and negative emotions that students experience in general when they engage in academic procrastination. The factor structure of measured emotions obtained using PCA in Study 1a would then be tested using confirmatory factor analysis (CFA) in Study 1b to see how well the observed items of positive and negative emotions represent the number of factor(s) as seen in PCA. The factors of emotions generated using CFA would then be used Study 2 and 3 to assess mood-repair during procrastination.

Study 2: Emotion Misregulation and Irrational Beliefs in Procrastination

In study 2, using a mixed methods design and PPA, I examined the interplay of emotions and irrational beliefs as posited in the mood-repair model of procrastination. The qualitative data in the mixed methods design provided the narrative of students'

emotional and cognitive appraisals of their procrastination experience across the four momentary phases: 1) when students attempt the academic tasks they procrastinate on, 2) when they make the decision to needlessly delay those academic tasks, 3) when they form an intention update for those academic tasks, and 4) when they take on alternate tasks instead of their academic tasks, all at the level of the individual (i.e., implementing the idiographic approach). The quantitative data, in contrast, provided aggregate numeric data at the group level to allow me to explore emotion misregulation and maladaptive cognitions linked to procrastination (i.e., implementing the nomothetic approach).

I investigated a number of specific hypotheses to investigate the interplay of the mood-repair model and irrational beliefs in procrastination, which are derived based on the arguments I have presented throughout my dissertation. To test these hypotheses, student participants were asked to complete a PPA questionnaire with affective (i.e., positive and negative emotions) and cognitive (i.e., irrational beliefs) dimensions. In this PPA, they reported the extent to which they experience the particular emotions across the four momentary phases of procrastination and also rated specific irrational beliefs dimensions reflecting how they justify their procrastination. The comparisons of their emotional experience across the four momentary phases of procrastination would demonstrate students' experience of emotion misregulation contributing their self-regulation failure in procrastination. Additionally, how they justify the needless delay of their important tasks can provide explanations for why people procrastinate despite their intention to do the tasks.

Rationale and Hypotheses for the PPA Matrix Analysis (Quantitative Data)

H2-1) Emotion misregulation and procrastination. *Based on the summary of the mood-repair model discussed above, I hypothesized that there would be a difference in positive and negative affect across the four momentary phases of procrastination: 1) when students thought of engaging in their academic tasks; 2) when they decide to needlessly delay their academic tasks; 3) when they update their intention to do the academic task later; and 4) when they engage in alternate tasks instead of their academic tasks* (H2-1a). *A number of a-priori hypotheses were created that were tested using orthogonal contrasts. I expected that students would experience more negative emotions and less positive emotions in the phase when they think of engaging in their academic tasks compared to the phases when they decide to delay their academic task (i.e., procrastinate), form intention updates and when they engage in alternate tasks indicating down-regulation of negative emotions and up-regulation of positive emotions* (H2-1b). *I also expected that the negative emotions would alleviate and positive emotions would increase when students form intention updates and when they participate in alternate activities compared to when they make the decision to postpone their academic task* (H2-1c). *Finally, students are expected to experience less negative emotions and more positive emotions when they take on some alternate activities compared to when they form an intention update* (H2-1d).

Additionally, I examined students' overall mood using a single PPA dimension across the four momentary phases. I expected that students' mood would significantly differ across the four momentary phases (H2-1e) *and again, I created planned contrast to test specific hypotheses. I expected that students would experience greater overall mood*

in the later three phases compared to the first phase where they think of engaging in the academic task (H2-1f). *They would also report having better overall mood when they form intention updates and engage in alternate activities compared to when they simply decide to delay the task* (H2-1g). *Lastly, they would report being in a much better overall mood when they take part in alternate activities than when they form an intention to the do the academic task later* (H2-1h).

H2-2) Irrational beliefs and procrastination. In the present study, participants were asked to report how they irrationally justified their delay when they procrastinated on a specific academic task. In the previous hypothesis, the goal was to capture the mood-repair in procrastination for a specific academic task. The purpose of this hypothesis was to examine whether irrational justification used to postpone the same academic task would relate to students' self-reported task specific procrastination and intensity of procrastination. As such, *I hypothesized that more irrational beliefs would predict higher level of task specific procrastination, procrastination behaviour and severity of procrastination.*

Rationale and Hypotheses for the PPA Interview (Qualitative Data)

H2-3) Emotion misregulation and procrastination. *Based on the mood-repair model, I hypothesized that more number of students would report experiencing more negative emotions and less positive emotions when they think about engaging in academic tasks they procrastinate on compared to when they make the decision to needlessly delay their academic tasks, when they form an intention update of when they may complete these tasks and when they engage in alternate activities* (H2-3a). *I also hypothesized that students would provide higher ratings on negative emotions and lower*

ratings on positive emotions when engaging in academic tasks that they procrastinate on. Conversely, they would provide lower ratings on negative emotions and higher ratings on positive emotions when they decide to needlessly delay their academic tasks, when they form an intention update and when they engage in alternative activities instead of their academic tasks (H2-3b). *I expected that students would explain that they choose not to complete their work in that moment, forms an alternate plan of when they will do the task and engage in alternate activities instead of their academic tasks to alleviate their negative mood and elevate their positive mood indicating mood-repair* (H2-3c).

H2-4) Irrational beliefs and procrastination. *I hypothesized that students who procrastinate would provide a number irrational justification for their needless delay on academic tasks (e.g., "This academic task is too difficult/challenging and so, I will not do well even if I start early") form an intention update and why they chose to engage in alternate tasks* (H2-4a). *Furthermore, in students' explanations of why they procrastinate, I expected to find that students would report that the maladaptive irrational appraisals of their academic tasks (e.g., "I don't like forming habits to work on this academic task") motivate their decision to needlessly delay their academic task, form an intention update and then engage in alternate tasks to alleviate emotional discomfort caused by academic tasks* (H2-4b).

Study 3: The Role of Emotions and Cognitions in Preference Reversal in Procrastination – from Needless Task Delay to Last Minute Efforts

Another important question that needs to be further explored in the procrastination literature is why individuals who procrastinate tend to steer their focus away from alternate activities to take actions on their academic tasks closer to the

deadline. The academic environment is deadline-driven (e.g., Malatincová, 2017; Zamir, Lewinsohn-Zamir & Ritov, 2017), and as much as people may procrastinate on their academic tasks, they typically do finally work on their pending academic tasks closer to the deadlines. Deadlines seem to motivate people to act on their pending tasks, but it is not clearly understood as yet why this is the case. Therefore, using PPA, the purpose of study 3 was to examine what participants report motivates them to alter their preference from not working on their academic tasks to start working on their tasks closer to the deadline.

To explain the preference reversal from procrastination to taking action, some researchers (e.g., Dewitte & Schouwenburg, 2002; Steel, 2007) have argued that when academic tasks are first received, the utility (or motivation) to work on these tasks is low because the benefits of academic preparation is not immediately available, but is in the distant future. The preference to work on the task changes nearer to the deadline because the initially distant rewards of academic tasks are not distant anymore which increases the utility to work on the tasks.

Other researchers have claimed that deadlines can be used as a self-regulatory tool to combat procrastination (Zamir, Lewinsohn-Zamir & Ritov, 2017) because they act as the external cues to take actions (Malatincová, 2017). People can benefit from short deadlines instead of long deadlines to overcome hyperbolic discounting and procrastination (Zamir et al., 2017).

Although shorter deadlines can be one of the possibilities to help reduce procrastination, it is not necessarily the temporal proximity of rewards associated with the tasks that facilitates task approach behaviour near the deadlines. An alternative

explanation for why individuals who procrastinate take action closer to the deadline is that the deadline can be perceived as *signalling a threat* at this point, not a reward. When a deadline nears, the decision to take action can become apparent as there is not enough time left to further delay taking actions on a given task without some form of possible punishment (e.g., poor performance, failure, social shame). For instance, when a student receives an essay in October that needs to be completed at the beginning of December, the student might choose to postpone writing the essay because the deadline is remote. Conversely, when the deadline is only a couple of days away, it is now *necessary* to start working on the essay because not completing the essay can have serious repercussions such as receiving a failing grade, which then will aversively affect the course grade and overall GPA, and possibly even result in a financial penalty of having to retake the course again, and so on. What I am arguing is that individuals who procrastinate start to work on their tasks near the deadlines to relieve themselves from perceived threat of negative consequences for not acting on the task. The action is then rewarded, an example of negative reinforcement, as action now removes the potential negative consequence of task failure or poor performance on the task. To understand how deadlines play a role in procrastination in reversing preference from delaying academic tasks to acting on the tasks, in study 3, I examined a number of specific hypotheses by employing a mixed methods design.

To test these hypotheses, I divided the timeline of students' experience of procrastination on a specific academic task into two segments: 1) the procrastination episodes (i.e., episodes when they needlessly delayed their academic task); 2) episodes of "last minute efforts" closer to the deadlines (i.e., episodes when they started working on

their academic task). Using PPA dimensions, students would report their experience of emotions and motivation, as well as cognitive appraisals of their academic tasks they procrastinated on and the alternate activities they engaged in instead during these episodes. The comparison of how emotions, motivation and cognitive appraisals of academic and alternate activities changes between the procrastination episodes and episodes of "last minute efforts" can explain why individuals who procrastinate eventually start working on their academic tasks when deadline approaches.

Rationale and Hypotheses for the PPA Matrix Analysis (Quantitative Data)

H3-1) Role of emotions during preference reversal in procrastination. Previous studies have found that individuals who procrastinate continue to find their academic tasks as aversive across all stages of procrastination (i.e., initiation, planning, action and termination stages; Blunt & Pychyl, 2000). I expected to find similar results in the present study. *Therefore, I hypothesized that individuals who procrastinate would not significantly differ in terms dimensions of reduced positive emotions (e.g., low pleasure and low enjoyment) and increased negative emotions (e.g., boredom, frustration, resentment) between the procrastination episodes and the episodes of "last minute efforts." However, within the procrastination episodes, students would report mood-repair (elevated positive and reduced negative affect) when they engage in alternate activities as opposed to their academic tasks* (H3-1a). *I also hypothesized that individuals who procrastinate would not differ in their overall mood during the procrastination episodes and when they attempt the academic task in the last-minutes effort episodes, but they would differ in perceived threat due to approaching deadlines of academic tasks between the procrastination episodes and the episodes of "last minute efforts"* (H3-1b).

H3-2) Role of motivation in preference reversal during procrastination. Departing from the reasoning of hyperbolic discounting that explains students are least motivated to work on their academic tasks because the reward for these tasks are situated in the future, I argue that it is the primacy of mood-repair over academic tasks that contribute to procrastinators' low motivation. *I expected that individuals who procrastinate would significantly differ in their experience of motivation to engage in the academic tasks during the procrastination episodes and the episodes of "last-minute efforts" where motivation to engage in academic tasks would be greater closer to the deadline compared to the procrastination episodes* (H3-2a). Because individuals who procrastinate perceive their academic tasks as aversive, these individuals tend to feel more negative emotions and less positive emotions (e.g., they feel more frustrated and less pleasure; Blunt & Pychyl, 2000), they will be less motivated to pursue their academic projects and avoid these tasks instead. It is also likely that students would perceive the deadlines as a signal of pending punishment, negative consequences or most generally as a threat to their academic goals motivating them to engage in the academic tasks closer to the deadlines. *However, within the procrastination episodes, students would report more motivation to engage in alternate tasks compared to academic tasks* (H3-2b).

A study by Blunt and Pychyl (2000) showed that perceiving lack of autonomy and less control on academic tasks predicted higher levels of procrastination. These researchers reasoned that academic task can be appraised as aversive by students when they perceive that they lack the autonomy and have little or no control over their academic tasks. As such, perception of low autonomy and control are more likely to prompt avoidance of this aversive academic task. In the present study, I expected to find

similar results. *I expected that students would report less autonomy, competence and control over their academic projects during the procrastination episodes compared to the episodes of "last minute efforts"* (H3-2c). *Additionally, they would report to have significantly less autonomy, competence and control to work on their academic task compared to the alternate task they engaged in to repair their mood during the procrastination episodes* (H3-2d).

H3-3) Cognitive appraisals of academic tasks during procrastination. Results from a previous study demonstrated that if academic tasks are perceived to be difficult and challenging during procrastination, these tasks are appraised as less difficult and less challenging when individuals who procrastinate begin to work on these tasks. But academic tasks were consistently perceived as important both during procrastination and during the last-minute effort phase (Pychyl et al., 2000). This result suggests that it is less likely that projects that are appraised as important and value congruent during the procrastination episodes will suddenly change near the deadlines when actions are taken to complete these projects. Indeed, individuals who procrastinate find the tasks they procrastinate on as aversive as demonstrated in several studies (e.g., Blunt & Pychyl, 2000), but they still tend to think that these tasks are important (Pychyl et al., 2000). These findings make it clear that procrastination is not simply a problem with utility as suggested by some researchers (e.g., Steel, 2007). The availability of rewards from academic tasks closer to the deadlines shifts the preference to work on the academic tasks is rather less convincing. An alternate, more plausible, answer for the preference reversal in procrastination is that individuals who procrastinate perceive the deadline as signalling a threat. In an effort to reduce the harm that could result from not meeting deadlines,

these individuals start working on their academic tasks near the deadlines. Therefore, I expected to replicate the findings by Pychyl and colleagues (2000). *I expected that cognitive appraisals of academic tasks assessed on a number of dimensions of PPA (e.g., difficulty, challenge) would significantly differ between the procrastination episodes and the episodes of "last-minute efforts" for individuals who procrastinate. These individuals would appraise their academic tasks to be less difficult and less challenging, with better outcomes once they are engaged in their academic tasks compared to the procrastination episodes* (H3-3a). *However, their appraisal ratings of how important and value congruent the academic tasks are would not change between the procrastination episodes and the episodes of "last minute efforts"* (H3-3b) *I also hypothesized that students would appraise their academic task as more important and value congruent but more difficult and challenging and having poor outcomes than the alternate task they engaged in during the procrastination episodes* (H3-3c). The justification for this hypothesis is presented above in the hypothesis for qualitative data (i.e., H2-3).

Rationale and Hypotheses for the PPA Interviews (Qualitative Data)

H3-4) Role of emotions in preference reversals during procrastination. When deadlines are remote, individuals have the opportunity to make choices between whether to work on their academic tasks or alternate tasks, and in the case of procrastination, it is the alternate tasks which receives priority over the academic tasks to repair their mood as previous studies have demonstrated (e.g., Tice, Bratslavsky, & Baumeister, 2001). However, as the deadline approaches, the time left is insufficient to further postpone academic tasks and as such procrastinators make a decision in favour of the academic tasks to avoid the potential negative consequences of not meeting deadlines. *As such, I*

argue that individuals who procrastinate would report an account of mood-repair by engaging in alternate tasks instead of academic tasks during the procrastination episodes (i.e., when they attempt their academic tasks they needlessly delayed) but not during the episodes of "last minute efforts" (i.e., when they work in their academic tasks) closer to the deadlines (H3-4a). *I also hypothesized that individuals who procrastinate would perceive the deadlines of their academic tasks as signalling a threat when the deadlines are nearby shifting their focus away from alternate tasks to their academic tasks to complete the tasks near the deadlines* (H3-4b).

H3-5) Role of motivation in preference reversal during procrastination. *I expected that students would report experiencing low motivation to engage in academic tasks during the procrastination episodes and high motivation to engage in their academic tasks closer to their deadlines during the episodes of "last minute efforts"* (H3-5a). *Furthermore, it is expected that students would report higher motivation to engage in the alternate tasks compared to the academic tasks during the procrastination episodes* (H3-5b). *I also hypothesized that students would report less autonomy, competence and control over their academic projects during procrastination compared to episodes of "last minute efforts"* (H3-5c). The rationale for this hypothesis can be found in the hypothesis for quantitative data (i.e., H3-2) presented above.

H3-6) Cognitive appraisals of academic tasks in procrastination. *I expected that the report of cognitive appraisals of academic tasks assessed using PPA dimensions (e.g., difficulty, challenge, likelihood of success) would differ between the procrastination episodes and the "last-minute efforts" episodes for individuals who procrastinate. These individuals would report their academic tasks to be less difficult, less challenging and*

that they are more likely to succeed once they engage in their academic tasks during the last-minute effort episodes compared to the procrastination episodes (H3-6a). *Furthermore, students' report of the perceived importance and how value congruent these academic tasks was not expected to change between the procrastination episodes and episodes of "last minute efforts"* (H3-6b). *Conversely, students would report their academic task as more important than the alternate task they engaged in during the procrastination episodes* (H3-6c). The rationale for this hypothesis is presented above with the hypothesis for quantitative data (i.e., H3-3) presented above.

CHAPTER 5

PRINCIPAL COMPONENT ANALYSIS AND CONFIRMATORY FACTOR ANALYSIS OF EMOTION RELATED TO PROCRASTINATION

STUDY 1: METHOD AND ANALYSES

In Study 1, positive and negative emotions experienced during procrastination that were reported by students in previous studies (e.g., Blunt & Pychyl, 2000, 2005; Pychyl, 1995; Pychyl et al., 2000) were selected for inclusion in the PPA. The goal of this study was to reduce the number of positive (e.g., happy, excited, relaxed) and negative (e.g., frustrated, angry, anxious) emotions to a smaller subset for analysis in subsequent studies. First, I ran a Principal Component Analysis (PCA) to reduce the number of specific individual emotions relevant to procrastination to determine their factor structure and internal consistency (Study 1a). Then a Confirmatory Factor Analysis (CFA) was run to confirm the factor structure generated by the PCA (Study 1b). The final factor structure of emotions with a good model fit generated in CFA was then used to assess mood-repair in procrastination in Study 2 and 3.

Principal Component Analysis of Emotions Related to Procrastination

Study1a: Method

Participants

Participants recruited in this study were undergraduate students registered in first- and second-year psychology courses at Carleton University. According to Tabachnick and Fidell (2013), a sample size of 300 - 500 is required to run a PCA with low communalities (i.e., proportion of common variance among the items in the data) and a small number of factors with 3 to 4 indicators/items per factor. Therefore, I aimed to

recruit approximately 500 participants in Study 1a. The initial sample consisted of 806 participants. During the data cleaning stage, 303 participants' data were excluded due to duplicate cases, participants providing incomplete data and/or for providing the same rating across all items or measures. The final sample consisted of 503 participants (70% women, M_{age} = 19.53 years, SD_{age} = 3.65 years). Of the 503 participants, 55% of the participants identified themselves as Caucasian with European Descent, 10% as African Canadian, 9% as East Asian, 9% as Middle Eastern, 7% as South Asian, 2% as Hispanic, 1% as Indigenous, and 7% as others. Little's MCAR test was conducted using SPSS version 27 statistical package to analyze missing values on this sample and no missing values were detected.

Procedures and Measures

Participants signed up for this study via an online experimental sign-up system. Those who provided consent to participate in the study proceeded to complete two set of online questionnaires – a demographic questionnaire and a questionnaire on emotions related to procrastination (see Appendix B for the informed consent). The length of the study was approximately 5-10 minutes and participants received grade-raising credits towards the final grades of their first- and second-year psychology courses for participating in this study.

Demographic Questionnaires

This questionnaire included information such as gender, age, and ethnicity (see Appendix C). The demographic information was collected to describe the sample.

Questionnaires on Emotions related to Procrastination

Prior to rating positive and negative emotions related to academic procrastination,

participants were provided with a short description of how procrastination is conceptualized. This is because in the procrastination literature some researchers have presented arguments for a positive form of procrastination (e.g., Choi & Moran, 2009; Chu & Choi, 2005). This research has been critiqued as Chu, Choi and colleagues have misconstrued purposeful delay (strategic delay), that is commonly used to prioritize tasks to be able to meet deadlines successfully with good outcomes, as a positive form of procrastination (e.g., Chowdhury & Pychyl, 2018; Corkin et al., 2011; Haghbin & Pychyl, 2015; Hensley, 2015). To ensure that participants understood how procrastination is defined in psychological research, that it is a problematic delay with no positive aspects or outcomes, a description of procrastination was provided (see Appendix D).

Participants were then provided with a list of academic tasks and were asked to report which academic tasks they typically performed in their university courses following which they were asked to report which academic tasks they frequently procrastinated on (see Appendix D). From this list of academic tasks they frequently procrastinated on, participants were asked to report one academic task they procrastinated on the most. Participants were then asked to reflect on specific emotions they experienced when they procrastinated on this academic task. They rated 19 items of emotions selected from previous procrastination studies – 8 positive emotions and 11 negative emotions. The list of all positive and negative emotions is presented in Table 5-1. All emotion items were rated on a 0 (*Not at all*) – 10 (*Extremely*) Likert-type scale.

Table 5-1

List of Positive and Negative Emotions Related to Procrastination Included in Study 1a Analyzed using Principal Component Analysis

Valence of emotions	Types or name of the emotion
Positive Emotions	1. Happy or pleased 2. Enjoyment 3. Fun 4. Excited 5. Enthusiastic 6. Content 7. Relaxed 8. Relief
Negative Emotions	1. Boredom 2. Frustration 3. Resentment 4. Anxious 5. Stressed 6. Afraid of failure 7. Distressed 8. Upset 9. Angry 10. Irritated 11. Nervous

Study 1a: Results

Preliminary Analyses

Prior to conducting the PCA, all assumptions for PCA such as presence of univariate and multivariate outliers, univariate and multivariate normality, linearity, heteroscedasticity, and multicollinearity were checked. All assumptions were checked using the software package SPSS version 27. I report the results of these assumptions in the following sections.

Univariate and Multivariate Outliers

The data were first examined for univariate and multivariate outliers. Tabachnick and Fidell (2013) recommend a value of $z = 3.29$ at $p < .001$ as a cut-off score to determine univariate outliers. Based on this criteria, standardized Z scores of emotion items in excess of 3.29 were considered univariate outliers. Multivariate outliers were determined using Mahalanobis Distance at $p < .001$. In this study, Mahalanobis Distance scores obtained for each participant across all items of emotions were compared to a chi-square value of 43.82 at $p < .001$ for 19 degrees of freedom (i.e., the number of items of emotions). A total of 28 outliers (univariate and multivariate) were detected using the criteria described. To determine whether to retain or exclude the outliers, PCA was run both with and without these outliers. Results of PCA differed in the presence and absence of outliers and, therefore, a decision to delete the outliers was made. Following the exclusion of these 28 outliers, no new outliers were detected. The final analyses were conducted on the final sample of 475 participants.

Univariate and Multivariate Normality

Examination of the univariate and multivariate normality of the data for the items of emotions revealed non-normality of the items. Univariate normality was examined using *z*-test of skewness and kurtosis as well as Kolmogorov-Smirnov test (test of normality) which did not support the assumption of normality (see Table 5-2). All negative emotion items demonstrated significant negative skews with the exception of the item “angry” which showed a normal distribution. Therefore, more participants reported experiencing negative emotions during procrastination in general. Conversely, all positive emotions showed significant positive skews indicating participants, overall,

experienced less positive emotions during procrastination. Kurtosis of these emotion items was mixed with most emotion items showing significant platykurtic distribution and a few items showing mesokurtic distribution. However, it is important to note that standard error of both skewness and kurtosis tend to shrink when the sample size is large making the skew and kurtosis significant reflecting non-normality of data. Similarly, the Kolmogorov-Smirnov test is sensitive to large sample as it obtains too much power to indicate data being significantly different from a normal distribution. Tabachnick and Fidell (2013) note that graphical methods (e.g., Q-Q plots, histograms) to be more appropriate to assess univariate normality when the sample size is large.

Table 5-2

Mean, Standard Deviation, Skew, Kurtosis and Test of Normality Results for the Emotion Items Analyzed using Principal Component Analysis

Emotion items	*M*	*SD*	Skew (*SE*)	Kurtosis (*SE*)	Kolmogorov-Smirnov
Boredom	6.42	2.64	-.71 (.11) ***	.09 (.22)	.15 ***
Frustration	6.60	2.49	-.72 (.11) ***	.18 (.22)	.13 ***
Resentment	5.68	2.91	-.39 (.11) ***	-.68 (.22) **	.14 ***
Anxious	7.30	2.77	-1.12 (.11) ***	.54 (.22) *	.18 ***
Stressed	7.80	2.43	-1.35 (.11) ***	1.52 (.22) ***	.20 ***
Afraid of failure	7.38	2.84	-1.05 (.11) ***	.22 (.22)	.18 ***
Distressed	6.22	2.92	-.55 (.11) ***	-.56 (.22) *	.12 ***
Upset	5.69	3.08	-.35 (.11) **	-.87 (.22) ***	.10 ***
Angry	4.55	3.13	.15 (.11)	-1.01 (.22) ***	.09 ***
Irritated	5.86	2.77	-.44 (.11) ***	-.51 (.22) *	.11 ***
Nervous	6.65	2.81	-.77 (.11) ***	-.18 (.22)	.15 ***
Happy	2.93	2.62	.62 (.11) ***	-.43 (.22)	.15 ***
Enjoyment	2.83	2.63	.65 (.11) ***	-.54 (.22) *	.15 ***
Fun	2.61	2.68	.81 (.11) ***	-.32 (.22)	.18 ***
Excited	2.53	2.59	.86 (.11) ***	-.10 (.22)	.18 ***
Enthusiastic	2.59	2.58	.72 (.11) ***	-.46 (.22) *	.18 ***
Content	2.89	2.58	.59 (.11) ***	-.60 (.22) **	.15 ***
Relaxed	2.60	2.56	.77 (.11) ***	-.37 (.22)	.17 ***
Relief	2.51	2.56	.73 (.11) ***	-.52 (.22) *	.19 ***

Note. *$p < .05$, **$p < .01$, ***$p < .001$

Examination of the Q-Q plots and histograms revealed small to moderate level of non-normality for all items of emotions. All negative emotions demonstrated negatively skewed distributions with the exception of "angry," which had a normal distribution, whereas all positive emotions showed positively skewed distributions. Negative emotions such as boredom, frustration, resentment, distressed, upset, irritated and nervous showed distributions with small negative skews; negative emotions like anxious, stressed and afraid of failure showed a moderate level of negative skew. Among the positive emotions, happy, enjoyment and content showed small positive skews, and emotions like fun, excited, enthusiastic, relaxed, and relief showed small negative skews. Multivariate normality associated with all emotions was examined using Small's test which also revealed non-normality. Separate assessment of multivariate normality for positive and negative emotions also demonstrated non-normal distributions. This is not surprising because when univariate normality is not supported for any of the items, multivariate normality of each item and all linear combination of the items also tends to show non-normal distribution (Tabachnick & Fidell, 2013). All emotion items in this study showed skewed and kurtotic distributions and, therefore, multivariate normality was also expected to be non-normal.

The small to moderately skewed and kurtotic distributions of emotion items were not considered overly problematic as participants were expected to experience more negative emotions and less positive emotions during procrastination as they tend to find the academic tasks they procrastinate on to be aversive. These results are consistent with previous findings by Blunt and Pychyl (2000). As such, data were not transformed to force normality for each emotion items as it could distort the number of factor(s) and

loadings of each emotion item on the factor(s) in PCA. Instead, I examined whether the standardized residuals of these emotion items were normally distributed using Q-Q plots. First, I examined a Q-Q plot with observed standardized residuals of all emotions plotted against expected standardized residuals. The residuals showed only slight deviation from normality. The same trend of normality of residuals was observed when residuals for positive and negative emotions were plotted separately in two Q-Q plots. Therefore, normality of residuals was met to run a PCA. It is also important to note that the inclusion or exclusion of univariate and multivariate outliers did not influence the skew and kurtosis of the distributions of emotion items.

Linearity, Homoscedasticity and Multicollinearity

First, I examined pairwise scatter plots to check the linearity of the emotion items. Examination of the pairwise scatterplots did not show a departure from a linear relationship between any pair of emotion items. Additionally, quadratic and cubic curves were fitted on these plots to determine if any pairs showed curvilinear relations. No such relations were observed between items on any plots.

The assumption of homoscedasticity was tested using scatterplots of the regression standardized residuals of all items plotted against the regression standardized predicted values. This assumption was met as the variance of the regression standardized residuals of all emotion items was similar across the level of the regression standardized predicted values confirming homoscedasticity.

Lastly, multicollinearity was assessed using two methods: tolerance value and correlations between emotion items. The tolerance value of each emotion item was found to be greater than the cut off score of 0.1 indicating no multicollinearity (e.g., Field,

2018; Tabachnick & Fidell, 2013). However, the correlation of "enthusiastic" and "enjoyment" with other emotion items exceeded .90 indicating multicollinearity and, therefore, the decision to exclude these two emotion items from the PCA was made.

Factorability of Emotion Items

Factorability of emotion items was examined using a number of criteria recommended by Field (2018). First, correlations between emotion items were explored to check if they were greater than .30 and significant.[5] All positive emotions significantly correlated to each other with magnitude above .60 and all negative emotions significantly correlated to each other with magnitude above .38 with the exception of "boredom" that showed mostly small or no correlations with all other negative emotion items. As such, "boredom" was excluded from confirmatory factor analysis in Study 1b.

The Kaiser-Meyer-Olkin measure of sample adequacy (KMO) generated a value of .91. The KMO statistic measures the ratio of the squared correlations between items to the squared partial correlations between items. A KMO measure of sample adequacy equal to or greater than .90 is considered excellent. Therefore, factor analysis using the present data would generate distinct and reliable factors (Hutcheson & Sofroniou, 1999), and the sample size obtained is adequate for a PCA (Field, 2018). Bartlett's test of Sphericity for PCA was found to be significant in the present data ($p < .001$), that is, the correlation matrix of all emotion items was significantly different from the identity matrix indicating this data is suitable to carry out a PCA.

Lastly, I examined the anti-image matrix that provides an assessment of sampling

[5] Correlations among positive and negative emotions were not explored as they were not expected to correlate with each other. Studies have found positive and negative emotions to have orthogonal relations (e.g., Little & Gee, 2007).

adequacy for each item across the diagonal (also known as KMO values) and partial correlations on the off-diagonals. The diagonal relations between emotion items in the anti-image matrix needed to be greater than .5 and the off-diagonal relations needed to approximate 0. In the current data, sampling adequacy was met as the relations on the diagonals were greater than .85 and all off-diagonal relations were close to 0. Therefore, all criteria for the factorability of the emotion items have been met to proceed with PCA.

Main Analyses

A principal component analysis (PCA) using an Oblimin (oblique) rotation was run on all emotion items from Table 1 with the exception of enthusiastic and enjoyment which were excluded from the analysis. Although boredom was not included in the factor analyses as it loaded on a factor on its own, this emotion was analyzed separately. The rationale for including boredom in the analyses is provided in Study 2. Therefore, a PCA was run on a total of 16 emotion items using the software package SPSS version 27. I chose an oblique rotation because it is possible for psychological factors to correlate in the real world (Kline, 1991). Forcing an orthogonal rotation may not be meaningful if multiple factors are generated and they correlate with each other. If the factors are orthogonal in reality, then they will not correlate even when an oblique rotation is applied.

The number of factors in the present sample were determined using three different methods: 1) parallel analysis, 2) scree plot, and 3) eigenvalues. Parallel analysis was conducted where the eigenvalues of the present data were compared to the eigenvalues of random datasets (i.e., 1000 datasets) simulated from the present data. To generate eigenvalues for the random datasets, permutations of the raw data were carried out given

that many of the emotion items in the present data were skewed. This is because comparing eigenvalues of the present data to eigenvalues created from normally distributed random datasets may provide an inaccurate number of factors with the present data. The result of parallel analysis showed that two of the eigenvalues of the raw data exceeded the eigenvalues from the random datasets suggesting a two-factor solution. Examination of the eigenvalues generated in SPSS based on Kaiser-Guttman rule also showed a two-factor solution with these factors having values greater than 1 (6.84 for factor 1 and 4.18 for factor 2), whereas the scree plot identified a three-factor solution. Given the possibility for a two-factor solution (based on parallel analysis) and a three-factor solution (based on scree plot) for the emotion items related to procrastination, I assessed both factor solutions to determine which factor solution best represented the data.

A specific criterion of factor loading was adopted to determine which items to retain in the analysis. Based on the recommendation by Stevens (2002), any items with a loading below .40 were not interpreted. Only items with loadings above .60 were included. Emotion items that cross-loaded on two or more factors with loadings above .40 were also excluded. Next, I discuss specific criteria (e.g., variance explained, communalities of each item, nonredundant residuals) to determine whether a two-factor solution or a three-factor solution was considered best, all things considered.

Two-Factor Solution with 16 Emotion Items

I began by running a PCA with Oblimin (oblique) rotation generating a two-factor solution for emotions.[6] A two-factor solution was chosen based on the factor solution

[6] The factorability of emotion items reported earlier were based on a two-factor solution which was generated in SPSS version 27 by default.

detected by parallel analysis and Kaiser-Guttman Rule, and both factors explained a total of 68.9% of the variance in the emotion items before and after extraction. However, the communalities of the emotion items (i.e., amount of variance of each emotion item explained by the retained factors) were less than the recommended level of 60% for 4 of the items after extraction in the current sample (see Table 5-3).

To assess the fit of the model, residuals were calculated based on the difference between observed correlation coefficients and correlation coefficients predicted from the model. Thirty two nonredundant residuals (26%) were identified that had absolute values greater than the .05 cut-off value. A good model typically has absolute values of nonredundant residuals that are less than .05 for most of the residuals. When these absolute values of residuals are greater than .05 for more than 50% of the residuals, the model is considered to be a poor fit (Field, 2018). Therefore, the two-factor solution showed a relatively reasonable model fit.

The factor loadings of the emotion items in the two-factor solution are presented in Table 5-3. All of the negative emotions (i.e., *frustration*, *resentment*, *anxious*, *stressed*, *afraid of failure*, *distressed*, *upset*, *angry*, *irritated*, and *nervous*) loaded on Factor 1 and as such, Factor 1 was labelled as *negative affect experienced during procrastination*; Conversely, all positive emotions (i.e., *happy*, *fun*, *excited*, *content*, *relaxed* and *relief*) loaded on Factor 2. This factor was labelled as *positive affect experienced during procrastination*. All loadings were found to be greater than .65 for both factors. A significant small correlation, $r = -.20$, was found between Factor 1 and Factor 2.

Reliability of the Two-Factor Solution of Emotions. The reliability of the two-factor model of emotions related to procrastination was examined using Cronbach's alpha

to assess the consistency of the factors. The Cronbach's alpha for *negative affect experienced during procrastination* (Factor 1) was found to be excellent, α = .93, and the item-total correlations ranged from .61 to .80. The Cronbach's alpha for *positive affect experienced during procrastination* (Factor 2) was also found to be excellent, α = .94, and the item-total correlations ranged from .69 to .86. Item deletion from these two factors did not show any improvement in the Cronbach's alphas of these factors.

Table 5-3

Results of Factor Loadings and Communalities of the Two-Factor Solution of Emotions associated with Procrastination using a Principal Component Analysis with Oblimin Rotation (N = 475)

Emotion items	**Factor 1 Negative affect**	**Factor 2 Positive affect**	**h2**
Frustration	**.77**		.59
Resentment	**.68**		.46
Anxious	**.82**		.68
Stress	**.81**		.68
Afraid of failure	**.79**		.62
Distress	**.82**		.67
Upset	**.86**		.74
Angry	**.76**		.59
Irritated	**.73**		.53
Nervous	**.80**		.64
Happy		**.91**	.83
Fun		**.93**	.86
Excitement		**.92**	.86
Content		**.92**	.85
Relaxed		**.87**	.78
Relief		**.81**	.65

Note. Factor 1 = Negative affect experienced during procrastination; Factor 2 = Positive affect experienced during procrastination; Loadings below .40 were excluded from the analyses; Bolded items were selected for inclusion.

Three-Factor Solution with 16 Emotion Items

Next a PCA with Oblimin (oblique) rotation was run to generate a three-factor solution of emotions. A three-factor solution was considered based on the scree plot and

the three-factors together explained 75.1% of the variance in the emotion items before and after extraction, which is greater than the explained variance of the two-factor solution described earlier. Communalities of the emotion items, in other words, variance of each emotion in the three-factor solution improved significantly for all emotion items compared to the two-factor solution with the exception of the item "irritated" which explained 58% variance in the retained factors (see Table 5-4). The fit of the model for the present sample assessed using residuals identified 21 nonredundant residuals (17%) that had absolute values greater than .05 cut-off value. Therefore, the model fit of 3-factor solution was found to be superior than the two-factor solution.

The negative emotions did not load on a single factor but instead loaded on two factors. Factor 1 consisted of the negative emotions – *frustration*, *resentment*, *upset*, *distressed*, *angry* and *irritated*; Factor 2 consisted of the negative emotions – *anxious*, *stressed*, *upset*, *distressed*, *afraid of failure* and *nervous*. Again, all positive emotions (i.e., *happy*, *fun*, *excited*, *content*, *relaxed* and *relief*) loaded on Factor 3. The factor loadings of all negative emotions improved compared to the factor loadings observed in two-factor solution. The factor loadings of positive emotions were almost identical for the two-factor and three-factor solutions (see Table 5-3 & 5-4). The KMO measure of sampling adequacy was also found to be .91 for the three-factor solution, which is considered to be excellent. Based on the increase in variance explained by the emotion items in the three-factor solution, the improved model fit, larger communality values for the emotion items and the higher factor loadings of negative emotions in three-factor solution, I decided to retain the three-factor solution for the emotions related to procrastination. In this 16-item three-factor solution, Factor 1 and Factor 2 of negative

emotions showed a large positive correlation of .65; Factor 2 of negative emotions and Factor 3 of positive emotions showed a small negative correlation of .14; Lastly, Factor 1 of negative emotions and Factor 3 of positive emotions also had small negative correlation of .22 justifying the choice of an oblique rotation in running this PCA.

Following the decision to retain the three-factor solution, I re-examined whether any of the 16 emotion items in the factor-solution were problematic. First, I examined the sampling adequacy for individual emotion items, in other words, KMO values across the diagonal cells of the matrix and these KMO value were greater than .88, and negatives of the partial correlations among emotion items in the off-diagonal cells of the matrix were mostly small-moderate with the exception of "upset" which showed a large partial correlation with "angry." To determine which item was more problematic, I removed one item at a time. First, I removed the item "angry" only to determine this item's impact on the three-factor solution and removing this item caused the item "upset" to cross-load on Factor 1 and Factor 2. Additionally, the model fit based on residuals was slightly worse compared to the initial 16-item three-factor solution with the item "angry;" that is, there were 21 (20%) nonredundant residuals with absolute values greater than .05. Conversely, removing the item "upset" instead of the item "angry" did not affect the model fit and did not cause any items to cross-load. In the initial three-factor solution with both items "angry" and "upset," all factors showed loadings above or equal to .65 with the exception of "distressed" which showed a loading below 0.6. After removing "upset" from the analysis, the loading of the item "distressed" also improved to .63; this was not the case when the item "angry" was removed. Therefore, a decision to remove the item "upset" from the analysis was made.

Three-Factor Solution with 15 Emotion Items Excluding "Upset"

A PCA of the three-factor solution with an Oblimin rotation was run again on the 15 emotions items without the item "upset." After removing "upset," communalities and factor loadings improved slightly for the emotion items in the new 15-item model compared to the initial 16-item, three-factor model with "upset." The communality values and factor loadings of emotion items with and without the item "upset" are presented in Table 5-4. The KMO measure of sampling adequacy remained at .91which is considered excellent, and Bartlett's test of Sphericity was found to be significant for this three-factor solution without the item "upset" ($p < .001$). There were 17 nonredundant residuals (18%) with absolute scores greater than the .05 which is similar to the initial 16-item three-factor solution with the item "upset." The three factors together accounted for 75.2% variance in the emotion items before and after extraction which similar to the initial 16-item three-factor solution.

The final three-factor solution that was retained consisted of 15 emotion items. Factor 1 consisted of five negative emotion items – *frustration*, *resentment*, *angry* and *irritated* and was labelled as *frustration intolerance during procrastination*. Factor 1 was labelled as *frustration intolerance during procrastination* based on previous research by Harrington (2003, 2005a) who argues that frustration intolerance is a key aspect of procrastination from a rational-emotive perspective. As Harrington (2005a, 2005b) explains, frustration intolerance is understood as the unwillingness to complete a task due to unpleasant feelings like frustration. Consistent with previous findings, students in the present study also reported having unpleasant feelings such as frustration, resentment, distress, irritation and anger when they attempted their aversive academic tasks leading to

avoidance of these tasks. Therefore, *frustration intolerance during procrastination* seemed to be a suitable name for this factor.

Factor 2 consisted of five negative emotion items namely *anxious*, *stressed*, *afraid of failure, distressed* and *nervous*, and was labelled as *fear of failure during procrastination.* Factor 2 was labelled as *fear of failure during procrastination* because proponents of REBT (e.g., Ellis & Knaus, 1977; Harrington, 2005a) and other researchers (e.g., Solomon & Rothblum, 1984) found fear of failure to be conceptually and empirically different from frustration intolerance. Procrastinating individuals feel that they are incapable of dealing with the task demands and are likely to fail if they attempt these tasks. As a result, their fear of failure leads to their task avoidance (e.g., Ellis & Knaus, 1977). Researchers have found that higher a level of procrastination is related to greater fear of failure (e.g., Haghbin et al., 2012; Solomon & Rothblum, 1984), and negative emotions such as anxiety and stress are both linked to fear of failure and procrastination (e.g., Hagtvet and Benson 1997; Onwuegbuzie, 2004). It is, therefore, not surprising that negative emotions captured in the project dimensions *afraid of failure*, *distressed, anxiety*, *stress* and *nervous*, loaded on a single factor. Taking into account previous research, theory and the factor loadings, I reasoned that *fear of failure during procrastination* seemed to be the most appropriate label for this factor. Finally, Factor 3 included all items of positive emotions similar to the previous analysis, that is, *happy*, *fun*, *excited*, *content*, *relaxed* and *relief*. As such, Factor 3 was simply named *positive affect during procrastination*.

The factor loadings of all emotion items on their respective factors were of high magnitude ranging from .70 to .90 with the exception of the items *irritated* and *distressed*

which, although lower in magnitude, were also reasonably high. The correlations between Factors 1, 2 and 3 in this 15-item, three-factor solution without *upset* were identical to the correlations observed in the 16-item three-factor solution with *upset* as noted earlier. The results of the correlations among these three factors support the discriminant validity of the different factors.

Reliability of the Three-Factor Solution of Emotions in PCA. A reliability analysis of the three-factor model of emotions related to procrastination (excluding upset) revealed that the Cronbach's alpha for *frustration intolerance during procrastination* (Factor 1) was found to be good, $\alpha = .86$ and the inter-item correlations ranged from .47 to .62. For the factor *fear of failure during procrastination* (Factor 2), the Cronbach's alpha was found to be excellent, $\alpha = .90$, with inter-item correlations ranging from .64 to .78. Lastly, the reliability score for *positive affect during procrastination* was also excellent, $\alpha = .95$, with inter-item correlations ranging from .64 to .86. Exclusion of any items from these three factors did not improve the Cronbach's alphas.

Table 5-4

Results of Factor Loadings and Communalities of the Three-Factor Solution of Emotions Associated with Procrastination using Principal Component Analysis with Oblimin Rotation (N = 475)

Emotion items	**Factor 1**	**Factor 2**	**Factor 3**	**h2**	**Factor 1**	**Factor 2**	**Factor 3**	**h2**
	Including "Upset"				**Excluding "Upset"**			
Frustration	**.74**			.67	**.75**			.70
Resentment	**.90**			.67	**.92**			.71
Angry	**.85**			.73	**.79**			.70
Irritated	**.65**			.58	**.65**			.60
Upset	**.67**			.77	**-**	**-**		-
Distressed		**.59**		.68		**.63**		.67
AOF		**.84**		.72		**.86**		.72
Anxious		**.88**		.79		**.88**		.79
Stressed		**.85**		.79		**.86**		.79
Nervous		**.89**		.77		**.89**		.77
Happy			**.92**	.83			**.92**	.83
Fun			**.93**	.86			**.93**	.86
Excitement			**.94**	.86			**.94**	.86
Content			**.92**	.86			**.92**	.86
Relaxed			**.84**	.78			**.84**	.78
Relief			**.80**	.65			**.80**	.65

Note. AOF = Afraid of failure; Factor 1 = Frustration intolerance during procrastination; Factor 2 = Fear of failure during procrastination; Factor 3 = Positive affect during procrastination; Loadings below .40 were excluded from the analyses; Bolded items were selected for inclusion.

Study 1a: Summary

Comparison of the results of the two-factor model and the three-factor model of emotions associated with procrastination showed that a three-factor model of emotions is a better model than a two-factor model. Parallel analysis is considered to be a better estimator of the number of factors for factor analysis than a scree plot, which is somewhat arbitrary and uses a subjective method to determine the number of factors. On this note, methodologists have argued that there is no perfect method to extract the *true* number of factors, and, therefore, it is more logical to search for the optimal number of factors instead of the correct number of factors (Preacher et al., 2013 for a review). After

assessing the total variance explained, communalities of emotion items, model fit, and factor loadings, the three-factor model of emotions was found to be better than the two-factor model in all respects. Therefore, a three-factor solution of emotions was chosen as the final model.

The final model consisted of Factor 1 which I labelled *frustration intolerance during procrastination* consisting of the negative emotion items *frustration*, *resentment*, *angry* and *irritated*. Factor 2, labelled *fear of failure during procrastination,* consisted of the negative emotion items of: *distressed*, *anxious*, *stressed*, *afraid of failure* and *nervous*. Factor 3, called *positive affect during procrastination,* consisted of all of the positive emotion items: *happy*, *fun*, *excited*, *content*, *relaxed* and *relief*. The reliability statistics of both the factors *frustration intolerance during procrastination* and *positive affect during procrastination* were in the excellent range while the reliability for the *fear of failure during procrastination* factor was found to be good, making this three-factor model an appropriate condensation of the original PPA dimensions for further analyses. In the following sections, the three-factor model obtained using principal component analysis was further evaluated using a confirmatory factor analysis (CFA) on a different sample to determine if this was a factor structure is stable.

Confirmatory Factor Analysis of Emotions Related to Procrastination

Study 1b: Method

Participants

A new group of undergraduate students registered in first- and second-year psychology courses at Carleton University were recruited for this study. To conduct a confirmatory factor analysis (CFA), a sample size of at least 500 participants is required (Tabachnick & Fidell, 2013), and as such, I attempted to recruit approximately 600 participants in this study. A total of 605 participants were recruited from which nine participants were excluded at the data cleaning stage for providing the same rating across all items or measures and/or for providing incomplete data.[7] Analyses were run on the final sample of 596 participants (69% women, M_{age} = 21.06 years, SD_{age} = 4.66 years). Among these 596 participants, 50% of the participants self-identified as Caucasian with European Descent, 9% as African Canadian, 13% as East Asian, 8% as Middle Eastern, 8% as South Asian, 1% as Hispanic, 1% as Indigenous, and 10% as "other." Overall, the demographics of this sample in terms of age, gender, and ethnic background were very similar to the sample demographics of Study 1a. To examine missing values in the present sample, Little's MCAR test was conducted using SPSS version 27 statistical package and no missing values were detected.

Procedure and Measures

The same procedure as Study 1a was followed in Study 1b to recruit participants. Participants in this study signed up using the same online experimental sign-up system as

[7] Due to some issues related to the SONA study setup, there were too many duplicate data in Study 1a which were removed at the data cleaning stage. This problem was fixed in Study 1b and as such, duplicate data was not an issue in this study.

Study 1a. Participants who consented to participate completed a demographic questionnaire and a questionnaire asking them about the emotions they typically experience when they procrastinate on their academic tasks. Participants took approximately 5-10 minutes to complete the study. In exchange for their participation, participants received grade raising credit towards their final grades for first- and second-year courses.

Demographic Questionnaires

The same demographic questionnaire from Study 1a was provided to the participants in this study asking about their age, gender and ethnic background (see Appendix C). This information was collected to describe the study sample.

Questionnaires on Emotions related to Procrastination

The same process was used to collect data on the specific emotions that participants experience during procrastination. Participants received a description of how procrastination is defined in psychological research to ensure they did not misconstrue this construct with other forms of delay such as purposeful delay (see Appendix D). Similar to Study 1a, participants were provided with a list of academic tasks and were asked to choose the academic tasks they usually have in the courses they were taking. From those academic tasks, they were asked to report the tasks they frequently procrastinated on following which they had to identify the academic task they procrastinated on the most. The same 19 emotions related to procrastination[8] from Study

[8] Note that participant recruitment for the CFA commenced before analysis of the PCA was completed due to time constraints. Data collection through the Carleton sign-up system was slow due to a large number of studies running at the time. As such, data collection for CFA was started earlier with all emotion items. However, I only selected the 15 emotion items based on the findings from PCA to run and confirm the model using CFA.

1a were provided to participants in this study (see Table 5-1) and they rated these emotion item on a scale of 0 (*Not at all*) – 10 (*Extremely*).

Study 1b: Results

Preliminary Analyses

First, assumptions for conducting a CFA were checked before proceeding with the main analyses. To avoid biases like Type I or Type II errors in the results, presence of univariate and multivariate outliers, univariate and multivariate normality, linearity, heteroscedasticity, and multicollinearity were checked. These assumptions were analyzed using SPSS version 27. It is important to note that the assumptions of CFA were run using the 3 factors with 15 items of emotions from the final model of PCA: 1) *frustration intolerance during procrastination* (i.e., *frustration*, *resentment*, *angry*, and *irritated*), 2) *fear of failure during procrastination* (i.e., *anxious*, *stressed*, *afraid of failure*, *distressed* and *nervous*), and 3) *positive affect during procrastination* (i.e., *happy*, *fun*, *excited*, *content*, *relaxed*, *relief*). Additionally, I examined whether the model with 15 items being tested was *identified* which is an important assumption that needs to be met before running a CFA.

Univariate and Multivariate Outliers

Outliers were detected using the same criteria as outlined in Study 1a. Based on Tabachnick and Fidell's (2013) recommendation, Z-scores of participants on each emotion item that were greater than $z = 3.29$ at $p < .001$ were considered univariate outliers. Multivariate outliers were detected using Mahalanobis Distance scores that were obtained for each participant across all emotion items. The scores of Mahalanobis Distance were compared with a critical chi-square value of 36.12 at $p < .001$ for 15

degrees of freedom which is the total number of emotions in the model. I found a total of 27 univariate and multivariate outliers. Exclusion of these outliers slightly affected the final CFA results. It is important to note that scholars have suggested that outliers should be retained in factor analysis when a robust estimation method is used instead of deleting these outliers. This is because deleting outliers can negatively impact the accuracy of model fit and parameters in factor analysis (Flora et al., 2012).

For the CFA, I used the robust Maximum Likelihood approach to account for influential outliers and non-normality which is described below. As such, these outliers were not removed from the analyses. I also checked the outliers for the three factors generated in PCA separately and only 2-3 outliers were detected per factor which did not overlap between factors. The impact of these outliers on CFA was determined by running the model with and without outliers. Results of the CFA were not affected by the presence or absence of outliers in each factor. The final analyses were run on a sample of 596 participants.

Univariate and Multivariate Normality

Next, I examined the univariate and multivariate normality of the data for the 15 emotion items. I used a *z*-test of skew and kurtosis and the Kolmogorov-Smirnov test to examine univariate normality. The results were found to be significant demonstrating non-normality similar to Study 1a (see Table 5-5). All the negative emotion items showed significant negative skews except the item “angry” which demonstrated a normal distribution, and all positive emotion items showed significant positive skews. Again, participants reported experiencing more negative emotions and less positive emotions during procrastination. The values of mean, standard deviation, skew, standard error of

skew and kurtosis, and Kolmogorov-Smirnov test for the emotion items in the present data were almost identical to the data from Study 1a. Kurtosis values of these emotion items in the present data demonstrated some minor variations compared to the kurtosis values in Study 1a with 8 items having mesokurtic distribution and 6 items showing platykurtic distribution (see Table 5-2 & 5-5). As noted in Study 1a, both tests of skew and kurtosis and the Kolmogorov-Smirnov test are sensitive to large sample size, and given the large sample collected for CFA, graphical methods (i.e., histograms, Q-Q plots) were preferred over these normality tests to examine univariate normality.

Table 5-5

Mean, Standard Deviation, Skew, Kurtosis and Test of Normality Results for the Emotion Items Analyzed using Confirmatory Factor Analysis

Emotion items	*M*	*SD*	Skew (*SE*)	Kurtosis (*SE*)	Kolmogorov-Smirnov
Frustration	6.40	2.63	-.74 (.10) ***	.02 (.20)	.13 ***
Resentment	5.38	3.01	-.36 (.10) ***	-.78 (.20) **	.15 ***
Anxious	6.97	2.85	-.92 (.10) ***	.02 (.20)	.16 ***
Stress	7.59	2.42	-1.15 (.10) ***	.86 (.20) ***	.18 ***
Afraid of failure	7.14	2.94	-1.00 (.10) ***	.07 (.20)	.18 ***
Distress	5.99	2.87	-.52 (.10) ***	-.55 (.20) **	.12 ***
Angry	4.40	3.10	.08 (.10)	-1.09 (.20) ***	.12 ***
Irritated	5.50	2.80	-.40 (.10) ***	-.58 (.20) *	.13 ***
Nervous	6.41	2.77	-.74 (.10) ***	-.17 (.20)	.13 ***
Happy	2.76	2.60	.74 (.10) ***	-.33 (.20)	.17 ***
Fun	2.62	2.70	.83 (.10) ***	-.32 (.20)	.18 ***
Excitement	2.54	2.71	.89 (.10) ***	-.21 (.20)	.20 ***
Content	2.73	2.62	.66 (.10) ***	-.53 (.20) **	.18 ***
Relaxed	2.53	2.60	.81 (.10) ***	-.35 (.20)	.19 ***
Relief	2.51	2.63	.76 (.10) ***	-.49 (.20) **	.20 ***

Note. *$p < .05$, ** $p < .01$, ***$p < .001$

The levels of skewness of emotion items observed using Q-Q plots and histograms in this study were very similar to the skewness observed for emotions items in

Study 1a. Based on Q-Q plots and histograms, the negative emotion items such as frustration, resentment, distressed, irritated and nervous showed small negative skews, whereas anxious, stressed and afraid of failure showed moderate negative skews. The item *angry* revealed an almost normal distribution. Positive emotions like happy, fun, excited, content, relaxed, and relief showed a moderate level of skew. I also examined multivariate normality of these emotion items together using Small's test, and results demonstrated a non-normal distribution. When positive and negative emotions were assessed separately for multivariate normality, non-normality was again evident. This is expected because when univariate normality shows departure from normality, multivariate normality also departs from normality which was also the case in Study 1a.

The skews and kurtosis observed for the emotion items were mostly of a small to moderate level. Given that these emotion items rated in relation to procrastination were expected to be skewed as described in Study 1a earlier, transformation of data was not considered as it could affect the model fit of the CFA as well as the factor loadings. Results of the univariate and multivariate normality of items did not vary with and without outliers. I also generated a Q-Q plot of observed standardized residuals plotted against expected standardized residuals based on all emotion items together which showed a small departure from normality. Similar patterns of non-normality of residuals (i.e., slightly skewed) were also observed when Q-Q plots with standardized residuals were created for positive and negative emotions separately. The effect of normality on the results of CFA was mitigated by the estimation method chosen to run the CFA which is described in the main analyses section below.

Linearity, Homoscedasticity and Multicollinearity

I plotted the emotion items of the final model in pairwise scatterplots to determine linearity and none of the pair of emotions showed a departure from a linear relationship when linear, quadratic and cubic curves were fitted on the plots. Homoscedasticity was examined using scatterplots of the of the regression standardized residuals of all items plotted against the regression standardized predicted values. The regression standardized residuals were evenly spread out across the regression standardized predicted values with no patterns indicating homoscedasticity of residuals. Finally, the assumption of multicollinearity was met as the tolerance value for each emotion item was greater than the 0.1, which is the criterion to detect multicollinearity. Furthermore, correlations between emotion items did not exceed the correlation coefficient of .90 to demonstrate collinearity or multicollinearity among items.

Main Analyses

I ran a CFA to confirm whether the final measurement model, that is the three-factor model of emotions associated with procrastination found at the exploratory stage of Study 1a, is a good model to proceed with in Studies 2 and 3. A CFA was conducted using Mplus version 8.3 (Muthén & Muthén, 1998-2017). In the following sections, I discuss whether the model was *identified* to run a CFA following which I explain which estimation method was chosen and the rationale for choosing this estimation method. I then provide the findings of the CFA and provide an evaluation of the model fits based on Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), Tucker Lewis Index (TLI) and Standardized Root Mean Square Residuals (SRMR).

Model Identification

To evaluate whether the three-factor model of emotions related to procrastination determined using PCA was identified to run a CFA, the three-indicator rule was applied; that is, each latent variable in the model needed to have at least three items. In the present three-factor model, each factor or latent variable included between 4 to 6 emotion items. Other additional assumptions to run a CFA were also met in the present model. Specifically, the factor loadings were assumed to be non-zero and the items in the model were not allowed to cross-load on two factors. Additionally, the error terms were not allowed to correlate as there were no theoretical or conceptual justification for the item errors to be correlated. The three-factor model also passed the recursive rule as this model included only unidirectional effects and no feedback loops.

I used the standardization method to choose a scale for each factor/latent variable (*frustration intolerance during procrastination*, *fear of failure during procrastination* and *positive affect during procrastination*). As such, the mean and variance of each factor was set to 0 and 1, respectively. I chose the standardization method because this method converts the scores on the latent variable to Z-scores, making it convenient to compare factor loadings. After using the standardization method, the three-factor model was over-identified, as the number of pieces of information (calculated using the t-rule) was greater than the total number of parameter estimates for this model. The calculations of the number of pieces of information and number of unique parameters are presented below:

- **Number of unique parameters:**

15 factor loadings + 15 residuals + 3 covariances between factors + 15 means = 48

- **Number of pieces of information (calculated using t-rule):**

$$\text{t-rule} = \frac{\text{number of items (number of items +1)}}{2} + \text{ number of item means}$$

$$\text{t-rule} = \frac{15\ (15+1)}{2} + \text{ 15 means} = 135$$

Model Estimation Method

There are a number of estimation methods that are used in factor analysis. Maximum Likelihood (ML) is a common estimation method that is frequently used when conducting factor analysis in psychological research. However, there are specific assumptions that need to be met to run factor analysis using ML, including: the sample size has to be large, items have to approximate interval level and data must not demonstrate multivariate normality (Brown, 2015). In the present study, although the sample size was large enough, the data were based on a Likert-type scale with ordinal data and the data showed a small to moderate deviation from multivariate normality.

An alternative to ML is the robust Maximum Likelihood estimation method which is a parameter estimate with standard errors and a chi-square test statistic that are robust to non-normality, and appropriate for use when there is non-independence of observations as well as with interval data. A type of robust Maximum Likelihood estimation method is MLR which produces Yuan-Bentler fit statistic that is robust against moderate level of multivariate non-normality in the data in a large sample (Yuan & Bentler, 2000). As such, I used MLR as the estimation method to run CFA because this method could estimate robust standard errors despite multivariate non-normality in the present data. The ordinal data due to the Likert-type scale used in the present study was less of a concern when using MLR estimation method because ordinal scales that have 5 or more categories can be considered as continuous or interval data (Normal, 2010, Sullivan & Artino, 2013). All emotion items related to procrastination in the present

study were measured using a 0 - 10 Likert-type scale which include 11 response categories and approximates interval variables. Therefore, MLR was appropriate to use.

Confirmatory Factor Analysis of Emotions Related to Procrastination

As explained, the PCA ran in Study 1a revealed a three-factor solution for emotions that are typically experienced during procrastination. To confirm this factor structure obtained from PCA, I ran a CFA using a new sample of 596 participants. Recall that the three-factor solution generated using the PCA consisted of two factors of negative emotions (i.e., *frustration intolerance* and *fear of failure during procrastination*) and one factor with positive emotions (i.e., *positive affect during procrastination*). *Frustration intolerance during procrastination* consisted of the emotions: *frustration*, *resentment*, *angry*, and *irritated*; *fear of failure during procrastination* consisted of the items: *anxious*, *stressed*, *afraid of failure*, *distressed* and *nervous*; and *positive affect during procrastination* consisted of the items: *happy*, *fun*, *excited*, *content*, *relaxed*, *relief.*

These three factors with their corresponding emotion items were entered in Mplus version 8.3 to run a CFA. Results of the CFA revealed factor loadings of emotion items on their respective factors to be of high magnitude (range between .70 to .90; see Table 5-6). The R-square factor loadings showed that 49.4% to 82.5% variance in emotion items were explained by these three factors. The factors *frustration intolerance during procrastination* (Factor 1) and *fear of failure during procrastination* (Factor 2) showed a significant large positive correlation (r = .73); in contrast, the factor *positive affect during procrastination* showed a significant small negative correlation with *frustration intolerance* (r = -.193) and *fear of failure during procrastination* (r = -.194). The correlations among these three factors suggested discriminant validity of the factors.

Table 5-6

Results of Standardized Factor Loadings, Residual Variances and R-Square for Item Variances of the Three-Factor Solution of Emotions Associated with Procrastination using Confirmatory Factor Analysis (N = 596)

Emotion items	**Factor loadings**			**Residual Variances**			**R^2 for Item Variances**		
	Estimate	**SE**	***p***	**Estimate**	**SE**	***p***	**Estimate**	**SE**	***p***
Factor 1									
Frustration	.78	.025	< .001	0.39	0.040	< .001	0.61	0.040	< .001
Resentment	.70	.028	< .001	0.51	0.040	< .001	0.49	0.040	< .001
Angry	.77	.022	< .001	0.41	0.034	< .001	0.59	0.034	< .001
Irritated	.72	.033	< .001	0.48	0.048	< .001	0.51	0.048	< .001
Factor 2									
Distress	.83	.020	< .001	0.40	0.037	< .001	0.61	0.037	< .001
AOF	.85	.019	< .001	0.46	0.041	< .001	0.54	0.041	< .001
Anxious	.73	.028	< .001	0.31	0.033	< .001	0.69	0.033	< .001
Stress	.75	.027	< .001	0.28	0.033	< .001	0.72	0.033	< .001
Nervous	.78	.024	< .001	0.44	0.041	< .001	0.56	0.041	< .001
Factor 3									
Happy	.87	.016	< .001	0.24	0.027	< .001	0.76	0.027	< .001
Fun	.91	.017	< .001	0.18	0.031	< .001	0.83	0.031	< .001
Excitement	.90	.020	< .001	0.19	0.036	< .001	0.81	0.036	< .001
Content	.88	.017	< .001	0.23	0.029	< .001	0.77	0.029	< .001
Relaxed	.73	.031	< .001	0.47	0.045	< .001	0.53	0.045	< .001
Relief	.73	.029	< .001	0.47	0.043	< .001	0.53	0.043	< .001

Note. AOF = Afraid of failure; Factor 1 = *Frustration intolerance during procrastination*; Factor 2 = *Fear of failure during procrastination*; Factor 3 = Positive affect during procrastination.

Model Fit of the Three-Factor CFA Model

Next, I examined the model fit of this three-factor solution of emotions related to procrastination. I used a combination of model fit statistics to evaluate whether the CFA ran on the three-factor solution with 15 emotion items noted in relation to procrastination demonstrated a good fit. Methodologists (e.g., Brown, 2015; Kline 2015) have strongly recommended that model fit statistics should not be selected based on convenience, that is, selecting only specific fit statistics that indicate the model to be a good fit. Instead a combination of model fit statistics should be used to determine whether a model is a

good, reasonable/acceptable or poor fit. The model fit indices with their corresponding cut-off values presented in Table 5-7 were used in the present study to assess the fit of the CFA model. The cut-off values for these model fit indices were determined based on the recommendation by different authors in a number of articles (e.g., Brown, 2015; Hu and Bentler, 1999; see Kline, 2015 for a review). It is important to note that Satorra-Bentler scaled chi-square model fit was not used to assess the model fit of the present CFA model. This is because Chi-square model fit always provides significant results when there is a large sample size indicating a model to be a poor fit regardless of whether a model is actually a good fit or not. Given that the sample size in the present study was large, this fit index was not used.

The Root Mean Square Error of Approximation (RMSEA) value of the current CFA model was .07 indicating this model to be a reasonably good fit as it fell between the cut-off criteria of .06 and .08. The 90% confidence interval of RMSEA, however, did not include the threshold value of .05. The Comparative Fit Index (CFI) and the Tucker Lewis Index (TLI) values of this CFA model were .93 and .92, respectively, also indicating this model to be a reasonably good fit. Lastly, the Standardized Root Mean Square Residuals (SRMR) indicated this CFA model to be a good fit as the SRMR score was .06 which was below the cut-off criteria of .08. Overall, there is balance of evidence from all fit indices that the present CFA model was a reasonably good model.[9]

[9] The two-factor model of emotions related to procrastination was also run using CFA and generated a model with poor fit and as such, results of the two-factor model were not reported here.

Table 5-7
Model Fit Indices and their Cut-off Values that were Used to Assess the Fit of the CFA Model

Model Fit Indices		Description	Cut-offs	Note
Name	Measure			
Root Mean Square Error of Approximation	RMSEA	-Absolute measure of fit calculated based on non-centrality parameters -Parsimony adjusted index	≤ 06: good Fit .06 - 08: reasonably good fit 0.08 - 0.10: poor fit > .10 rejection; need for re-specification	Adjusted for the degrees of freedom to account for model complexity
Tucker Lewis index	TLI	-Compares fit of the target model with the null model -Incremental fit index	≥ .95: good fit ≥ .90: reasonably good fit < .90 rejection	Depends on the average size of correlations in the data. Not sensitive to sample size
Comparative Fit Index	CFI	-Compares fit of the target model with the null model -Incremental fit index	≥ 95: good fit ≥ .90: reasonably good fit < .90 rejection	Not sensitive to sample size
Standardized Root Mean Square Residual	SRMR	-Compares the square-root of the difference between the residuals of the sample covariance matrix and the hypothesized model -Absolute fit	≤ .08: Good fit	-
Model Chi-Square (Satorra-Bentler scaled chi-square)	χ^2	-Examines the discrepancy between the sample and fitted covariance matrix -Absolute fit	$p > 0.05$: not significant	Sensitive to sample size

Reliability of the Three-Factor Solution of Emotions in CFA

Lastly, reliability analyses of the three-factor model of emotions related to procrastination showed a good Cronbach's alpha for the factor *frustration intolerance during procrastination* (Factor 1, $\alpha = .83$) with inter-item correlation ranging from .46 to .59. The Cronbach's alpha for the factor *fear of failure during procrastination* is regarded as very-good to excellent (Factor 2, $\alpha = .89$), and the inter-item correlations of emotion items in this factor were between .55 to .66. Finally, the Cronbach's alpha was found to be excellent for the factor *positive affect during procrastination* (Factor 3, $\alpha = .93$) and the correlation between items in this factor ranged from .60 to 85. All reliability analyses were run using SPSS version 27. Item exclusion from these three factors did not improve the Cronbach's alphas.

Study 1b: Summary

The results of the CFA confirmed that the three-factor solution of emotion related to procrastination obtained using PCA is a reasonable model to represent the PPA emotion dimensions. The final three factors that were retained were: *frustration intolerance during procrastination, fear of failure during procrastination* and *positive affect during procrastination*. The first factor called *frustration intolerance during procrastination* included the emotion items: *frustration*, *resentment*, *angry*, and *irritated.* The second factor named *fear of failure during procrastination* included the emotion items: *distressed, anxious*, *stressed*, *afraid of failure* and *nervous*. The third factor named *positive affect during procrastination* consisted of all positive emotion items: *happy*, *fun*, *excited*, *content*, *relaxed*, *relief.* The reliability statistics of these three factors were also found to be in the good to excellent range.

The results of the principal component and confirmatory factor analyses supported previous research that investigated the relation of frustration intolerance and fear of failure to procrastination (e.g., Burka & Yuen, 2008). These are two separate constructs that play important roles psychologically in this dysfunctional behaviour. Researchers have found that the intolerance towards negative emotions like frustration, distress that triggers procrastination (e.g., Harrington, 2005b) where emotions generated in a given situation can trigger certain justifications. Similarly, fear of failure has been examined to understand how the perceived aversive consequences of being unsuccessful on a task can promote task avoidance (e.g., Bridges & Roig, 1997; Haghbin et al., 2012; Solomon & Ruthblum, 1984).

In the following studies, I took a dual-process perspective, to investigate the interplay of emotions and cognitions related to the irrational task delay like procrastination. Using a dual-process model, it can be argued that students experience emotions like frustration, resentment, anger and irritation when they deal with difficult academic tasks. The inability to tolerate those emotions may result in the avoidance of those tasks. Empirical evidence has demonstrated that individuals who procrastinate have low tolerance for negative emotions which leads to their use of avoidance coping (Harrington 2005b; Ekert et al., 2016). Likewise, students could feel certain emotions like distress, anxiety, stress, fear of failure and nervousness when they find certain academic tasks as difficult. The negative emotions related to their performance on those academic tasks may also contribute to their fear of failure beliefs. As such, I used these three factors of emotions with their corresponding emotion items to examine the mood-repair process and additionally examined irrational beliefs to investigate the interplay of

emotions and cognitions during procrastination in Study 2 and Study 3.

CHAPTER 6

EXAMINING MOOD-REPAIR AND IRRATIONAL BELIEFS IN PROCRASTINATION

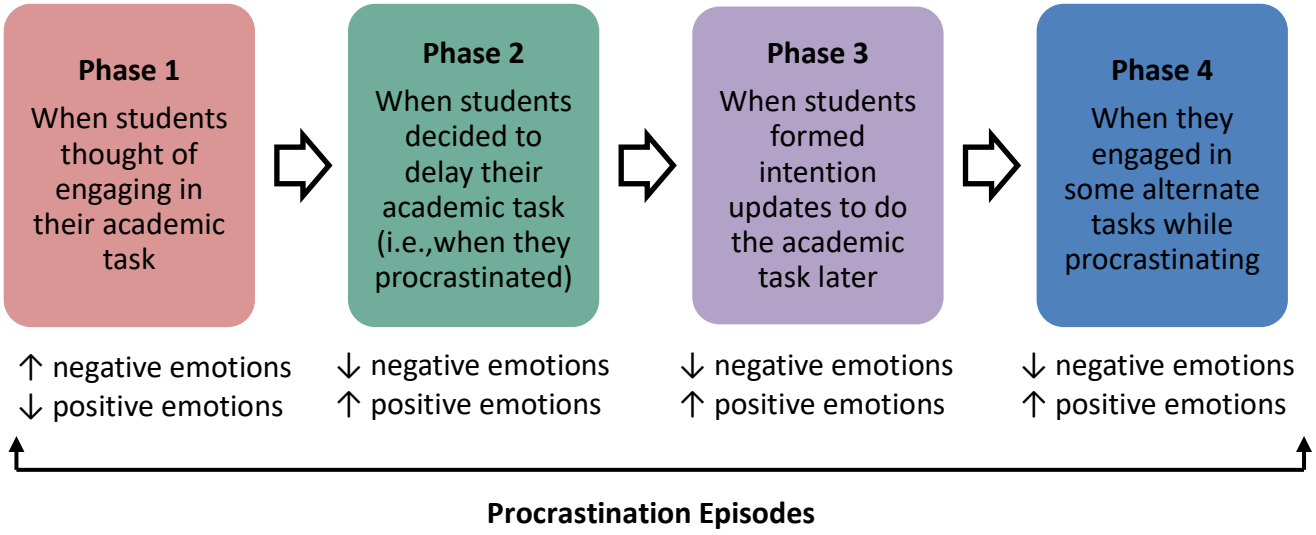
STUDY 2: METHOD AND ANALYSES

The purpose of Study 2 was to investigate the interplay of emotion misregulation (i.e., mood-repair) and maladaptive cognitions (i.e., irrational beliefs) in procrastination leading to the needless delay of important academic tasks. To examine the specific hypotheses for Study 2, I used Personal Project Analysis (PPA) with a mixed methods design where I used online questionnaires to obtain quantitative data (Study 2a) and conducted semi-structured interviews to obtain qualitative data (Study 2b) about undergraduate students' academic projects.

For the quantitative study, students were asked to complete self-report questionnaires of positive and negative emotions as well as irrational beliefs using PPA dimensions to indicate how they felt and what justification they used when they procrastinated on an ongoing academic task (Study 2a). Students first rated the emotion items named *frustration intolerance*, *fear of failure* and *positive affect during procrastination* that were determined using principal component and confirmatory factor analyses in Study 1a and 1b, respectively. The goal was to examine the extent to which students experienced these emotions during four momentary phases in project pursuit, namely: 1) when they thought of engaging in their academic tasks; 2) when they decide to delay these tasks (i.e., decide to procrastinate); 3) when they formed an intention update of when they might work on their academic tasks later; and 4) when they engaged in some alternate tasks while procrastinating on their academic tasks (see Figure 6-1).

Figure 6-1

The Four Momentary Phases of Procrastination Examined in Study 2



Although boredom was removed from the confirmatory factor analysis in Study 1b because it loaded on a separate factor in the principal component analysis, a decision to assess this emotion in this study was made. This is because studies have found that boredom shares a strong relation with procrastination (e.g., Blunt & Pychyl, 1998, 2005). Moreover, students who were interviewed in the present study emphasized that they experienced boredom during procrastination which is discussed later. One possible reason for why boredom loaded on a separate factor is that the other negative emotions that were included in the PPA were activating emotions whereas boredom is a deactivating emotion (Pekrun, 2006; Haghbin, 2015; Sharp et al., 2017).

Pekrun's control-value theory (Pekrun, 2006) distinguishes emotions on three dimensions, one of which is the degree of activation (activating and deactivating). Based on this theory, emotions such as anger, frustration, anxiety, and stress have been

categorized as negative activating emotions and emotions such as boredom, disappointment, hopelessness have been categorized as negative deactivating emotions. Compared to activating emotions that are high arousal emotions, deactivating emotions are considered low arousal emotions (Pekrun, 2006). Research has shown that when individuals get bored by a given task, they are able to recognize that they are bored. In such situations, they may avoid the task due to low stimulation and seek alternate sources of stimulation (Blunt & Pychyl, 2005). As an alternative, they may seek something more productive or they may give in to unimportant, unproductive tasks due to the breakdown of self-regulation (e.g., Sharp et al., 2017). Procrastinating individuals may choose the latter to compensate for their low stimulation. It is plausible that boredom loaded on a separate factor as this is the only deactivating emotion among the other negative emotions that were selected for the PPA. Therefore, I examined boredom separately across the four momentary phases as a deactivating negative emotion instead of excluding this emotion.

To explore the mood-repair process in procrastination (or more simply, the emotion misregulation strategies in procrastination), a number of hypotheses were created. I expected that students' positive and negative emotions would vary across the four momentary phases of procrastination (H2-1a). Specifically, more negative emotions and less positive emotions would be reported in the phase where students were thinking of engaging in their academic tasks compared to the last three phases (when they decided to delay their academic task, formed intention updates to do them later and when they engaged in alternate tasks; H2-1b). I also expected that the negative emotions would decrease significantly and positive emotions would increase when students formed

intention updates to do their tasks later, as well as when they participated in alternate activities compared to when they made the decision to postpone their academic task (H2-1c). Finally, students were expected to experience less negative emotions and more positive emotions when they took on some alternate activities compared to when they formed an intention update (H2-1d).

For the same academic tasks that they procrastinated on, students were also asked to report how they justified their procrastination on these tasks. This allowed me to examine the emotions and beliefs related to procrastination together for the same academic tasks. Students rated some PPA belief dimensions that were obtained from previous studies (e.g., Egan et al., 2007; Haghbin & Pychyl, 2015; Lindblom-Ylänne et al., 2015; McCown et al., 2012). It was expected that irrational beliefs would predict higher levels of task-specific procrastination and the intensity of procrastination (H2-2; see Chapter 4 for the details of all hypotheses).

In the qualitative study using semi-structured interviews (Study 2b), students were asked to elaborate on their emotional experience and how they justified their procrastination on an ongoing academic task during the momentary phases noted above (see Figure 6-1). During the interview, they also answered some open-ended questions related to their academic tasks and procrastination. It was expected that students would explain that they chose to not complete their work as originally intended, but to form an alternate plan of when they will do the task while engaging in alternate activities instead of their academic tasks to alleviate their negative emotions and elevate their positive emotions indicating mood-repair. I also expected that students would: 1) report maladaptive irrational appraisals of their academic tasks (e.g., “I believe that I will work

better under pressure on this academic task") which they might associate with their decision to needlessly delay their academic task, 2) form an intention update to work on the task in the future, and 3) engage in alternate tasks to alleviate emotional discomfort caused by academic tasks (see Chapter 4 for the details of the hypotheses).

Examining Mood-Repair and Irrational Beliefs in Procrastination using Quantitative Analyses

Study 2a: Method

Participants

A total of 529 undergraduate students were recruited from Carleton University. To determine the sample size for all analyses conducted in this study (i.e., Multivariate Analysis of Variance [MANOVA], correlation, regression analyses), I ran *a priori* power analyses using the software G*power. To obtain sufficient power for all the analyses in this study, the power was set to 80% for a one-tailed hypothesis at an alpha level of .05. Given that a number of variables were examined in this study and that the effect size ranged from small to moderate for irrational beliefs (e.g., Balkis et a., 2013; Solomon & Rothblum, 1984) and moderate to large for mood-repair (e.g., Tice et al., 2001), I used a small effect size to determine the final sample required for this study. Based on power calculations, a sample of 300 participants was needed to obtain sufficient power for all analyses in this study. Due to the possibility of participant exclusion, I overrecruited to retain sufficient power. From the 530 participants who were recruited, 221 participants were excluded based on time spent on the questionnaires, incomplete data and duplicate data. Analyses were completed on data from 308 participants.

In the final sample, 213 participants were women (69.2%), 94 participants were

men (30.5%), and 1 person identified as other (.3%). The mean age of participants was 20.1 years (*SD* = 4.21) ranging from 17 to 48 years old. Of the 308 participants, 56.4% of the participants identified themselves as Caucasian with a European descent, 12.4% as African Canadian, 9.1% as Middle Eastern, 5.9% as South Asian, 5.4% as East Asian, 1.6% as Latin American, 1.0% as Indigenous, 4.6% noted having a Bi- or Multi-racial background, 2.6% identified as other and 1.0% did not prefer to answer.

Procedure

Participants were informed about the study through the experimental sign-up system of the Department of Psychology (SONA) at Carleton University. All participants were asked to complete a battery of questionnaires. Prior to completing the questionnaires, participants were asked to complete an online consent form (see Appendix F). The consent form stated the purpose of the study and informed participants of the expectations for and their rights in relation to their participation. After reading the description of the study, participants were given the choice to accept or decline participation in the study. If the participants chose to consent, only then they could proceed to complete the questionnaires.

After obtaining consent, participants completed a demographic questionnaire that included questions on gender, age, ethnic background and so on (see Appendix C). Following the demographic questionnaire, participants were asked to read a scenario about a student who is currently procrastinating on writing an essay for a psychology course. Procrastination, which is inherently a problematic delay, has been misconstrued as an adaptive form of delay by some researchers (e.g., Chu & Choi, 2005). However, not all delay is procrastination (Pychyl, 2013) and empirically, researchers have distinguished

procrastination from other forms of delay (Chowdhury & Pychyl, 2018; Haghbin & Pychyl, 2015). As such, a scenario approach was adopted to provide participants with a clear understanding of what procrastination is and to ensure that procrastination is not confused with other forms of adaptive delay such as purposeful delay (i.e., a strategic delay used to prioritize tasks such that all tasks can be completed on time without affecting performance).

After reading the scenario, participants were asked to report the ongoing academic projects they are procrastinating on and filled out a number of online questionnaires. Participants completed Personal Projects Analysis (PPA; Little, 1983), questionnaires on emotions (see Appendix G) and irrational beliefs (see Appendix H). Participants also completed the Multifaceted Measure of Academic Procrastination (MMAP, Haghbin & Pychyl, 2015; see Appendix I). After completing the questionnaires, participants received a debriefing form (see Appendix J).

The data for the online questionnaires were collected using Qualtrics, which employs a secure system to ensure privacy of data. Participants took approximately 60 - 75 minutes to complete the online questionnaires. For their participation, they were awarded .75% as grade-raising credits towards their final grades in their first (PSYC 1001 & 1002) and second year (PSYC 2001 & PSYC 2002) psychology courses.

Measures

Demographic Questionnaires. This questionnaire included information on participants' gender, age, ethnic background, first language, program of study and year of study (see Appendix C). These data were collected primarily to describe the sample.

Personal Project Analysis (PPA). In this study, PPA developed by Little (1983) was used to assess project-related positive and negative emotions as well as project appraisals during procrastination (see Appendix G & H). First, participants read a scenario about a student procrastinating on writing an essay for a psychology course. As mentioned earlier, a scenario approach was adopted to ensure that participants understand how procrastination is conceptualized. Then they were asked to list 10 academic projects that they were undertaking at the time when they were filling these questionnaires including the projects on which they were procrastinating. For each task, participants were also asked to provide a rating for the extent to which they thought they were procrastinating on a 11-point Likert type scale ranging from 0 (Not procrastinating at all) to 10 (Procrastinating a lot). The purpose of this rating on the procrastination dimension was to understand the magnitude of procrastination appraisals of each project from the participants' perspective and to rank these projects during analysis such that the most problematic projects can be identified and analyzed together.

From the academic projects that participants have listed, they were asked to select the project they were procrastinating on the most at that time. Then participants were asked to reflect on the emotions they were experiencing at that time when procrastinating on this project. All participants rated 15 dimensions of positive (e.g., happy, content, fun) and negative (e.g., frustration, anxious, resentment) emotions from Study 1 across the four momentary phases of procrastination. That is, how they felt when: 1) they attempted the academic task they procrastinated on the most; 2) they decided to delay this academic task (i.e., decided to procrastinate); 3) they formed an intention update of when they might work on this academic task; and 4) they engaged in some alternate tasks while

procrastinating on their academic tasks. Boredom was assessed separately given its relevance to procrastination assessed in previous studies. Before providing the ratings for emotion items for the alternate activities, participants were asked to name five alternate activities they engaged in the most when they were procrastinating on the academic task. Participants rated each dimension of emotions across all four momentary phases on a 0 (Not at all) to 10 (Extremely) Likert-type scale. All dimensions of positive and negative emotions are presented in Appendix F. Participants also rated their overall mood across all four momentary phases of procrastination on a Likert-type scale of 0 (Bad) to10 (Good).

Participants' justifications associated with their procrastination were also assessed using PPA. A total of 14 dimensions of irrational beliefs were selected based on previous studies (e.g., Egan et al., 2007; Haghbin & Pychyl, 2015; Lindblom-Ylänne et al., 2015; McCown et al., 2012). All dimensions of irrational beliefs are presented in Appendix H. Participants were asked to reflect on the extent to which they held these beliefs to justify their needless delay of the academic task. An example of an irrational belief is "I need to have more free time and studying for this academic task seems to steal them." where participants rated this dimension on a 0 (Not at all) to 10 (Extremely) scale.

Multifaceted Measure of Academic Procrastination (MMAP). Procrastination was assessed using the MMAP developed by Haghbin (2015). The MMAP is a new tool to measure problematic procrastination behaviour on many different aspects important for its conceptualization including the associated emotions and cognitions in academic settings. The MMAP consists of four main scales, including: the Procrastination Behaviour Scale (PBS), the Perceived Negative Consequences Scale (PNCS), the

Negative Emotions Scale (NES), and the Procrastination Duration Scale (PDS). In the present study, I only used the PBS, the PNCS and a subscale of the NES to measure the severity of the procrastination problem (see Appendix I). I obtained the severity scores by calculating an average of the PBS, the PNCS and a subscale of NES called task-delay negative activating emotions. Higher scores represent a more severe procrastination problem. The PBS consists of 10 items (e.g., "*When academic tasks are assigned, I tell myself that I will not start them late, but I end up delaying them without a good reason*"), the PNCS consists of 15 items (e.g., "*delaying needlessly on academic tasks has made me a less successful student*"), and the NES subscale consists of 5 items (e.g., "*while I am needlessly delaying on an academic task despite my initial plan, I feel guilty"*). All items were measured on a Likert-type scale ranging from 1(*never*) to 6 (*always*).

Additionally, participants completed a modified version of the PBS (5 items) that measured their procrastination behaviour on the ongoing academic project they were procrastinating on the most at that time (e.g., "*I am needlessly delaying working on this academic task* [the academic task they procrastinate on the most] *despite the fact that I know I will not be happy about doing so later*"; see Appendix I). An average of these five PBS items was calculated to measure participants' task-specific procrastination behaviour where higher scores reflect higher levels of task-specific procrastination behaviour.

The MMAP was reported to have a Cronbach's $\alpha > .90$ showing excellent internal consistency. The Cronbach's alpha for the different subscales of MMAP ranged from .84 to .94 for the current sample. The MMAP was validated using 10 validity studies that provided strong evidence for convergent, divergent and concurrent validity in relation to important antecedents (e.g., self-regulation failure, intention-action) and consequences

(e.g., poor performance, poor health and well-being) of procrastination (Haghbin, 2015). Most importantly, the MMAP has excellent construct validity as it was designed to operationalize the most widely accepted definition of procrastination (i.e., voluntary delay of an intended action despite expecting to be worse off because of this delay), not just delay.

Study 2a: Results of the Quantitative Analyses

In Study 2a, a number of analyses were conducted to test the different hypotheses I included in Chapter 4 of my dissertation. To test the quantitative hypotheses on emotion misregulation (i.e., mood-repair process) in procrastination, I conducted one-way repeated measures Multivariate Analysis of Variance (MANOVA; also known as *profile analysis* and *doubly multivariate MANOVA*) which were followed up with orthogonal *a-priori* contrasts. I discuss the details of these analyses in the following sections. The hypotheses related to irrational beliefs and procrastination were examined using correlations and regression analyses. In the following sections, I present the results of the analyses I completed for Study 2a. I begin with the discussion of data cleaning (i.e., missing value analyses). Then I discuss the results of the preliminary analyses (i.e., assumption checks) to conduct MANOVA, correlations and regression analyses. Following this, I provide the results of the MANOVA and *a priori* contrasts pertaining to the mood-repair process in procrastination. Lastly, I present the results of correlations and regression analyses examining the relations of the various beliefs with procrastination.

Data Cleaning

The data from 308 participants was examined to determine the percentage of missing values. I conducted a missing value analysis using Little's MCAR test on SPSS version 27 software package. Overall, the final data had less than 2% missing values in all measures combined and the values were found to be missing completely at random (MCAR). Therefore, missing data was not found to be a problem in the present study.

Preliminary Analyses

To determine if the data were suitable to run a one-way repeated measures MANOVA, correlations and regression analyses, all assumptions of these analyses were checked using SPSS version 27 software package. Assumptions such as the presence and absence of univariate and multivariate outliers, univariate and multivariate normality, linearity and multicollinearity were checked for all analyses. Homoscedasticity was checked specifically for correlations and regressions. In the following sections, I present the results of assumptions tested for MANOVA and ANOVA followed by the results of assumptions for correlation and regression analyses.

Univariate and Multivariate Outliers

First, I examined the presence and absence of univariate outliers. To determine outliers, the mean scores for the three factors of emotions, *frustration intolerance during procrastination (FI-Proc)*, *fear of failure during procrastination (FoF-Proc)* and *positive affect during procrastination (PA-Proc)*,[10]were calculated. The mean score for *FI-Proc* was calculated by taking an average of the scores for the emotions – frustration, resentment, angry and irritated; the mean score for *FoF-Proc* was calculated by

[10] In the subsequent sections, I used the acronym of the three factors of emotions

averaging scores for anxious, stressed, distressed, afraid of failure and nervous; and the mean score for *PA-Proc* was calculated by taking average of the scores for happy, fun, excited, content, relaxed and relieved. The mean scores for each of these emotion factors were calculated for the four momentary phases of procrastination. Then standardized Z scores for each factor of emotion and the single PPA dimension of overall mood for the four momentary phases were calculated for each participant. No univariate outliers were detected for any of these factors of emotions as these Z scores did not exceed the cut-off value of $z = 3.29$ at $p < .001$ recommended by Tabachnick and Fidell (2013) to identify univariate outliers.

Then the Mahalanobis Distance was calculated for the three factors of emotions at all four momentary procrastination phases for each participant to determine multivariate outliers at $p < .001$. There were 2 multivariate outliers detected as the Mahalanobis Distance obtained for each participant exceeded a chi-square value of 32.91 at $p < .001$ for 12 degrees of freedom (for three emotion factors across four momentary phases). These outliers were retained as the results of MANOVA with and without outliers did not differ.

Univariate and Multivariate Normality

Both univariate and multivariate normality of three factors of emotions, *FI-Proc*, *FoF-Proc* and *PA-Proc*, and the overall mood dimension were assessed across the four momentary phases. First, I examined univariate normality using *z*-test of skewness and kurtosis which showed skew for some of the factors of emotions and overall mood dimension across the four momentary phases. *FI-Proc* showed negative skew during phase 1, 3 and 4 and platykurtic distribution in phase 2; *FoF-Proc* showed negative skew

for phase 1, 2 and 3, and platykurtic distribution in phase 3 and 4; and *PA-Proc* showed negative skew during phase 1, 2 and 4, and platykurtic distribution in phase 2 and 3 (see Table 6-1).

Kolmogorov-Smirnov test (test of normality) also did not support the assumption of normality for any of the three factors of emotions and overall mood dimensions across the four momentary phases with the exception of *FI-Proc* in phase 2 and FoF-Proc in phase 3 (see Table 6-1). As noted earlier in Study 1, when sample size gets larger, standard error of both skew and kurtosis shrink making the skew and kurtosis significant reflecting non-normality of data, and the Kolmogorov-Smirnov test is also sensitive to large sample sizes which results in a false positive for this test due to too much power. As such, I relied on graphical methods again (e.g., Q-Q plots, histograms) to assess univariate normality.

Examination of the Q-Q plots and histograms showed small to moderate skew only for some of the factors of emotions and overall mood dimensions across the four momentary phases. *FI-Proc* showed small and moderate positive skews in phase 3 and 4, respectively. *FoF-Proc* showed only a small negative skew in Phase 1. *PA-Proc* showed moderate positive skews in Phase 1 and 2. Lastly, the overall mood dimension showed slight negative skews in Phase 3 and 4.

I checked multivariate normality of all three factors of emotions and overall mood measured in the four momentary phases using Small's test and results showed multivariate non-normality. This was expected because when tests of univariate normality show deviation from normality, tests of multivariate normality also tend to demonstrate non-normality (Tabachnick & Fidell, 2013). The non-normality in the

present data was not determined to be a serious problem as the data showed only small to moderate skew and kurtosis and also, the data was naturally expected to have non-normal distributions for the different factors of emotions and the overall mood dimensions. For example, when students attempted their academic task, they were expected to feel less positive and more negative emotions and conversely, when they formed an intention update, they were expected to feel less negative and more positive emotions.

Additionally, I examined whether the standardized residuals of the three factors of emotions and overall mood dimension across the four momentary phases were normally distributed using Q-Q plot. When the observed standardized residuals of all emotion factors were plotted against the expected standardized residuals using a Q-Q plot, the distribution of residuals showed only a slight deviation from normality. When residuals of different factors of emotions and overall mood dimension were plotted separately in four Q-Q plots, the pattern of results indicated essentially normally distributed residuals. Therefore, the assumption of the normality of residuals was met to run a MANOVA using the three factors of emotions and an ANOVA using overall mood dimension. Importantly, MANOVA and ANOVA are robust against univariate and multivariate non-normality when there is a small to moderate deviation from normality and therefore, these analyses were deemed appropriate for the present study.[11]

[11] Note. The inclusion or exclusion of univariate and multivariate outliers did not change the skew and kurtosis of the distributions of emotion factors.

Table 6-1

Mean, Standard Deviation, Skew, Kurtosis and Test of Normality Results for the Three Factors of Emotions during Procrastination across the Four Momentary Phases

Phase	Factors of Emotions	*M*	*SD*	Skew (*SE*)	Kurtosis (*SE*)	Kolmogorov-Smirnov
Phase 1	Frustration Intolerance	5.38	2.21	-0.30(.14)	-0.35(.28)	0.07***
	Fear of Failure	6.70	2.21	-0.66(.14)	-0.04(.28)	0.09***
	Positive Affect	2.39	2.12	0.76(.14)	-0.15(.28)	0.13***
	Overall Mood	3.86	2.19	0.19(.14)	-0.42(.28)	0.11***
Phase 2	Frustration Intolerance	4.62	2.56	0.05(.14)	-0.71(.28)	0.05
	Fear of Failure	5.94	2.43	-0.37(.14)	-0.34(.28)	0.06***
	Positive Affect	3.35	2.59	0.41(.14)	-0.80(.28)	0.10***
	Overall Mood	4.77	2.34	-0.08(.14)	-0.33(.28)	0.11***
Phase 3	Frustration Intolerance	3.25	2.38	0.47(.14)	-0.24(.28)	0.09***
	Fear of Failure	4.75	2.51	0.01(.14)	-0.60(.28)	0.04
	Positive Affect	4.17	2.39	-0.14(.14)	-0.74(.28)	0.11***
	Overall Mood	6.21	2.02	-0.52(.14)	0.55(.28)	0.13***
Phase 4	Frustration Intolerance	2.49	2.65	1.00(.14)	0.52(.28)	0.17***
	Fear of Failure	3.98	2.58	0.33(.14)	-0.61(.28)	0.07***
	Positive Affect	5.86	2.49	-0.57(.14)	-0.26(.28)	0.09***
	Overall Mood	7.00	2.39	-0.87(.14)	0.49(.28)	0.16***

Note. FI-Proc = Frustration Intolerance during Procrastination; FoF-Proc = Fear of Failure during Procrastination; PA-Proc = Positive Affect during Procrastination.

Sphericity and Homogeneity of Variance-Covariance

The assumption of sphericity for one-way repeated measures MANOVA was not tested as repeated measures MANOVA does not require this assumption (O'Brien &

Kaiser, 1985). Also, testing the assumption of homogeneity of variance-covariance matrices was not necessary in this study. This is because when the sample sizes are the same at each level of the independent variable for each dependent variable, the evaluation of homogeneity of variance-covariance matrices is not required (Tabachnick & Fidell, 2013). In the present study, sample sizes were the same in the four momentary phases for all three factors of emotions and thus, the assumption of homogeneity of variance-covariance matrices passed.

Linearity and Multicollinearity

To conduct MANOVA, it is important to determine whether all pairs of factors of emotions have linear relations across the four momentary phases. As such, I examined the relation among all three emotion factors for the four phases separately using scatterplots. The assumption of linearity passed as all plots showed linear relations indicating that the data was suitable to conduct a MANOVA. Linearity of the different factors of emotions and the overall mood dimension within their respective momentary phases was examined using scatterplots to conduct *a-priori* contrasts. That is, linear relations of scores of *FI-Proc*, scores of *FoF-Proc*, and scores of *PA-Proc* within the four phases as well as linear relations for the overall mood dimension within the four phases were examined. All factors of emotions and the overall mood dimension measured showed linear relations within the four momentary phases and no curvilinear relations.

To run a one-way repeated measures MANOVA, dependent variables are expected to have moderate to large correlations (e.g., Tabachnick & Fidell, 2013). In the present study, the correlations among the three factors of emotions and overall mood dimension across the four momentary phases ranged from moderate to large magnitude,

however, none of the correlations exceeded 0.9 to indicate multicollinearity. Multicollinearity among the three factors of emotions and overall mood dimension across the four momentary phases was also checked using the tolerance value. Results showed that the tolerance values for the emotion factors and the overall mood dimension did not exceed the cut off score of 0.1 indicating absence of multicollinearity (e.g., Field, 2018; Tabachnick & Fidell, 2013).

Assumption Testing for Correlations and Regression Analyses

Next, I tested the assumptions for the correlation and regression analyses. As noted earlier, I checked univariate and multivariate outliers and normality, linearity, homoscedasticity and multicollinearity to run correlations and regression analyses. The independent variables in these analyses are the 14 irrational belief items and the dependent variables were: task-specific procrastination behaviour, general procrastination behaviour, and severity of procrastination.

Univariate and Multivariate Outliers

Univariate outliers for the irrational belief PPA dimensions, task-specific procrastination behaviour, general procrastination behaviour, and severity of procrastination were examined using the same criterion of standardized Z scores as noted above and no outliers were detected. However, using Mahalanobis Distance, eight multivariate outliers were found as the scores for Mahalanobis Distance exceeded a chi-square value of 40.79 at $p < .001$ for 17 degrees of freedom (i.e., 14 irrational belief dimensions and 3 procrastination measures). Results of the correlations and regression analyses with and without these outliers did not differ and as such, these outliers were kept in the final sample.

Univariate and Multivariate Normality

The *z*-tests of skewness and kurtosis revealed that the irrational belief dimensions were mostly normally distributed with some exceptions where some dimensions showed small to moderate skew and kurtosis. Results of the tests of skew and kurtosis and their corresponding standard error for all irrational belief dimensions are presented in Table 6-2. Results of Kolmogorov-Smirnov test also demonstrated significant deviation from normality for all irrational belief dimensions. Given that both *z*-tests of skewness and kurtosis and Kolmogorov-Smirnov tests are sensitive to large sample size that leads to significant deviation of data from normality, I again used graphical methods, that is, Q-Q plots and histograms, to examine the normality of irrational belief dimensions.

Using Q-Q plots, I found five irrational belief dimensions having moderate level of skewness: "*I think I am too smart to study for this academic task and so, I don't need it*", "*I don't think I will benefit from studying for this academic task and so I put it off*", "*I don't like forming habits to work on this academic task*", "*I am too stupid to benefit from studying for this academic task and so, I will hangout on Facebook or do something else*" and "*It is hopeless to study for this academic task.*" The dimension "*This academic task is too difficult/challenging and so, I will not do well even if I start early*" showed a slight positive skew. In contrast, "*I will work better on this academic task tomorrow*" and "*I think I will feel more like it tomorrow to work on this academic task*" showed slight negative skews.

I also checked the multivariate normality of all the irrational belief items using Small's test and results showed multivariate non-normality. However, these deviations from normality for the irrational belief dimensions were not determined to be an issue as

the data revealed only a small to moderate skew and kurtosis and they were expected to be skewed. For example, students were expected to have higher ratings for item like "*I believe that I will work better under pressure on this academic task*" and thus indicating a positive skew. I also plotted the observed standardized residuals of all irrational belief dimensions against the expected standardized residuals together and separately for each item using Q-Q plots. These plots showed minimal deviation of standardized residuals from normality for the irrational belief dimensions, thereby meeting the assumption of correlations and regression analyses.

Linearity, Homoscedasticity and Multicollinearity

The irrational belief items also showed only linear relations across different dimensions indicating that the final data were suitable for correlations and regression analyses. No multicollinearity was found among the irrational belief dimensions based on the tolerance values and correlations obtained among these dimensions. All tolerance values of belief dimensions were greater than .4 which is higher than the cut-off value of .1 and all correlations ranged from small to large but did not exceed the threshold of .9 to indicate multicollinearity.

To run correlations and regression analyses on the irrational belief dimensions, I also plotted regression standardized residuals against the regression standardized predicted values of all 14 belief dimensions using a scatterplot to check the assumption of homoscedasticity. The scatterplot showed that the variance of the regression standardized residuals of all irrational belief dimensions was similar across the level of the regression standardized predicted values confirming homoscedasticity.

Table 6-2

Mean, Standard Deviation, Skew, Kurtosis and Test of Normality Results for the Irrational Beliefs PPA Dimensions

Irrational Beliefs PPA dimensions	*M*	*SD*	Skew (*SE*)	Kurtosis (*SE*)	Kolmogorov-Smirnov
I think I am too smart to study for this academic task and so, I don't need it (B1)	2.07	.14	1.10(.14)	.35(.28)	.27
I don't think I will benefit from studying for this academic task and so I put it off (B2)	2.35	.15	.88(.14)	-.34(.28)	.24
I think I need to be in a good mood to study for this academic task (B3)	5.74	.15	-.56(.14)	-.27(.28)	.14
I don't like forming habits to work on this academic task (B4)	3.17	.15	.24(.14)	-1.09(.28)	.17
I need to have more free time and studying for this academic task seems to steal them (B5)	4.75	.17	-.09(.14)	.92(.28)	.10
This academic task is too difficult and so I decide to deal with it tomorrow (B6)	5.73	.15	-.62(.14)	-.34(.28)	.15
This academic task is too difficult/challenging and so, I will not do well even if I start early (B7)	3.77	.17	.27(.14)	-1.11(.28)	.13
I will work better on this academic task tomorrow (B8)	6.46	.14	-.81(.14)	.59(.28)	.13
I believe that I will work better under pressure on this academic task (B9)	5.39	.18	-.35(.14)	-.86(.28)	.12
I think I will feel more like it tomorrow to work on this academic task (B10)	6.46	.14	-.76(.14)	.35(.28)	.13
Putting off this academic task helps me to relax (B11)	4.54	.17	-.05(.14)	-.89(.28)	.11
This academic task is too much to get into (B12)	5.80	.14	-.63(.14)	.04(.28)	.14
I am too stupid to benefit from studying for this academic task and so, I will hangout on Facebook or do something else (B13)	2.53	.16	1.05(.14)	.13(.28)	.19
It is hopeless to study for this academic task (B14)	2.46	.15	.78(.14)	-.45(.28)	.19

Examining Mood-Repair Process using Multivariate Analysis of Variance

It will be recalled that I hypothesized that there would be a difference in positive and negative affect across the four momentary procrastination phases of procrastination: 1) when students thought of engaging in their academic task; 2) when they decided to needlessly delay their academic task; 3) when they updated their intention to do the academic task later; and 4) when they engaged in alternate activities or tasks instead of their academic task. The within-subjects independent variable was momentary phases of procrastination with these four levels. The three dependent variables were the two negative emotion factors, *FI-Proc* and *FoF-Proc*, and one positive emotion factor, *PA-Proc*.

A one-way repeated measures MANOVA was performed to investigate the mood-repair process in procrastination. Results of the one-way repeated measures MANOVA revealed that there was a significant difference in the three factors of positive and negative emotions, *FI-Proc*, *FoF-Proc* and *PA-Proc*, across the four momentary phases of procrastination for the academic task that students reported to have procrastinated on the most, $f = .50$, Wilks' $\lambda = .52$, $F(9, 299) = 76.55$, $p < .001$, partial $\eta^2 = .20$. It is important to note that the sample size in this study was determined based on MANOVA to ensure there was sufficient power to detect significance in this analysis. However, the limitation of having such as a large sample size is that it increased the likelihood of planned contrasts having too much power due to high familywise error rate. To control for the familywise error rate at 0.05, I used the Bonferroni correction (a conservative test) which limited the α for the per comparison error rate to .006 for the nine planned contrasts that were carried out. I also relied on effect sizes to interpret the results instead

of the significance levels only given the possibility of Type I error rate. The convention set by Cohen (1988, 1992) was followed to interpret magnitude of the following statistical tests: MANOVA and ANOVA (small: partial $\eta^2 = .01$; medium: partial $\eta^2 = .06$; large: partial $\eta^2 = .14$); planned contrasts (small: $d = .20$; medium: $d = .50$; large: $d = .80$; and small: $f = .10$; medium: $f = .25$; large: $f = .40$). Based on the effect size criteria noted by Cohen, the partial η^2 of .20 revealed in the MANOVA is very large in the present study.

The MANOVA was then followed up with a series of planned contrasts to examine the specific hypotheses that were created. In the first series of planned contrasts, I expected that students would experience more negative emotions and less positive emotions in the phase when they thought of engaging in their academic tasks (Phase 1) compared to the phases when they decided to delay their academic task (i.e., procrastinate; Phase 2), formed intention updates (Phase 3) and when they engaged in alternate tasks (Phase 4) indicating down-regulation of negative emotions and up-regulation of positive emotions. Results of this planned contrast for the positive emotions measured using the factor *PA-Proc* revealed that students experienced significantly greater positive emotions in Phase 2, 3 and 4 compared to Phase 1, $d = 1.70$, $t(307) = 14.80$, $p < .001$, partial $\eta^2 = .42$ (see Figure 6-2A). Conversely, planned contrast for the negative emotions showed that they experienced less negative emotions related to frustration intolerance (*FI-Proc*), $d = 1.84$, $t(307) = 15.97$, $p < .001$, partial $\eta^2 = .46$, and less negative emotions related to fear of failure (*FoF-Proc*), $d = 2.08$, $t(307) = 18.08$, $p < .001$, partial $\eta^2 = .52$, in the latter momentary phases of procrastination compared to Phase 1 (see Figures 6-2B & 6-2C). Together, these results provide support for the mood-

repair model where students attempt to up-regulate or improve their mood by avoiding their aversive academic task, making an intention to do the task later and engage in some other activities. It should also be noted that all effect sizes for these planned contrasts with positive and negative emotions are in the large range. The means and standard deviations of the three emotion factors across the four momentary phases are presented in Table 6-3.

Table 6-3

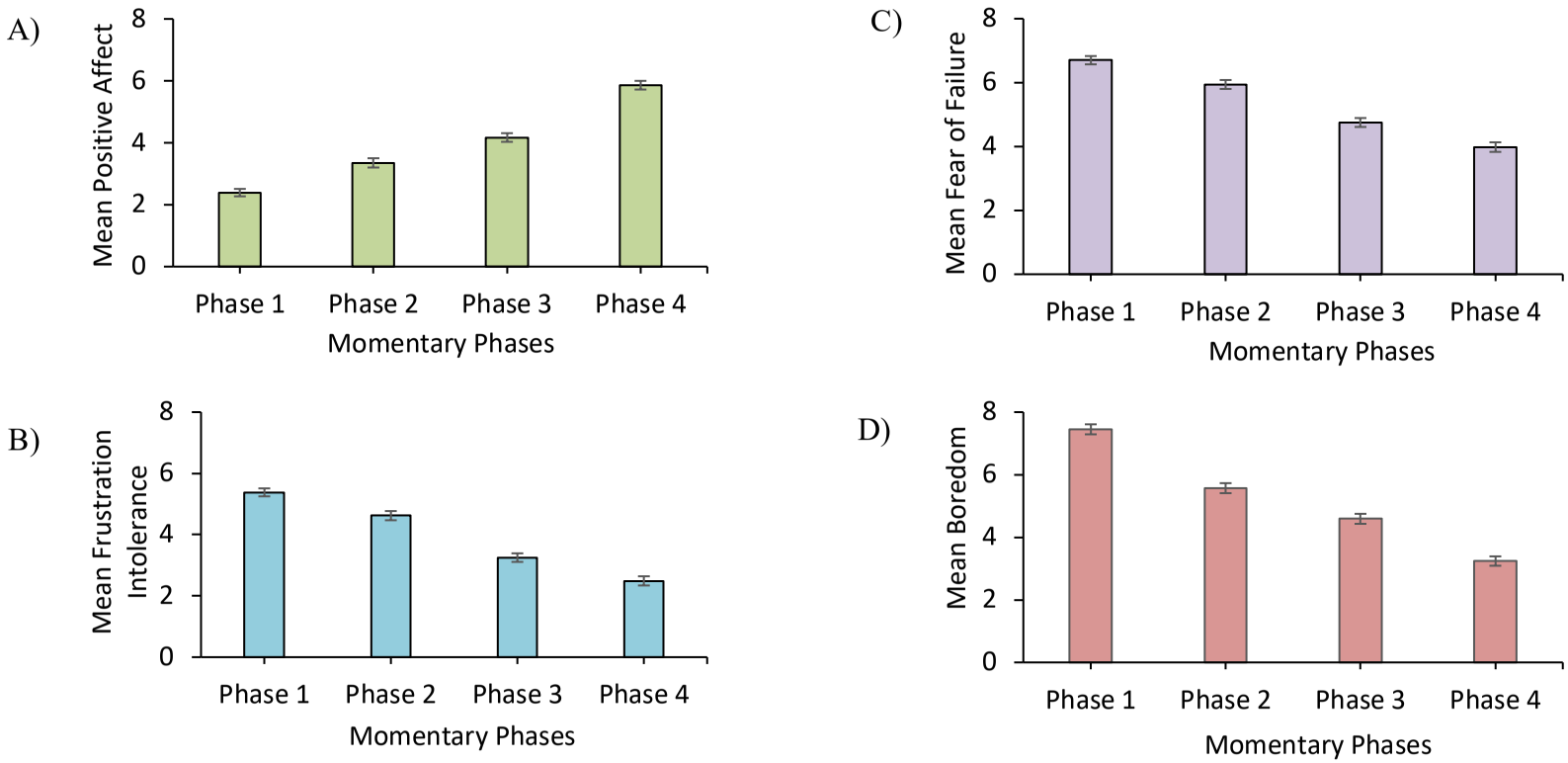
Means and Standard Deviations of the Three Factors of Emotions across the Four Momentary Phases

Variables	FI-Proc		FoF-Proc		PA-Proc		Boredom		Overall Mood	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Phase 1	5.38	2.20	6.70	2.21	2.39	2.12	7.45	2.82	3.86	2.19
Phase 2	4.62	2.56	5.94	2.43	3.35	2.59	5.57	2.97	4.77	2.34
Phase 3	3.25	2.38	4.75	2.51	4.17	2.39	4.59	2.72	6.21	2.03
Phase 4	2.49	2.65	3.98	2.58	5.86	2.49	3.24	2.61	7.00	2.39

Note. FI-Proc = Frustration Intolerance during Procrastination; *FoF-Proc* = Fear of Failure during Procrastination; and *PA-Proc* = Positive Affect during Procrastination.

Figure 6-2

Mean (A) Positive Affect, (B) Frustration Intolerance, (C) Fear of Failure and (D) Boredom across the Four Momentary Phases of Procrastination



Note. The four momentary phases during procrastination are when students thought of engaging in their academic task (Phase 1); when they decided to needlessly delay their academic task (Phase 2); when they updated their intention to do the academic task later (Phase 3); and when they engaged in alternate tasks instead of their academic task (Phase 4). Error bar represents +/- 2 standard errors.

To understand whether students' mood stays the same or improves showing significant increment among Phase 2, 3 and 4, I tested additional planned contrasts. In the second series of planned contrasts, I hypothesized that negative emotions would decrease significantly and positive emotions would increase when students formed intention updates for the task they have been procrastinating on (Phase 3) and when they participated in alternate activities (Phase 4) compared to when they made the decision to postpone their academic task (Phase 2). This hypothesis was supported. Results of the second planned contrast showed that students who procrastinated experienced significantly more positive affect (*PA-Proc*), $d = 1.46$, $t(307) = 12.84$, $p < .001$, partial $\eta^2 = .35$, and significantly less negative emotions related to frustration intolerance (*FI-Proc*), $d = 1.52$, $t(307) = 13.32$, $p < .001$, partial $\eta^2 = .37$, and less negative emotions related to fear of failure (*FoF-Proc*), $d = 1.60$, $t(307) = 13.95$, $p < .001$, partial $\eta^2 = .39$, in Phase 3 and 4 than Phase 2 (see Figure 6-2A to 6-2C presented above). This means students self-reported feeling much better when they formed a new intention to work on their task later and engaged in an alternate activity compared to when they had only made the decision to needlessly delay their task. The effect sizes for these analyses were found to be large as well.

In the third series of planned contrasts, I examined whether students' experience of emotions differed between the final two phases. I specifically hypothesized that students would experience less negative emotions and more positive emotions when they engaged in some alternate activities instead of working on their academic task (Phase 4) compared to when they formed an intention update (Phase 3). This hypothesis was also supported as results revealed that students who were procrastinating reported

experiencing significantly more positive affect (*PA-Proc*), $d = 1.40$, $t(307) = 12.18$, $p < .001$, partial $\eta^2 = .33$, and less emotions related to frustration intolerance (*FI-Proc*), $d = .62$, $t(307) = 5.55$, $p < .001$, partial $\eta^2 = .09$, and fear of failure (*FoF-Proc*), $d = .70$, $t(307) = 6.26$, $p < .001$, partial $\eta^2 = .11$, when they took part in alternate activities compared to when they updated their intention to work on the task later (see Figure 6-2A to 6-2C presented above). Although the results are significant for the negative emotions related to frustration intolerance and fear of failure during procrastination with medium effect sizes, the magnitude of these effect sizes for these emotions are relatively smaller than the large effect size for positive affect. These results imply that students may experience more positive emotions when they engage in the alternate activities of their choosing, but these activities do not necessarily help them alleviate their negative emotions as much compared to when they make a renewed intention to do their academic task.

As indicated earlier, boredom was assessed separately as a deactivating emotion using a one-way repeated measures ANOVA. Results showed that the level of boredom students experienced differed across the four momentary phases, $f = .77$, $F(2.91, 894.46) = 181.78$, $p < .001$, partial $\eta^2 = .37$. It is important to note that the assumption of sphericity was violated for ANOVA as the Mauchly's test of sphericity did not pass. As such, a more conservative test is reported here. I chose to report the Huynh-Feldt estimate instead of the Greenhouse-Geisser estimate. This is because when the Greenhouse-Geisser estimate is greater than .75 and the sphericity estimate is also as high as .90, the Greenhouse-Geisser estimate becomes too conservative (Girden, 1992; Huynh & Feldt, 1976). In such cases, Huynh-Feldt correction is a better alternative when sphericity score

is high and the Greenhouse-Geisser estimate exceeds .75 (Barcikowsky & Robey, 1984; Girden, 1992).

Three *a priori* planned contrasts were conducted to distinguish students' experience of boredom across the four momentary phases. In the first contrast, I investigated whether boredom significantly reduced in the last three phases (when they choose to avoid the academic task [Phase 2], formed an intention update [Phase 3] and engaged in alternate activities [Phase 4]) compared to the first phase (attempt to engage in the task [Phase 1]) indicating down-regulation of negative emotion. Results provides support for mood-repair in the latter phases with a large effect size, $d = 2.04$, $t(307) = 18.34$, $p < .001$, partial $\eta^2 = .52$ (see Figure 6-2D). In the second planned contrast, I examined whether students experienced low levels of boredom when they formed intention updates (Phase 3) and engaged in alternate activities (Phase 4) compared to when they simply decided to delay the task (Phase 2). A significant difference was detected in this contrast with a large effect size, $d = 1.24$, $t(307) = 11.04$, $p < .001$, partial $\eta^2 = .28$. Lastly, it was examined whether students felt significantly less bored when they engaged in alternate tasks than when they formed an intention update, and the result of this contrast revealed a significant difference in boredom with a large effect, $d = .84$, $t(307) = 7.32$, $p < .001$, partial $\eta^2 = .15$. Similar to negative emotions related to frustration intolerance and fear of failure during procrastination, boredom also decreased significantly across the phases with students self-reporting much less boredom in the last phase of this procrastination sequence.

In addition to the specific positive and negative emotions, I examined how students' overall mood varied across the four momentary phases using a one-way

repeated measures ANOVA. I expected that students' mood would significantly differ across the four momentary phases and results supported this hypothesis, $f = .77$, $F(2.81, 862.85) = 180.72$, $p < .001$, partial $\eta^2 = .37$. Again, the assumption of sphericity was violated for ANOVA as the Mauchly's test of sphericity did not pass and so, I chose the more conservative Huynh-Feldt estimate. I also conducted three planned orthogonal contrasts with overall mood. In the first *a priori* contrast, I examined the hypothesis that students would experience significantly better overall mood in the last three phases compared to the first phase and I found support for this hypothesis, $d = .87$, $t(307) = 15.21$, $p < .001$, partial $\eta^2 = .43$ (see Figure 6-3). This result complements the findings of positive and negative emotions experienced during procrastination and provides further support for the temporal mood-repair model. A large effect size was also found for this contrast.

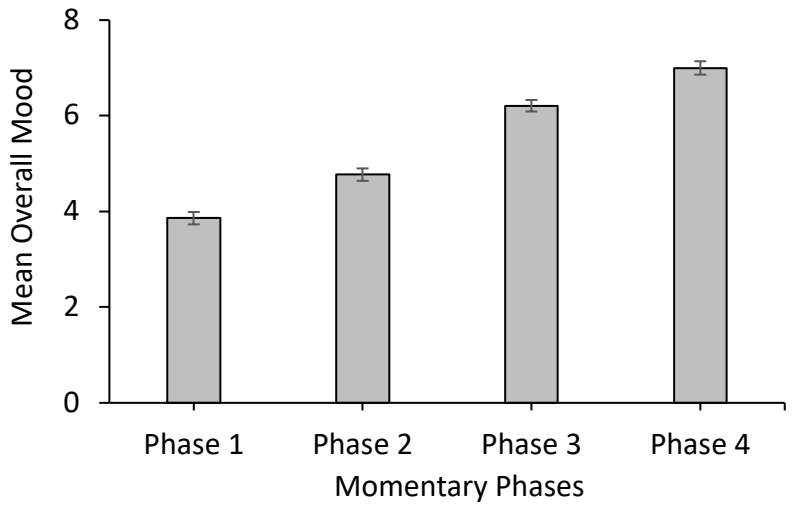
I also hypothesized that students who procrastinated would also report having better overall mood when they formed intention updates (Phase 3) and engaged in alternate activities (Phase 4) compared to when they simply decided to delay the task (Phase 2), which was tested in the second planned contrast for overall mood. I also found support for this hypothesis with a large effect size, $d = 1.80$, $t(307) = 15.89$, $p < .001$, partial $\eta^2 = .45$. Again, from this result it is evident that forming an intention update and engaging in alternate activities have a greater positive impact on mood than making the decision to delay the academic tasks.

In the final contrast, I examined the difference in overall mood between the last two momentary phases. I specifically hypothesized that students who procrastinated would report being in a much better overall mood when they took part in alternate

activities than when they formed an intention to the do the academic task later, and support for this final contrast was also found, $d = .66$, $t(307) = 5.74$, $p < .001$, partial $\eta^2 = .10$. When the medium effect size for this planned contrast is taken into consideration, the result of the overall mood is similar to the results of the negative emotions frustration intolerance and fear of failure. That is, students do feel better when they engage in alternative activities when they are procrastinating more than when they form an intention update, but this uplift in mood is not as great as the improvement in the positive affect that showed a large effect statistically speaking.

Figure 6-3

Mean Overall Mood Scores across the Four Momentary Phases of Procrastination



Note. The four momentary phases during procrastination are when students thought of engaging in their academic task (Phase 1); when they decide to needlessly delay their academic task (Phase 2); when they update their intention to do the academic task later (Phase 3); and when they engage in alternate tasks instead of their academic task (Phase 4). Error bar represents +/- 2 standard errors.

Gender Differences in Emotions

I also examined whether participants' gender had an impact on the results obtained. To examine gender differences in emotions, I conducted a series of two-way mixed ANOVAs for each of the emotion variables separately: positive affect, frustration intolerance, fear of failure and overall mood during procrastination. In this design, gender (men and women) was the between-subjects variable and the momentary phases of emotions (Phase 1 to 4) was the within-subjects variable. A decision to run a series of ANOVAs was made instead of a MANOVA because of an unbalanced design due to the variable gender (n_{men} = 94; n_{women} = 213). Robustness of MANOVA cannot be assumed if

the sample size is very unequal across the groups which is the case in the present data (Field, 2018; Tabachnick & Fidell, 2013).

Before conducting these analyses, the assumption of normality was checked for both genders separately using histograms and Q-Q plots, and these plots showed mostly normal distributions of emotions with some exception where small to moderate skew and kurtosis were observed. However, these deviations from normality were not found to be problematic. The normality of residuals was checked for each gender by plotting observed standardized residuals of emotion factors against expected standardized residuals of the factors of emotions and overall mood using Q-Q plots. The distributions of residuals did not deviate much from a normal distribution for each of these emotions. Additionally, analyses were run with and without univariate and multivariate outliers that were detected but no difference in the results were observed and, as such, the outliers were retained. It is also important to note that the test of sphericity did not pass for any of the two-way mixed ANOVAs that were conducted. Again, I reported the Huynh-Feldt estimate as the Greenhouse-Geisser estimate ranged between .91 to .94 which is greater than .75 making the results too conservative.

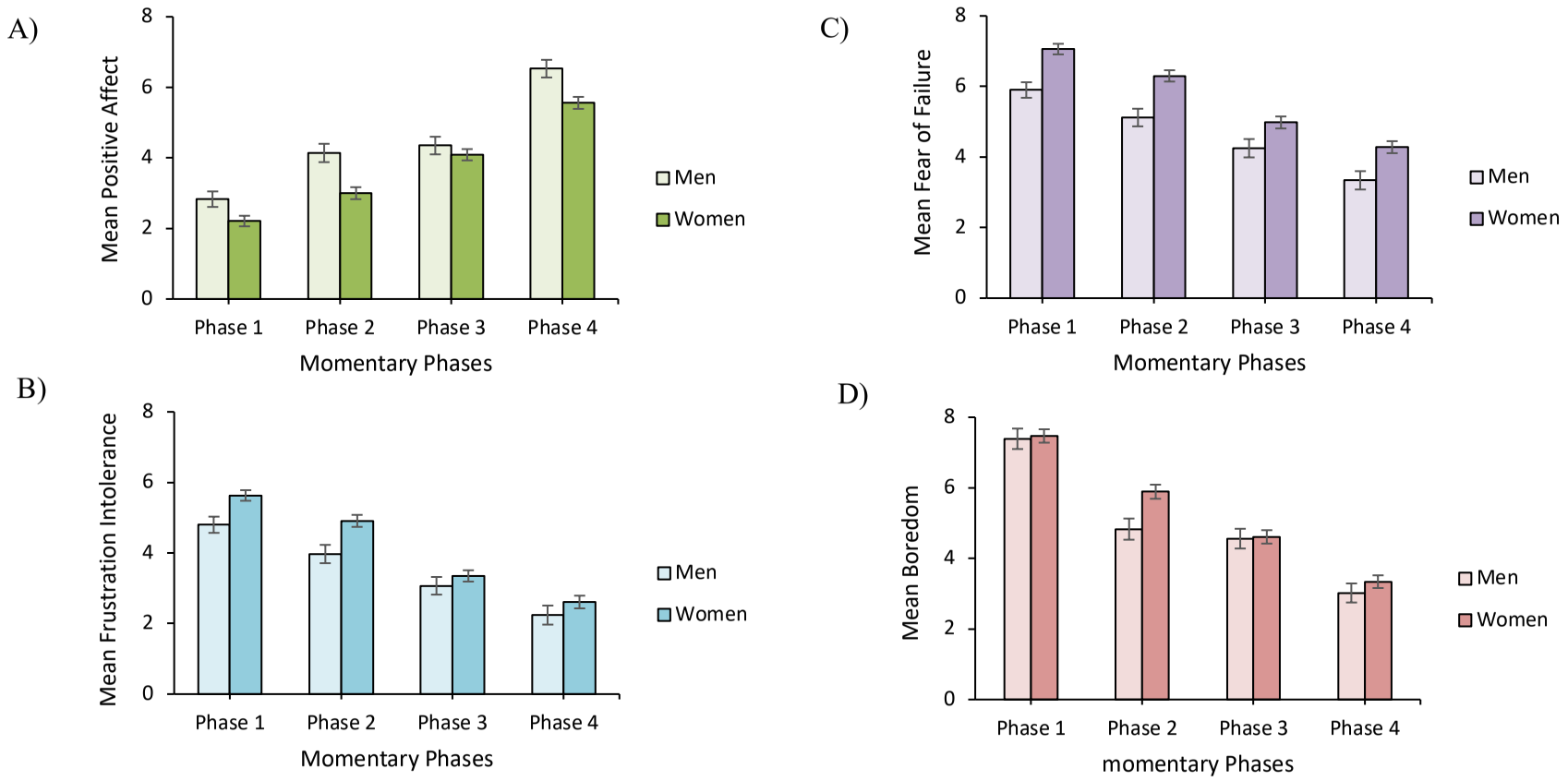
First, gender differences in positive affect across the four momentary phases of procrastination was investigated using 2 (gender) x 4 (momentary phases) mixed ANOVA. The Levene's test of homogeneity of variance passed for the first three phases (Phase 1, 2 and 3) of positive emotions between the two genders but did not pass for Phase 4. It is possible to have heterogeneity of variance when the sample size is large because small differences in group variances can result in a significant Levene's test when this test is run on a large sample (Field, 2018). Given this limitation of Levene's

test with large sample size, I calculated Hartley's F_{max} (also known as variance ratio) to determine if error variances are really heterogeneous. F_{max} is the ratio of largest cell variance ratio to the smallest cell variance and an F_{max} score as high as 10 is accepted when sample sizes between cells are unequal with a ratio of 4 to 1 (Milligan et al., 1987). The women to men sample size in the present data has a ratio of 2.26 to 1 and the F_{max} calculated for positive affect in Phase 4 was 2.04 which is much lower than 10 and so, homogeneity of variance was assumed.

Result of the mixed ANOVA revealed a significant improvement in positive affect from Phase 1 to Phase 4 as demonstrated previously, $f = .72$, $F(2.83, 861.86) = 157.65$, $p < .001$, partial $\eta^2 = .34$, and also showed men experienced significantly more positive affect than women, $f = .20$, $F(1, 305) = 12.37$, $p = .001$, partial $\eta^2 = .04$. A borderline significant gender x phases interaction was also found where both men and women participants mood significantly improved from Phase 1 to Phase 4 with men experiencing more positive affect than women in each phase, $f = .10$, $F(2.83, 861.86) = 2.75$, $p = .05$, partial $\eta^2 = .01$ (see Figure 6-5). The significant gender x phases interaction was followed up with *post hoc* tests to examine gender difference in each momentary phase. Given the unbalanced design, I chose to conduct Welch's test due to the robust nature of this test against unequal sample sizes. Bonferroni correction was used to control for the familywise error rate at 0.05 and as such, significance of each comparison was determined using .013 for the four pairwise comparisons. It was found that men experienced significantly more positive affect than women in Phase 2 and Phase 4 (see Table 6-4 & Figure 6-4A).

Figure 6-4

Mean Positive Affect (A), Frustration Intolerance (B) and Fear of Failure (C) Scores across the Four Momentary Phases of Procrastination for Men and Women Participants



Note. The four momentary phases during procrastination are when students thought of engaging in their academic task (Phase 1); when they decided to needlessly delay their academic task (Phase 2); when they updated their intention to do the academic task later (Phase 3); and when they engaged in alternate tasks instead of their academic task (Phase 4). Error bar represents +/- 2 standard errors.

Table 6-4A

Means and Standard Deviations of the Three Factors of Positive and Negative Emotions and Boredom for Men and Women during Procrastination across the Four Momentary Phases

Variables		FI-Proc				FoF-Proc				PA-Proc				Boredom			
		M	*SD*	F_{welch}	*p*	*M*	*SD*	F_{welch}	*p*	*M*	*SD*	F_{welch}	*p*	*M*	*SD*	F_{welch}	*P*
Phase 1	Men	4.80	2.11	9.49	.002	5.90	2.15	19.22	>.001	2.83	2.08	5.65	.018	7.39	2.89	.05	.820
	Women	5.63	2.21			7.06	2.15			2.21	2.12			7.47	2.81		
Phase 2	Men	3.97	2.24	8.99	.003	5.12	2.15	16.20	>.001	4.14	2.51	13.12	>.001	4.83	2.91	8.56	.004
	Women	4.91	2.64			6.30	2.46			3.00	2.55			5.89	2.95		
Phase 3	Men	3.07	2.32	.88	.349	4.25	2.29	5.56	.019	4.35	2.19	.75	.388	4.56	2.83	.02	.904
	Women	3.35	2.39			4.98	2.58			4.09	2.47			4.61	2.68		
Phase 4	Men	2.24	2.43	1.28	.259	3.34	2.29	8.86	.003	6.53	1.87	10.13	.002	3.02	2.66	.97	.327
	Women	2.61	2.73			4.28	2.65			5.56	2.67			3.34	2.60		

Note. Men (*n* = 94); women (*n* = 213). *FI-Proc* = Frustration Intolerance during Procrastination; *FoF-Proc* = Fear of Failure during Procrastination; and *PA-Proc* = Positive Affect during Procrastination. The four momentary phases during procrastination are when students thought of engaging in their academic task (Phase 1); when they decided to needlessly delay their academic task (Phase 2); when they updated their intention to do the academic task later (Phase 3); and when they engaged in alternate tasks instead of their academic task (Phase 4).

Table 6-4B

Means and Standard Deviations of Overall Mood for Men and Women during Procrastination across the Four Momentary Phases

Variables		Overall Mood			
		M	*SD*	F_{welch}	*P*
Phase 1	Men	4.36	2.09	7.13	.008
	Women	3.64	2.20		
Phase 2	Men	5.27	2.26	6.37	.012
	Women	4.54	2.35		
Phase 3	Men	6.33	1.90	.43	.511
	Women	6.16	2.09		
Phase 4	Men	7.34	2.14	2.76	.098
	Women	6.85	2.48		

Gender differences in negative emotions related to frustration intolerance were investigated next using a mixed ANOVA. Levene's test of homogeneity of variance passed for all combinations of gender and momentary phases except for Phase 2 frustration intolerance. Hartley's F_{max} was found to be 1.38 for Phase 2 which is less than 10 and so, error variances of frustration intolerance are homogenous across gender, which I interpreted to mean that the ANOVA was appropriate. Results of the ANOVA showed significant main effects of phases, $f = .64$, $F(2.76, 841.72) = 124.42$, $p < .001$, partial $\eta^2 = .02$, and gender, $f = .15$, $F(1, 305) = 6.79$, $p = .01$, partial $\eta^2 = .02$, but no significant gender x phases interaction on frustration intolerance, $f = .08$, $F(2.76, 841.72) = 2.17$, $p = .10$, partial $\eta^2 = .08$ (see Figure 6-4B & Table 6-4A). Then I examined gender differences in negative emotions related to fear of failure across the four phases of emotions. Similar to positive emotions, Levene's test of homogeneity of variance passed for all combinations of gender and momentary phases except for Phase 4 fear of failure. The calculated score of Hartley's F_{max} was 1.34 which is less than 10, so homogeneity of variance was assumed. Again, only significant main effects of phases, $f = .70$, $F(2.85, 869.13) = 151.12$, $p < .001$, partial $\eta^2 = .33$, and gender, $f = .23$, $F(1, 305) = 16.68$, $p < .001$, partial $\eta^2 = .05$, were found, but no significant gender x phases interaction for fear of failure, $f = .06$, $F(2.85, 869.13) = 1.25$, $p = .29$, partial $\eta^2 = .004$ (see Figure 6-4C & Table 6-4A).

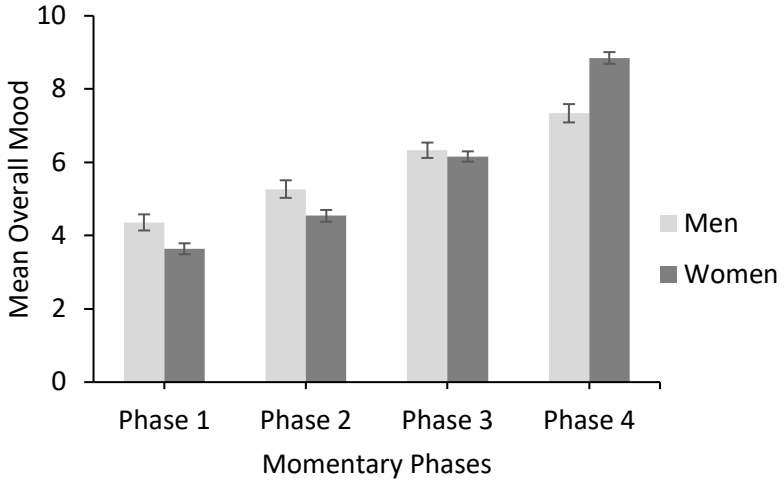
Next, I examined gender differences in boredom across the four momentary phases. Homogeneity of variance for boredom was found as Levene's test passed for all combinations of gender and phases. Results showed significant main effect of phases, $f = .72$, $F(2.92, 888.98) = 155.27$, $p < .001$, partial $\eta^2 = .34$ but not for gender on boredom, f

= .09, $F(1, 305) = 2.45$, $p = .12$, partial $\eta^2 = .01$. A gender x phases interaction was found, $f = .10$, $F(2.92, 888.98) = 2.73$, $p = .04$, partial $\eta^2 = .01$. *Post hoc* tests were conducted to determine where the gender differences are across the momentary phases. Given the unbalanced design, again, a Welch's test was conducted. Bonferroni correction was used to control for the familywise error rate at 0.05 and each comparison was compared against .013 to determine significance. It was found that women experienced significantly more boredom than men in Phase 2 (see Table 6-4A & Figure 6-4D).

Lastly, gender differences in overall mood were examined across the four momentary phases. Levene's test of homogeneity of variance for overall mood passed for all combinations of gender and phases. Again, significant univariate effects of phases, $f = .69$, $F(2.82, 859.19) = 145.00$, $p < .001$, partial $\eta^2 = .32$, and gender, $f = .16$, $F(1, 305) = 7.41$, $p = .01$, partial $\eta^2 = .02$, on overall mood were found but no gender x phases interaction was detected, $f = .06$, $F(2.82, 859.19) = 1.33$, $p = .27$, partial $\eta^2 = .004$ (see Figure 6-5 & Table 6-4B).

Figure 6-5

Mean Overall Mood Scores across the Four Momentary Phases of Procrastination for Men and Women Participants



Note. The four momentary phases during procrastination are when students thought of engaging in their academic task (Phase 1); when they decided to needlessly delay their academic task (Phase 2); when they updated their intention to do the academic task later (Phase 3); and when they engaged in alternate tasks instead of their academic task (Phase 4). Error bar represents +/- 2 standard errors.

Although significant main effects of gender were found for all factors of emotions and the overall mood dimension, and a significant gender x phases interaction was detected for positive affect, it is important to note that the effect sizes for these main effects and the interaction effect are small ranging between .01 to .05 for the partial η^2. It is possible that the large sample size in this study may have resulted in more power to determine these significant main effects for all emotion variables and an interaction effect for the positive affect. Given the possibility of Type I errors, these results should be interpreted with caution. Other plausible interpretations of the results of gender differences for positive affect, frustration intolerance and fear of failure are provided in the result summary section.

Examining Irrational Beliefs in Procrastination using Regression Analyses

I ran correlation and regression analyses to examine whether the dimensions of irrational beliefs selected in this study predicted procrastination. Unlike the dimensions of emotions, I did not run a factor analysis to summarize the 14 dimensions of irrational beliefs into a small number of factors because the thoughts and beliefs students hold in relation to procrastination are difficult to narrow down; students can differ quite significantly in how they think about or even justify their procrastination. This is evident in the procrastination literature and is also demonstrated in the interview data that were collected from participants. Certain irrational belief items that students mentioned during the interview sessions were not among the 14 dimensions I selected from previous research. As such, I did not factor analyze the dimensions of irrational beliefs and instead, each belief item's relation to procrastination was examined.

Again, I relied more on effect size than on significance level due to the large sample size in this study. To avoid the possibility of making Type I error when interpreting results of correlations and regression analyses, I used the following criteria of Cohen's effect size: correlations (small: $r = .10$, medium: $r = .30$, large: $r = .50$); regressions (small: $R^2 = .01$, medium: $R^2 = .09$, large: $R^2 = .25$). Pearson product-moment correlations were calculated among the 14 irrational belief dimensions and three procrastination measures, task-specific procrastination behaviour (PBS-task), general procrastination behaviour (PBS-general) and severity of procrastination (MMAP-severity; see Table 6-5). I expected that higher scores on irrational beliefs would predict higher levels of procrastination. Correlations among belief dimensions and the three measures of procrastination showed small to moderate correlations. With all three

procrastination measures, all belief dimensions revealed significant positive relations that were small or close to moderate in magnitude with a few exceptions that showed no significant relations. The belief dimension "*I think I am too smart to study for this academic task and so, I don't need it*" (B1) did not relate to any of the procrastination measures. With PBS-task, the belief dimension "*I don't think I will benefit from studying for this academic task and so I put it off*" (B2) showed no significant correlation, and with MMAP-severity, the dimension "*Putting off this academic task helps me to relax*" (B11) did not show a significant correlation. I also calculated a mean score of all belief dimensions and examined whether the mean of all irrational belief dimensions correlated with the three procrastination measures. Results showed a small-moderate positive correlation between mean irrational beliefs scores and PBS-task, $r = .27$, $p < .001$, a moderate correlation of mean irrational beliefs scores with PBS-general, $r = .34$, $p < .001$ and MMAP-severity, $r = .39$, $p < .001$.

Table 6-5
Correlations among the Irrational Beliefs Items and Procrastination

Dimensions	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1)I think I am too smart to study for this academic task and so, I don't need it (B1)	-	.63***	.14**	.23***	.32***	-.01	.07	.12*	.21***	.09	.36***	.14**	.04	.09
2)I don't think I will benefit from studying for this academic task and so I put it off (B2)		-	.18**	.31***	.29***	.15**	.28***	.21***	.27***	.15**	.35***	.20***	.27***	.31***
3)I think I need to be in a good mood to study for this academic task (B3)			-	.29***	.22***	.13*	.17**	.31***	.19***	.39***	.18**	.16**	.16**	.21***
4)I don't like forming habits to work on this academic task (B4)				-	.22***	.17**	.17**	.15**	.21***	.18**	.13**	.19**	.22***	.25***
5)I need to have more free time and studying for this academic task seems to steal them (B5)					-	.15**	.15**	.23***	.14**	.24***	.30***	.25***	.08	.09
6)This academic task is too difficult and so I decide to deal with it tomorrow (B6)						-	.59***	.35***	.17**	.33***	.13**	.42***	.33***	.30***
7)This academic task is too difficult/challenging and so, I will not do well even if I start early (B7)							-	.27**	.22**	.15**	.15**	.33***	.53***	.48***
8)I will work better on this academic task tomorrow (B8)								-	.26***	.53***	.13*	.28***	.10*	.15**
9)I believe that I will work better under pressure on this academic task (B9)									-	.21***	.13*	.19***	.08	.25***
10)I think I will feel more like it tomorrow to work on this academic task (B10)										-	.22***	.34***	.09	.14**
11)Putting off this academic task helps me to relax (B11)											-	.20***	.13*	.19**
12)This academic task is too much to get into (B12)												-	.30***	.31***
13)I am too stupid to benefit from studying for this academic task and so, I will hangout on Facebook or do something else (B13)													-	.68***
14)It is hopeless to study for this academic task (B14)														-
PBS-task	-.01	.07	.16**	.15**	.11*	.14**	.13**	.11*	.21***	.25***	.10*	.28***	.15**	.20***
PBS-general	.02	.10*	.16**	.25***	.15**	.19***	.17**	.16**	.31***	.29***	.11*	.29***	.15**	.23***
MMAP-severity	-.02	.10*	.19**	.24***	.12*	.30***	.27***	.19**	.23***	.29***	.01	.33***	.31***	.37***

Note. *$p < .05$, **$p < .01$, ***$p < .001$.
PBS-task = task-specific procrastination behaviour; PBS-general = general procrastination behaviour; MMAP-severity = severity of procrastination.

Next, regression analyses were carried out to determine how much variance the irrational belief dimensions explained in the three self-reported measures of procrastination. Among the 14 irrational belief items, only three belief items predicted PBS-task explaining 15% of the variance, four belief items predicted PBS-general explaining 22.2% of the variance and five belief items predicted MMAP-severity explaining 26.7% of the variance (see Table 6-6). There are three belief items that predicted all three procrastination measures – "*I believe that I will work better under pressure on this academic task*," (B9) "*I think I will feel more like it tomorrow to work on this academic task*," (B10) and "*This academic task is too much to get into*" (B12). The dimension "*I don't like forming habits to work on this academic task*" predicted both PBS-general and MMAP-severity. Lastly, the dimension "*It is hopeless to study for this academic task*" additionally predicted MMAP-severity.

Table 6-6

Standardized Regression Coefficients for Irrational Belief Dimensions with task-specific procrastination behaviour, general procrastination behaviour and severity of procrastination as the outcomes

Dimensions	PBS-task			PBS-general			MMAP-severity		
	β	*t*	*p*	*β*	*t*	*p*	*β*	*t*	*p*
1)I think I am too smart to study for this academic task and so, I don't need it (B1)	-.11	-1.50	.14	-.10	-1.44	.15	-.08	-1.20	.23
2)I don't think I will benefit from studying for this academic task and so I put it off (B2)	.00	-.004	1.00	-.04	-.53	.60	-.03	-.37	.71
3)I think I need to be in a good mood to study for this academic task (B3)	.04	.66	.51	-.02	-.33	.74	.02	.36	.73
4) I don't like forming habits to work on this academic task (B4)	.06	.98	.33	.16	2.72	.01	.12	2.06	.04
5) I need to have more free time and studying for this academic task seems to steal them (B5)	.02	.35	.73	.05	.77	.44	.04	.65	.52
6) This academic task is too difficult and so I decide to deal with it tomorrow (B6)	-.03	-.45	.66	-.02	-.31	.76	.08	1.15	.25
7) This academic task is too difficult/challenging and so, I will not do well even if I start early (B7)	-.01	-.08	.94	.02	.23	.82	.00	.03	.98
8) I will work better on this academic task tomorrow (B8)	-.08	-1.24	.22	-.06	-.93	.35	-.04	-.68	.50
9) I believe that I will work better under pressure on this academic task (B9)	.14	2.34	.02	.23	3.99	<.001	.11	1.98	.05
10) I think I will feel more like it tomorrow to work on this academic task (B10)	.18	2.53	.01	.19	2.83	.01	.17	2.54	.01
11) Putting off this academic task helps me to relax (B11)	.02	.31	.76	.01	.20	.84	-.11	-1.97	.05
12) This academic task is too much to get into (B12)	.19	2.92	.004	.16	2.65	.01	.15	2.54	.01
13) I am too stupid to benefit from studying for this academic task and so, I will hangout on Facebook or do something else (B13)	.01	.11	.91	-.03	-.35	.73	.08	1.07	.29
14) It is hopeless to study for this academic task (B14)	.09	1.10	.27	.11	1.45	.15	.20	2.76	.01
ΔR^2		**.15**			**.22**			**.27**	

Note. PBS-task = task-specific procrastination behaviour; PBS-general = general procrastination behaviour; MMAP-severity = severity of procrastination.

Gender differences in Irrational Beliefs and Procrastination

To determine if there were gender differences in procrastination, I ran three independent samples *t*-tests. Levene's test of homogeneity of variance passed indicating no difference in error variance of procrastination between men and women, and so I proceeded with *t*-tests. Results of the *t*-tests showed no difference in PBS-task, $d = .10$, $t(307) = .83$, $p = .41$, PBS-general, $d = .12$, $t(307) = .99$, $p = .32$, and MMAP-severity, $d = .04$, $t(307) = .35$, $p = .73$, between men and women. Previous studies on procrastination did not find any gender differences and the present findings are consistent with the results of these studies (e.g., Blunt & Pychyl, 2005; Haghbin, 2015).

Results showed no gender differences among the belief items with the exception of "*I think I am too smart to study for this academic task and so, I don't need it*" (item B1), $d = .63$, $t(149.39) = 4.72$, $p < .001$, and "*I don't think I will benefit from studying for this academic task and so I put it off*" (item B2), $d = .51$, $t(161.48) = 3.88$, $p < .001$. It will be recalled that item B1 did not show any relation to any of the three procrastination measures and item B2 did not show any relation to PBS-task measure. I ran regression analyses of these two items, B1 and B2, predicting three measures of procrastination for men and women separately. Results revealed that both B1 and B2 significantly predicted PBS-task, (B1: $\beta = .23$, $t(210) = 2.73$, $p = .01$; B2: $\beta = .26$, $t(210) = 3.10$, $p = .002$), PBS-general, (B1: $\beta = .19$, $t(210) = 2.25$, $p = .03$; B2: $\beta = .23$, $t(210) = 2.72$, $p = .01$) and MMAP severity (B1: $\beta = .28$, $t(210) = 3.35$, $p = .001$; B2 = $\beta = .28$, $t(210) = 3.33$, $p = .001$) for women explaining only 5.0% variance in PBS-task, 3.7% variance in PBS-general and 6.3% variance in MMAP severity. Given this small proportion of variance

explained in these procrastination measures, I conclude that the gender of students seems to have little influence on irrational beliefs in predicting procrastination.

Study 2a: Summary

The purpose of this study was to investigate mood-repair and irrational beliefs together to understand the interplay of both affective and cognitive processes in procrastination. Data on emotions and beliefs related to specific academic tasks were collected from participants to understand their experience of emotions and beliefs they across the four stages of procrastination that I outline previously, namely: when students thought of engaging in their academic task (Phase 1); when they decided to needlessly delay their academic task (Phase 2); when they updated their intention to do the academic task later (Phase 3); and when they engaged in alternate tasks instead of their academic task (Phase 4).

The results provided evidence for the mood-repair model. Students reported experiencing significantly less negative emotions and more positive emotions as well as improved overall mood in the last three momentary phases, that is, when they decided to delay the aversive academic task (Phase 2), when they updated their intention to do the task later (Phase 3), and when they engaged in more pleasant alternate tasks (Phase 4) compared to the initial phase when they were thinking about their aversive academic task (Phase 1). These results demonstrate that students experience more negative emotions related to frustration intolerance (i.e., more frustration, resentment, anger and feel irritated) and fear of failure (i.e., more stress, anxiety, afraid of failure, nervous, and distressed) as well as boredom when they think about or even initially engage in the academic tasks. These negative emotions decreased subsequent to the decision to

procrastinate, and decreased even further when the students reported making an intention to do the task in the future while also engaging in some alternative activity or task. Conversely, students reported experiencing low positive affect (e.g., happy, fun, excited, relieved, relaxed) and poor overall mood at the task engagement phase. However, positive affected increased significantly when they made the choice to not work on the academic task or procrastinate. Most interestingly, they reported feeling even better when they formed a renewed intention to work on the task later and then when they engaged in more pleasant alternate activities.

In fact, there seems to be an incremental improvement in students' mood across the four momentary phases. Students experienced more positive and less negative emotions in Phase 3 and 4 compared to Phase 2, and more positive and less negative emotions in Phase 4 compared to Phase 3. The pattern of changes in emotions and overall mood across the four momentary phases reflects a down-regulation of negative emotions and an up-regulation of positive emotions in procrastination when they made a series of decisions from attempting the academic task through to "giving in to" pleasant activities when avoiding the academic task. Interestingly, the change in negative emotions from Phase 3 to Phase 4 showed a medium effect whereas this effect was large for positive emotions. In effect, while procrastination serves to decrease negative emotions, what seems to really enhance positive emotions is an updated intention to work later while engaging in a more enjoyable alternative activity in the present moment. However, this conclusion gets me ahead of my story to some extent, because this pattern of change in positive and negative emotions and overall mood in the final two phases of

procrastination can be better understood using the interview data where students describe their experience of these emotions and their mood across time.

In addition to this general pattern across participants, gender differences in emotions and mood across the four momentary phases were examined to determine whether the results differ for men and women. Results showed that women experience relatively less positive emotions and overall positive mood, and more negative emotions compared to their men counterparts. In addition, gender by phase interactions were found for positive affect and boredom separately. Women experienced less positive affect in Phase 2 and 4 than men, whereas women experienced more boredom than men in Phase 2. Despite these significant results, the effects detected for gender were small statistically.

The results of Study 2a also revealed that both affective and cognitive processes are reflected in the procrastination process from task avoidance through to intention update and alternative-task engagement. It is not only the mood-repair across the four momentary phases that is related to the decision to delay, but also the task-specific irrational justifications that motivates the needless delay of academic tasks. For example, the results revealed that beliefs such as “working better under pressure,” “feeling more like it tomorrow” and “this academic task is too much to get into,” explained 15% of the variance in task-specific procrastination. These irrational beliefs also predicted the trait-level procrastination behaviour and severity of procrastination measures. Additionally, beliefs like *not willing to form habits for this academic task* predicted both PBS-general and MMAP-severity, and the justification that *it is hopeless to study for this academic*

task predicted MMAP-severity.[12] Interestingly, no gender differences were found for any of these beliefs.

Overall, the results of these nomothetic analyses demonstrated support for the mood-repair model and revealed that both affective and cognitive processes are clearly related to procrastination. Although the four stages of procrastination used as variables in these analyses make it tempting to further explain the data in terms of causal processes or processes more generally, the correlational nature of the data simply does not support this type of interpretation. Instead, I turn to Study 2b where I took an idiographic approach to data collection and analysis in order to develop an understanding of the interplay of emotions and cognitions in procrastination as experienced and explained at the level of the individual.

[12] It is important to note that the irrational justification students use during procrastination are not limited to these dimensions. There are other irrational beliefs that students use to rationalize their procrastination that were not included in Study 2a. These irrational beliefs are discussed in the qualitative study where students explained the other justifications they use during procrastination.

Examining Mood-Repair and Irrational Beliefs in Procrastination using a Qualitative Approach

Study 2b: Method

Participants

Data from the interviews were used to conduct a thematic analysis for the narrative inquiry approach. In qualitative research, theoretical saturation has a close relation to grounded theory (i.e., construction of theories following data collection and analysis; Ando, Cousins, & Young, 2014) where traditionally an inductive approach (i.e., themes emerging from data) is used to determine the themes for a new theory (Ando et al., 2014; Saunders et al., 2018). Given that I worked with an existing model of procrastination (i.e., the mood-repair model), I took a contemporary research perspective on saturation. I used the concept of *a priori thematic saturation* that utilizes a deductive approach allowing researchers to work with pre-determined categories or themes for a theory. In the deductive approach, qualitative data are collected following the formulation of a theory with specific themes, and the results obtained from the data then exemplify the logic and the themes of the theory (Saunders et al., 2018).

A popular concern among researchers about thematic analysis is how to determine thematic saturation. Guest and colleagues (2006) have suggested that by developing a clear, detailed codebook for thematic analysis (i.e., codes for the specific themes of the theory), saturation can be determined effectively. In fact, using a careful, consistent approach to coding, these researchers found that approximately six participant interviews can provide adequate information on the themes of a theory. Further interviews can then provide more information to refine or further exemplify a theory. Approximately, 12

participant interviews are sufficient to reach complete saturation (Guest et al., 2006), and this criterion for sample size has been replicated in other studies (e.g., Ando et al., 2014).

Given that the goal of this study was to examine the mood-repair and irrational beliefs among individuals who procrastinate, it was important to determine participants who were invited for an interview have experience in procrastination. To select participants for the interview, mean scores of participants' task-specific procrastination behaviour as well as mean scores of participants' severity of procrastination problem were obtained from Study 2a. Participants who scored greater than a mean of 3.61 on task-specific procrastination behaviour and severity of procrastination problem were identified. This criterion to select participants for the interview was used because Haghbin (2015) provided this cut-off score of 3.61 for the MMAP scale using the Receiver Operating Characteristics (ROC) curve, sensitivities, and specificities statistics to screen individuals with significant procrastination problems and to distinguish procrastination from other forms of delay. Based on this cut-off score, a total of 75 students were randomly drawn from the quantitative study (Study 2a) and were invited via email to participate in the study.[13] Of these 75 students, 18 students responded to participate in the interview. Three of the 18 students did not show up on the scheduled date. The final sample consisted of 15 participants who were interviewed in-person for the qualitative study.

Although 15 students were recruited in the present study, two of the 15 participants were excluded from the study.[14] One of the participants was excluded

[13] The recruitment for the online study was ongoing when the interviews were being scheduled and conducted.
[14] The two participants who were excluded were men.

because he misconstrued purposeful (strategic) delay as procrastination.[15] The second participant was excluded because this person was recovering from a long-term addiction problem and demonstrated difficulty in reflecting on the emotions he experienced during procrastination. In the present study, recruitment was stopped after interviewing 13 participants as saturation was reached where no new information was obtained.

Of the 13 participants, 11 participants were women (78.6%) and 2 were men (15.4%).[16] The mean age of participants was 19.08 years (*SD* = 1.75) ranging from 17 to 23 years old. The ethnic background of these participants is as follows: four participants identified themselves as Caucasian with a European descent, two participants as Middle Eastern, two participants as Latin American, one participant as South Asian, one participant as East Asian, one participant identified as a bi- or multi-racial background, and two identified as other.

Procedure

Participants who were selected for the in-person interview sessions were contacted via email and were informed about the purpose of the study in an informed consent form (see Appendix K). Participants who consented to do the interview were invited to sign up for the study through the Experimental sign-up system of the Department of Psychology (SONA) at Carleton University.

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[15] This participant explained that he was reprioritizing his academic tasks to ensure he meets all the deadlines. He had started working on the academic tasks that he reported to have procrastinated on well ahead of time. He put this academic off only due to necessity, that is, he strategically delayed the task when he had to complete another academic task with an earlier deadline or when he had to go to work. None of this indicated that he was needlessly delaying any of his academic task including the academic task he thought he was procrastinating on. His explanation indicated that he was purposefully delaying this academic task.

[16] Although the goal was to recruit equal number of men and women for the interviews, the participants who responded were mostly women and men did not respond by the deadline that was set on SONA to schedule an interview.

All interviews were conducted in the Procrastination Research Group meeting room located in the Loeb Building at Carleton University. At the beginning of the interview, participants were provided with the informed consent again which they needed to review and sign to proceed with the interview. Each participant completed a semi-structured interview during which they answered some open-ended questions about their procrastination problem that they had identified in the online questionnaires, and then they reflected on the emotions they experienced and the beliefs they held in relation to their procrastination (see Appendix L). Basically, the PPA questionnaire that was in the online study (Study 2a) was used to guide the open-ended questions participants answered during the interview to understand their thought processes and how they felt at the moment. At the end of the interview, participants were debriefed about the study (see Appendix M for the debriefing form). All interview sessions were audiotaped and each session was approximately 60-minutes long. Participants were awarded 1% grade-raising credit towards their final grades first (i.e., PSYC 1001 & 1002) and second year (PSYC 2001 & 2002) psychology courses for their participation.

Questionnaire for the Semi-Structured Interview

The use of PPA dimensions to determine the frequency and extent to which students experience specific emotions and the irrational beliefs they held when they procrastinated, simplified the coding of students' academic procrastination experiences in the present study. The interview consisted of specific open-ended questions for which a rigorous approach to coding was used. The details of the coding process for this study are discussed in the analyses section below.

The questionnaires for the semi-structured interview included a number of open-ended questions. First, students were asked to describe the ongoing academic project they were procrastinating on the most (i.e., the academic project they noted in the online study). They were also asked to reflect on why they thought they were procrastinating on this particular task more than others and what specific qualities of this academic task affected them the most. To understand the mood-repair process and irrational beliefs in procrastination, participants answered some open-ended questions where they elaborated on their experience of positive and negative emotions and irrational justification they noted in the online (quantitative) study using PPA across the four momentary phases of procrastination: 1) when they thought of engaging in the academic task they procrastinated on the most (Phase 1); 2) when they decided to delay this academic task (i.e., decided to procrastinate; Phase 2); 3) when they formed an intention-update of when they might work on this academic task (Phase 3); and 4) when they engaged in some alternate activities while procrastinating on their academic tasks (Phase 4). These interview questions are presented in Appendix L.

Study 2b: Results of Qualitative Analyses

All interviews in the present study were transcribed verbatim and then were checked for accuracy for a second time. I conducted a thematic analysis using the NVivo software program to examine the interview transcripts of students to investigate evidence for mood-repair and the associated irrational beliefs students hold when they procrastinate. NVivo is a software package that has been built specifically to organize, classify and analyze unstructured qualitative data such as interview transcripts, focus group notes, and survey data with open-ended questions. Furthermore, using this

software, data from multiple sources can be compared to test theories. Researchers can use this software to identify specific themes and trends in the qualitative data for an existing theory.

To identify the specific themes of the mood-repair model of procrastination together with the irrational thoughts that students have when they procrastinate, I created three theory-driven codebooks. The codebook is a reference guide for coding responses of respondents in qualitative designs (e.g., Merriam & Tisdell, 2016). Based on the guidelines for thematic analysis documented in previous studies (e.g., Ando et al., 2014; Braun & Clarke, 2006), there are two stages in the development of a codebook consisting of themes. In the first stage, a codebook is developed using an inductive or deductive approach, which is applied to the first six interview transcripts from participants. In the second stage, the codebook is modified based on these six interview transcripts to apply the new coding to the transcripts of the remaining participants.

Of the three codebooks, two codebooks were created for the mood-repair model. The first codebook included codes to analyze students' responses that accounts for the up-regulation of positive emotions during procrastination. That is, whether students reported experiencing reduced positive affect when they try to engage in the academic task (Phase 1) and if they feel better when they decided to needlessly delay the academic task (Phase 2), when they formed an intention update (i.e., planned to do the task later; Phase 3) and when they engaged in alternate activities (Phase 4). The second codebook consisted of codes to decipher students' reports of the down-regulation of negative emotions during procrastination. These codes were meant to identify whether students experienced increased negative emotions when they attempted the academic task (Phase

1), which they tried to reduce by avoiding the academic task (Phase 2), by forming an intention update (Phase 3) and by giving in to alternate activities (Phase 4). Additionally, types of emotions, number of emotions and ratings of emotions were coded. The third codebook, which was the codebook for the irrational beliefs, explored which irrational beliefs students endorsed to justify their avoidance of academic tasks in favour of mood-repair. The codebooks for mood-repair model and irrational beliefs are presented in Table 6-7 to Table 6-9.

Table 6-7

Codebook Developed to Analyze the Mood-Repair Model of Procrastination using Qualitative Interview Data in Study 2b. The Codes and the Corresponding Descriptions were Created to Analyze Up-Regulation of Positive Emotions during Procrastination

Code	Description
1. Types of positive emotions experienced during the four phases of procrastination included in the PPA	Students' account of the types of positive emotions when they thought of engaging in their academic tasks (Phase 1), when they made the decision to needlessly delay the task (Phase 2), after forming an intention update (Phase 3) and when engaged in alternate activities (Phase 4). The emotions coded were happy/pleased, enjoyment, fun, excited, enthusiastic, content, relaxed, relief and overall good mood.
2. Other types of positive emotions experienced during the four phases of procrastination not included in the PPA	Additional positive emotions that students referred to when describing their experience of academic procrastination. These emotions were coded separately in Phase 1, Phase 2, Phase 3 and Phase 4.
3. Endorsement of positive emotion during the four phases of procrastination	Number of students endorsing each positive emotion when describing their procrastination experience were coded. These emotions were coded separately for Phase 1, Phase 2, Phase 3 and Phase 4 of procrastination.
4. Positive emotions experienced in each of the four phases during procrastination.	Students' description of reduced positive emotions in Phase 1 and increased positive emotions in Phase 2, Phase 3 and Phase 4 were coded.

Table 6-8

Codebook Developed to Analyze the Mood-Repair Model of Procrastination using Qualitative Interview Data in Study 2b. The Codes and the Corresponding Descriptions were Created to Analyze Down-Regulation of Negative Emotions during Procrastination

Code	Description
1. Types of negative emotions experienced during the four phases of procrastination included in the PPA	Students' account of the types of negative emotions when they thought of engaging in their academic tasks (Phase 1), when they made the decision to needlessly delay the task (Phase 2), after forming an intention update (Phase 3) and when engaged in alternate activities (Phase 4). The emotions coded were boredom, frustration, resentment, anxious, stressed, afraid of failure, distressed, upset, angry, irritated, nervous and overall bad mood.
2. Other types of negative emotions experienced during the four phases of procrastination not included in the PPA	Additional negative emotions that students referred to when describing their experience of academic procrastination. These emotions were coded separately in Phase 1, Phase 2, Phase 3 and Phase 4.
3. Endorsement of negative emotion during the four phases of procrastination	Number of students endorsing each negative emotion when describing their procrastination experience were coded. These emotions were coded separately for Phase 1, Phase 2, Phase 3 and Phase 4 of procrastination.
4. Negative emotions experienced in each of the four phases during procrastination.	Students' description of increased negative emotions in Phase 1 and decreased negative emotions in Phase 2, Phase 3 and Phase 4 were coded.

Table 6-9

Codebook Developed to Analyze the Irrational Beliefs in Procrastination using Qualitative Interview Data in Study 2b.

Code	Description
1. Type of irrational belief items endorsed from the PPA to justify procrastination	Students' account of how they justified their decision to avoid their academic tasks and instead engaged in some alternate activities. Belief items included using PPA were coded (see Appendix G for the specific items).
2. Other belief items noted to justify procrastination that were not included the PPA.	Students' account of other types of beliefs (not included in the PPA list) that they typically use to justify why they decided not to work on their academic task and chose to take part in some other alternate tasks.
3. Endorsement of belief items to justify procrastination	Number of students endorsing each belief items when describing their procrastination experience were coded.

The codebooks created to investigate the mood-repair model and irrational beliefs during procrastination were applied to the first six interview transcripts as suggested in previous studies (e.g., Ando et al., 2014; Braun & Clarke, 2006). The benefit of maintaining codebooks is that these documents can be updated to reflect new themes and categories when responses are being collected from participants. As a next step to the codebook development, I determined whether the codebooks needed to be modified based on the first six interview transcripts of participants. A research journal was maintained to audit the changes made in the codebooks and how decisions were made during the inquiry. After interviewing the first six participants, two new codes were added (see Table 6-10). Students from the first six interview reported having lingering

thoughts about the pending academic task and they reported that they prefer certain alternate tasks more than others. As such, lingering thoughts about the academic task students have been procrastinating on the most in Phases 2, 3 and 4 were coded and the extent to which students experienced the positive, negative and other emotions for the various alternate tasks they reported doing when they procrastinate were also coded to better understand mood-repair.

Table 6-10

The Additional Codes with their Corresponding Descriptions Analyzed in Study 2b

Code	Description
1. Lingering thoughts about the academic task students procrastinating on the most	Students' account of the lingering thought about the academic task when they make the decision to needlessly delay the task (Phase 2), after forming an intention update (Phase 3) and when engaging in alternate activities (Phase 4).
2. Positive, negative and other emotions experienced for the different alternate tasks	Students' description of the emotions for the different alternate task they participate in when they procrastinate. These descriptions are obtained from Phase 4

Types of Emotions Reported during the Four Momentary Phases of Procrastination

As mentioned previously, students' experience of procrastination was assessed on an ongoing academic task that they procrastinated on the most at the time when they participated in the study. The name of the ongoing academic tasks that each student listed that they procrastinated on the most are listed in Table 6-11. Before asking students about their experience of emotions during procrastination, students were asked to describe the academic task they were procrastinating on the most. Then students' understanding of procrastination was assessed by asking them "*What makes you think you are procrastinating?"* This question was asked to confirm whether students were really

procrastinating or if they had confused procrastination with other forms of delay.[17] Each participant's response to this question is presented in Table 6-12 in the Appendix A. Students' answer to this question confirmed that they were procrastinating on their academic task. In their statements, all students explained that they had needlessly delayed working on the academic task despite having the intention to work on it. These students explained that they found the specific academic task they procrastinated on as aversive, that is, they struggled with the task, found the task intimidating or noted how the content of the academic task caused them stress. Although they had ample time to work on the academic task which they explicitly stated during the interview, they postponed their academic task until last minute which was not sufficient to successfully complete the task. When they had the time to work on the academic task, they chose to engage in other activities (e.g., watching Netflix or YouTube videos, FaceTime with friends, work on another academic task) that they found more pleasant and enjoyable. A few students (*n* = 4) mentioned that they started procrastinating in high school which they continued in university.

[17] As noted earlier, one of the participants was excluded from the analyses as this student misconstrued purposeful delay as procrastination, and it was determined based on this question.

Table 6-11
Ongoing Academic Tasks that Students Reported to have Procrastinated on the Most at the Time of their Participation in the Present Study

Students' Anonymous ID	Name of the ongoing academic task
S1	Psychology assignment
S2	Critical review paper for Ancient Greek language course
S3	Studying for Chemistry midterm
S4	Studying for Chemistry midterm
S5	Anthropology Essay
S6	Studying for Computer Science midterm
S7	Media Essay
S8	Human Rights response paper
S9	Studying for Linguistics midterm
S10	Forensic Psychology term paper
S11	Law paper
S12	Studying for Psychology midterm
S13	Watching online lectures and completing an online quiz

The types of emotions and number of students who endorsed each emotion during the interviews were assessed. Although students were reminded of the name of the emotions that they reported in the online survey, I assessed the types of emotions students specifically articulated when they described their experience during the four momentary phases of procrastination. The positive and negative emotions as well as other types of emotions that students noted experiencing in each momentary phase of procrastination are presented in Figures 6-6 to 6-9. The emotions they reported are for the ongoing academic task that they procrastinated on the most.

In the first hypothesis of this qualitative study, I hypothesized that a greater number of students would report experiencing more negative emotions and less positive

emotions when they thought about engaging in academic tasks they procrastinate on compared to when they make the decision to needlessly delay their academic tasks, when they formed an intention update of when they may complete these tasks and when they engaged in alternate activities. This hypothesis was created in line with the mood-repair model and support for this hypothesis was found. Results showed that none of the students reported during the interview that they experienced any positive emotions when they attempted to work on the academic task in Phase 1. The negative emotions students reported feeling were: bored, stressed, frustrated and anxious, and a majority of the students noted that they experienced a bad mood overall (see Figure 6-6A). They also reported experiencing some other emotions during Phase 1 that were not included in the emotion dimensions of the PPA in this study. Although these emotions were not consistently noted by all students, several students mentioned feeling annoyed and overwhelmed when they attempted to work on their academic task (see Figure 6-6B).

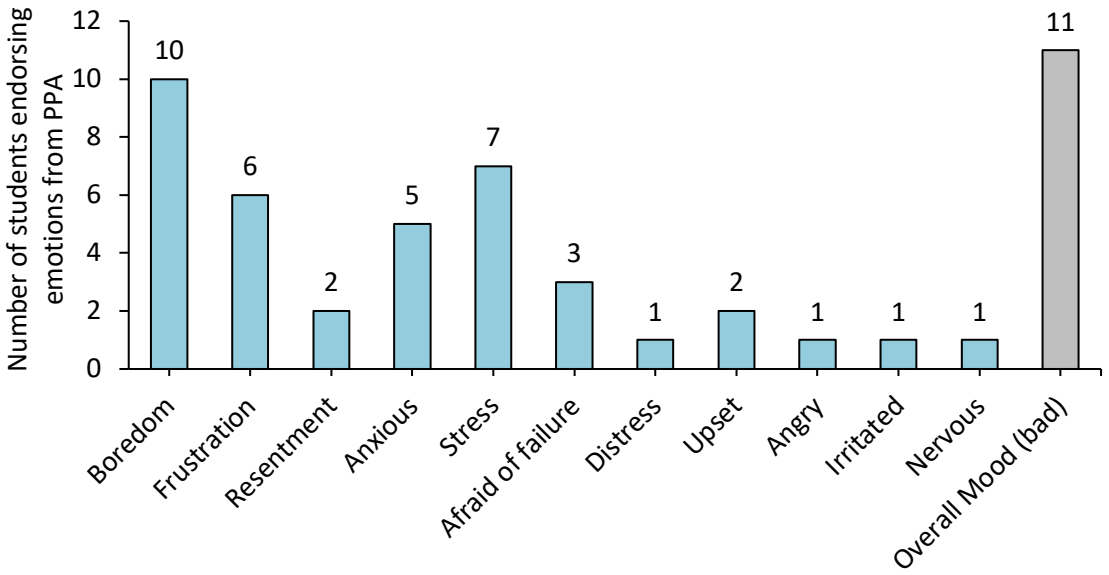
In Phase 2, students explained that they experienced positive emotions when they decided to delay (procrastinate) working on their aversive academic task. The most frequently endorsed positive emotions in this phase were happy, feeling relaxed and relieved after making the decision that they did not want to work on the task at the moment. Other positive emotions from the PPA were also endorsed such as fun, content, enjoyment, but only by a few students. Among the negative emotions from the PPA in Phase 2, most students noted feeling stressed despite making the choice to not work on the academic task. A small number of students (i.e., about 4 students) endorsed some of the other negative emotions from PPA such as boredom, resentment, feeling nervous. A little less than half of the students noted feeling good overall following their decision to

needlessly delay their academic task (see Figure 6-7A). Students also noted other negative emotions that were not included in the PPA. One or two students reported feeling annoyed, disappointed, guilt, mad, sad and worried about their decision to delay. Only one student noted feeling calm when they decided to delay the task (see Figure 6-7B). Overall, a greater number of students reported feeling more positive emotions than negative emotions in Phase 2 when they decided to needlessly delay their academic task as opposed to in Phase 1 when they attempted to work on the academic task where they had experienced only negative emotions and no positive emotions.

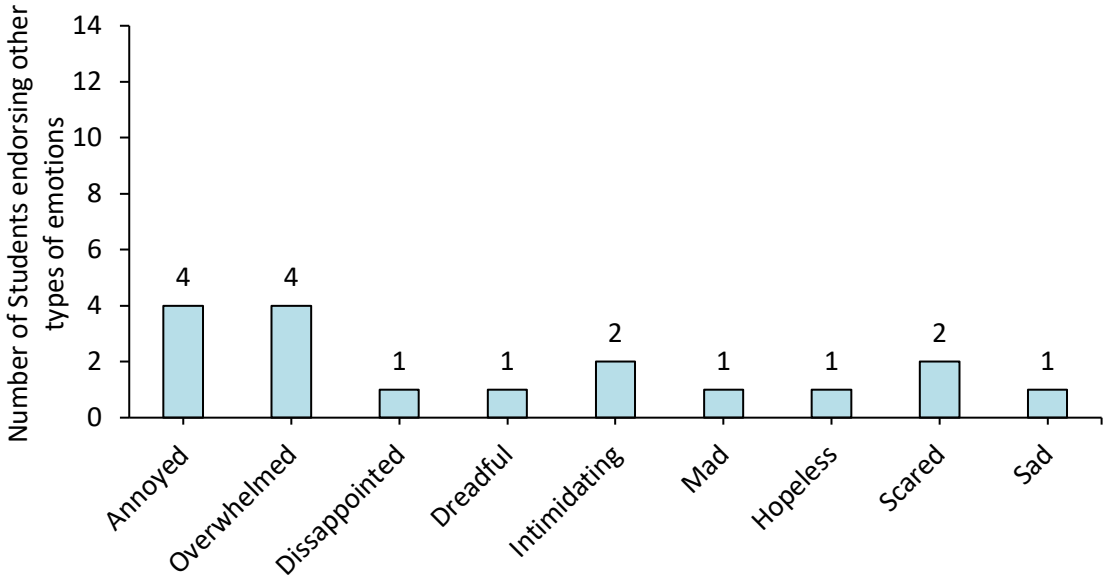
Figure 6-6

Number of Students Endorsing the Different Types of Emotions when Describing Their Procrastination Experience in Phase 1 of the Mood-Repair Model, that is, When They Attempted to Engage in the Academic Task

A)



B)

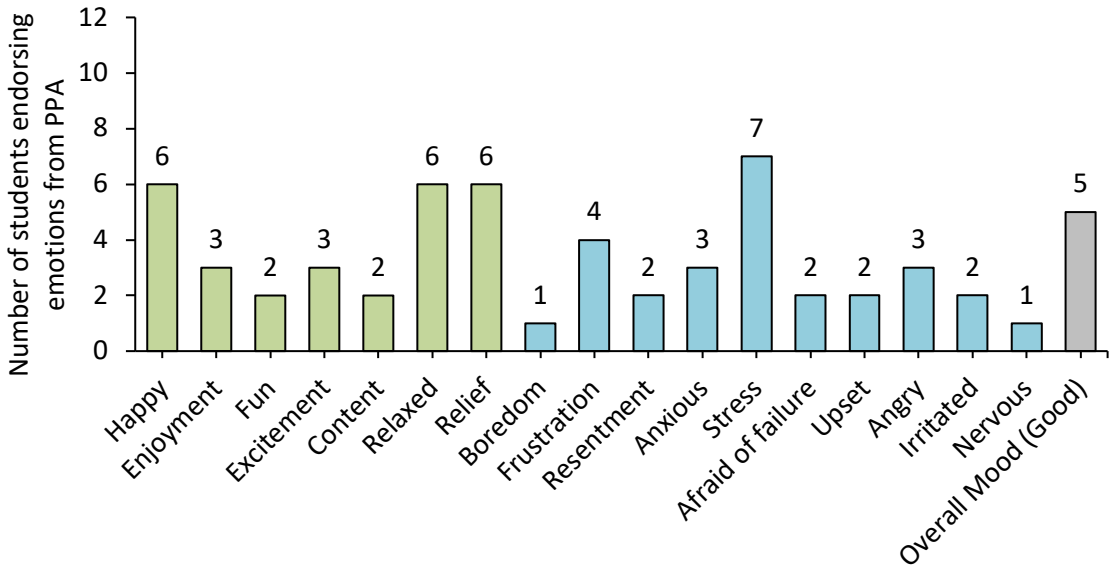


Note. Panel A: Types of emotions from PPA that were reported by students in their explanation of procrastination. Panel B: Other emotions students additionally reported when explaining their procrastination experience that are not included the PPA

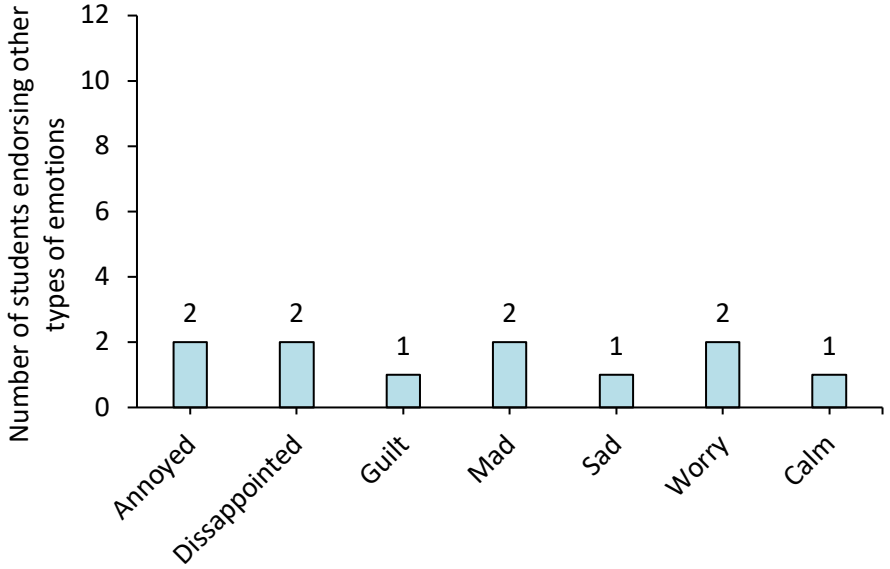
Figure 6-7

Number of Students Endorsing the Different Types of Emotions When Describing Their Procrastination Experience in Phase 2 of the Mood-Repair Model, that is, When They Decided to Needlessly Delay Their Academic Task

A)



B)



Note. Panel A: Types of emotions from PPA that were reported by students in their explanation of procrastination. Panel B: Other emotions students additionally reported when explaining their procrastination experience that are not included the PPA

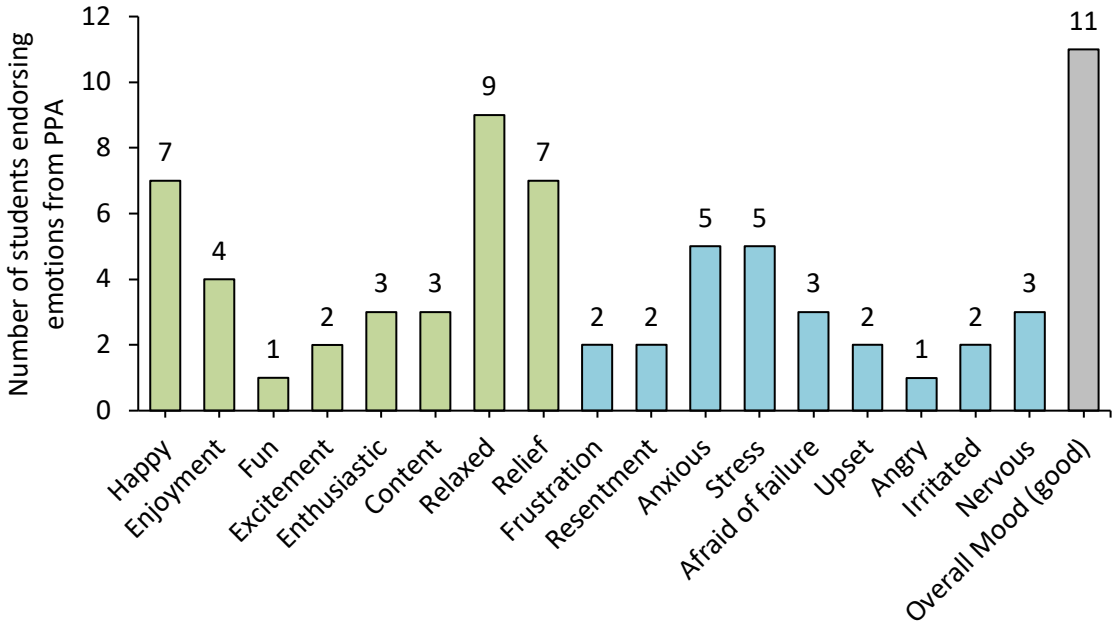
Compared to Phase 2, the majority of the students reported feeling happy, relaxed and relieved in Phase 3 when they formed a new intention to work on the academic task at a later time. Some students (about one to five students) experienced negative emotions among which feeling anxious and stressed were more common, but the majority expressed that their overall mood was much better compared to Phase 1 and Phase 2 when they formed some kind of an intention update to work on the academic task instead of just putting it off and not think about it (see Figure 6-8A). Interestingly, while there were a few students who felt disappointed in themselves even when they formed an intention update, a few students felt hopeful and calm knowing that they have a plan to do the task later (see Figure 6-8B).

In Phase 4, the majority reported that they felt happy, relaxed, relieved and even had fun when they engaged in some alternate activities instead of working on the academic task they found aversive. Students mostly discussed the positive emotions as opposed to negative emotions. Only a few students noted feeling some negative emotions when they engaged in activities other than their academic task. In terms of overall mood most students felt good when they participated in other activities (see Figure 6-9A). A few other negative emotions (not included in the PPA) were noted by some students such as feeling annoyed, disappointed, worried and being mad at themselves for not working on their academic task they were supposed to work on. However, one student reported feeling calm after engaging in other activities instead of working on the aversive academic task (see Figure 6-9B).

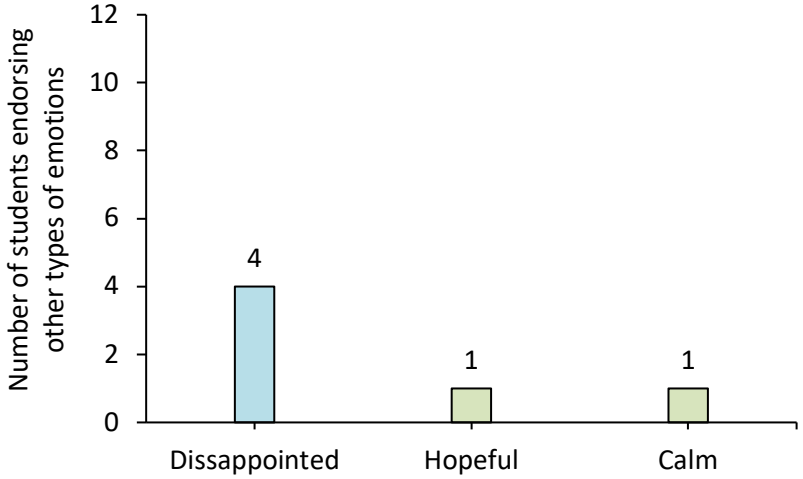
Figure 6-8

Number of Students Endorsing the Different Types of Emotions When Describing Their Procrastination Experience in Phase 3 of the Mood-Repair Model, that is, When They Formed an Intention Update to Work on the Academic Task Later

A)



B)

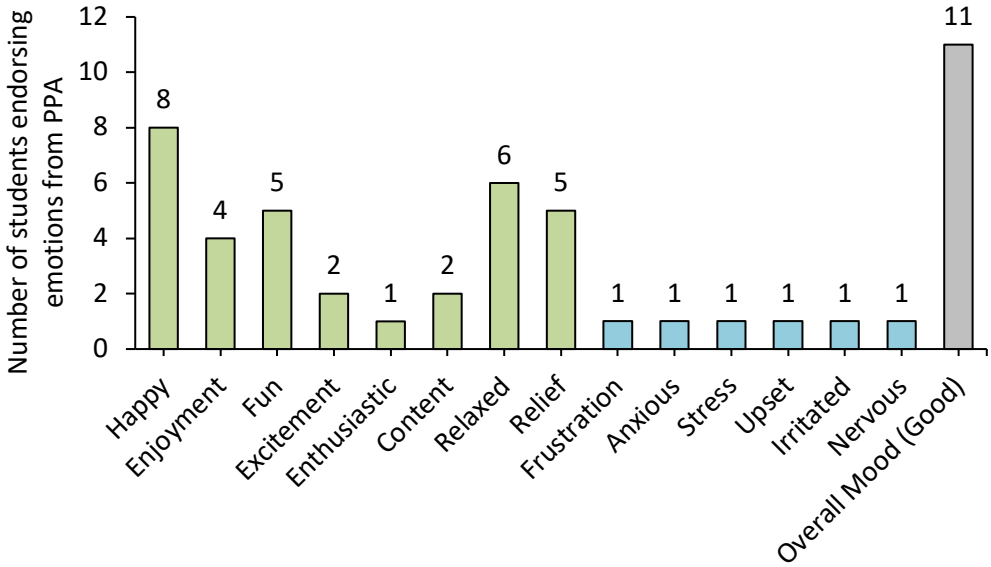


Note. Panel A: Types of emotions from PPA that were reported by students in their explanation of procrastination. Panel B: Other emotions students additionally reported when explaining their procrastination experience that are not included the PPA

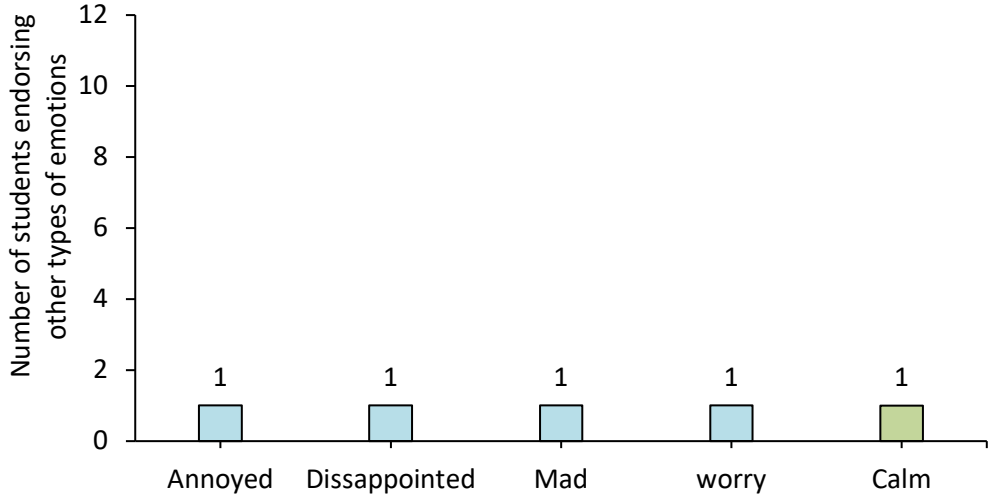
Figure 6-9

Number of Students Endorsing the Different Types of Emotions When Describing Their Procrastination Experience in Phase 4 of the Mood-Repair Model, that is, When They Engaged in Alternate Activities instead of Working on Their Academic Task

A)



B)



Note. Panel A: Types of emotions from PPA that were reported by students in their explanation of procrastination. Panel B: Other emotions students additionally reported when explaining their procrastination experience that are not included the PPA

Individual Differences in the Ratings of Emotions

I also examined how each student who took part in the interview rated each positive and negative emotion and their overall mood across the four momentary phases of procrastination in the online study. The trends of ratings of each student were individually analyzed to understand their data at the person level. As can be seen in Figures 6-10 and 6-11, each student's ratings of each positive and negative emotion varied randomly across the four momentary phases of procrastination with certain negative emotions showing a downward trend more so than other negative emotions across the four phases (e.g., boredom, frustration, resentment, stressed, distressed). Similarly, the upward trends of positive emotions for students were observed specifically for certain emotions than others (e.g., happy, relaxed, relieved). When an average of the ratings of negative emotions and an average of the ratings of positive emotions were calculated for each student separately, the trend in the average ratings showed that mood-repair did not happen consistently in an upward trend for positive emotions and downward trend of negative emotions from Phase 1 to Phase 4 at the person level (see Figure 6-12).

However, when an average of the ratings of students for each negative and positive emotion were calculated separately, the trends revealed mostly down-regulation of negative emotions and up-regulation of positive emotions across the four momentary phases of procrastination (see Figure 6-13). All emotions that were originally included in the PPA of Study 1 prior to factor analysis were examined because students discussed all of these emotions during their interviews including the ones that were excluded based on the factor analyses. The trend of ratings of negative and positive emotions observed can

be better understood after analyzing the explanation students provided for each momentary phase of procrastination.

Figure 6-10

PPA Ratings of Negative Emotions for Each Student

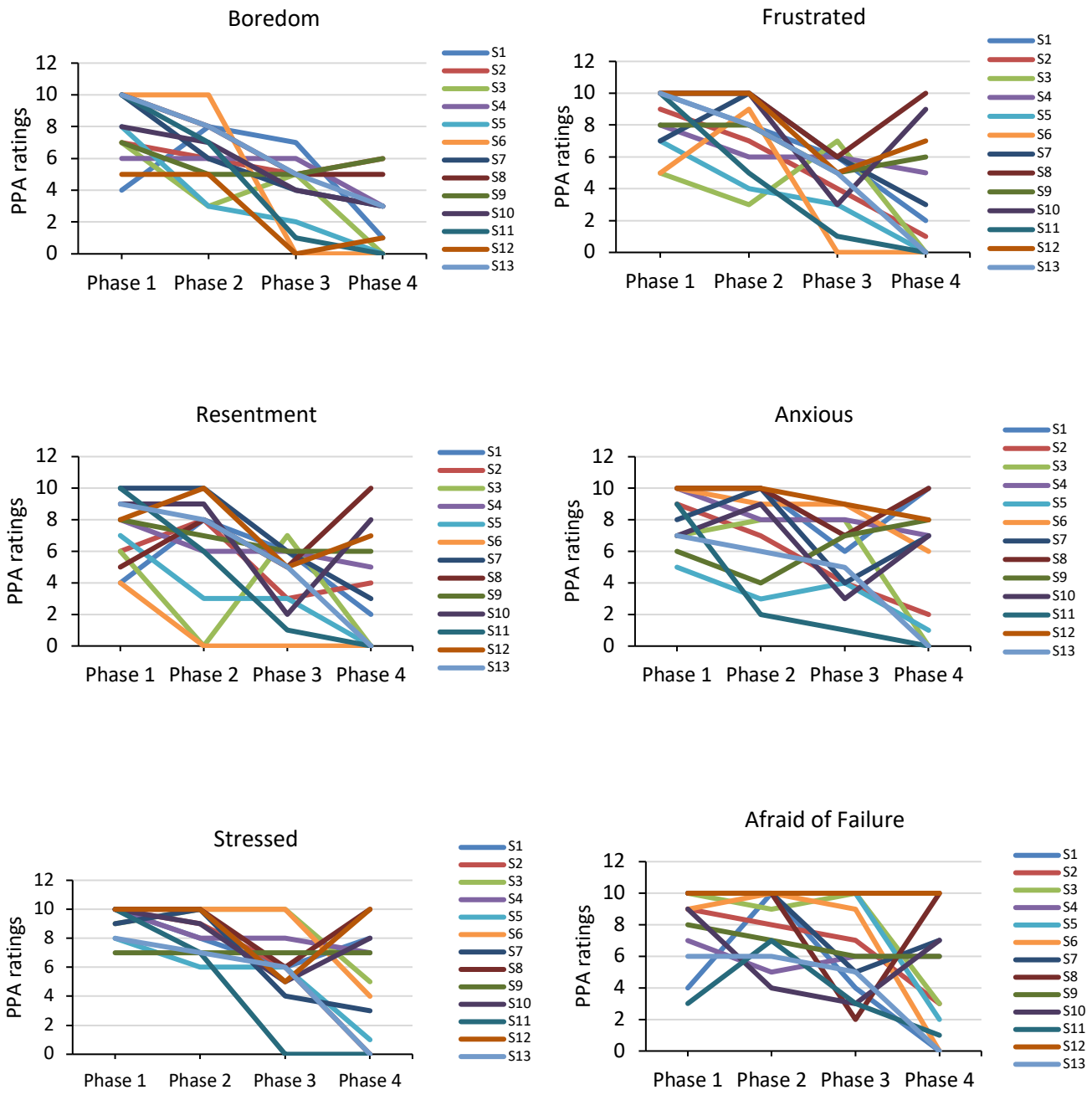


Figure 6-10 continues

PPA Ratings of Negative Emotions for Each Student

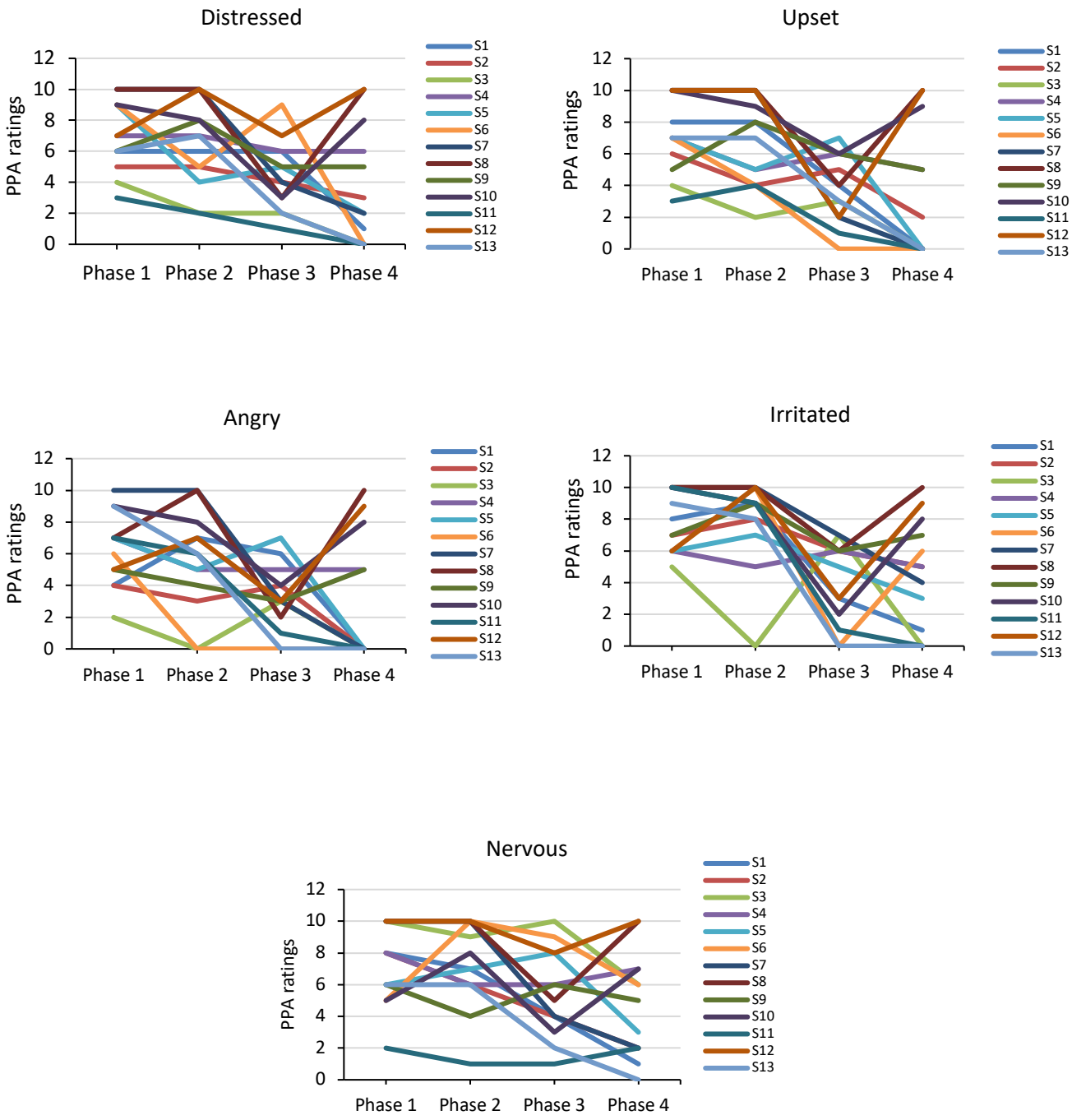


Figure 6-11

PPA Ratings of Positive Emotions and Overall Mood for Each Student

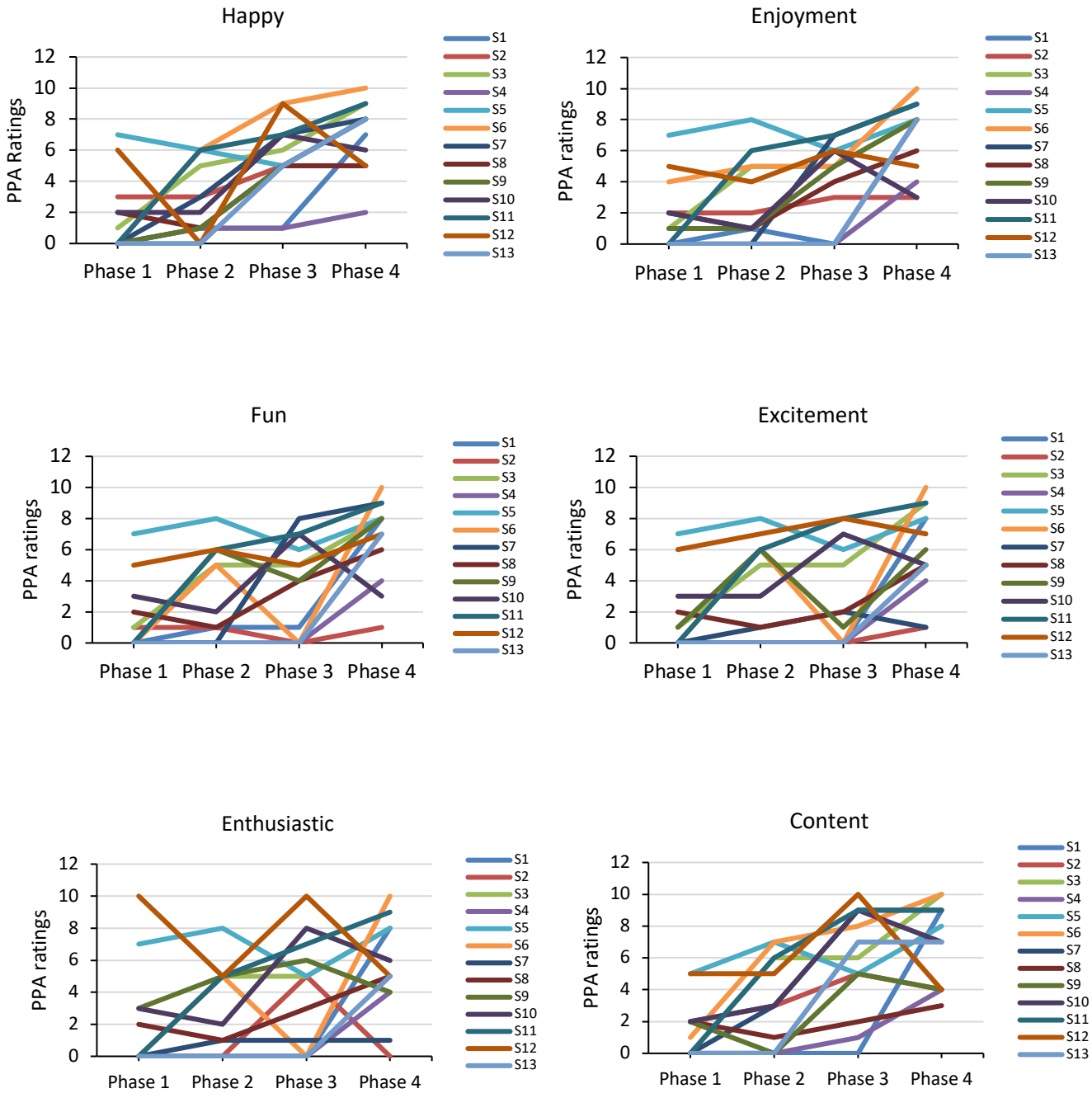
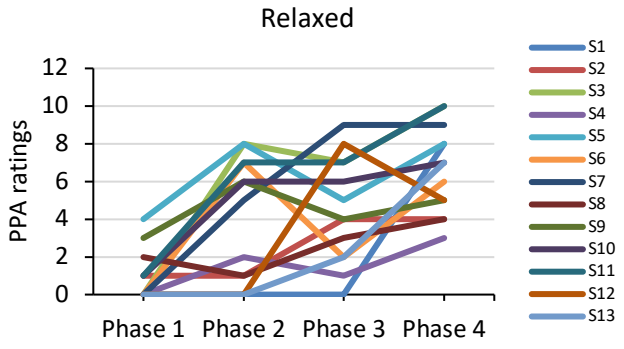
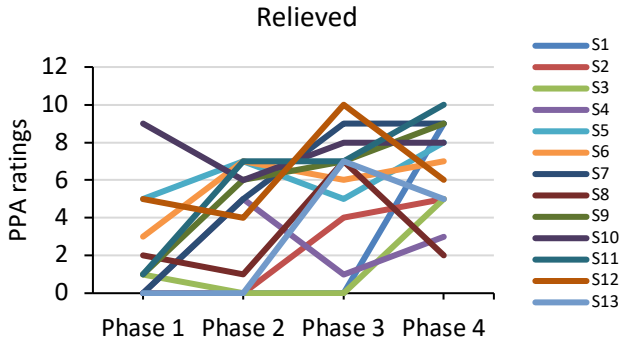


Figure 6-11 continues

PPA Ratings of Positive Emotions for Each Student





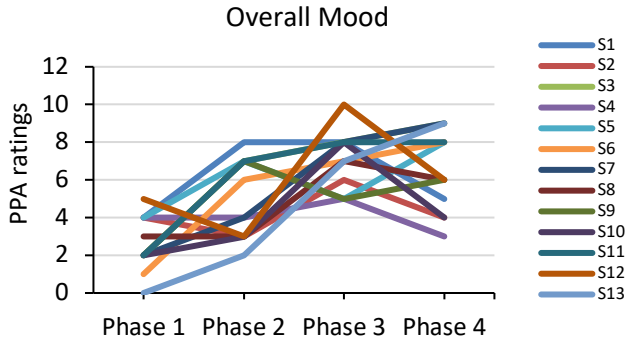
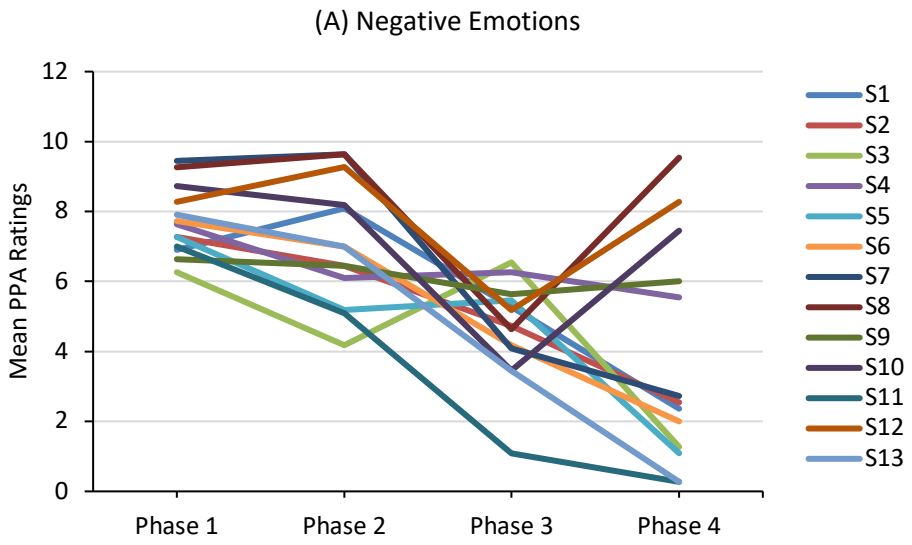


Figure 6-12

Mean PPA Ratings of Negative (A) and Positive (B) Emotions for Each Student



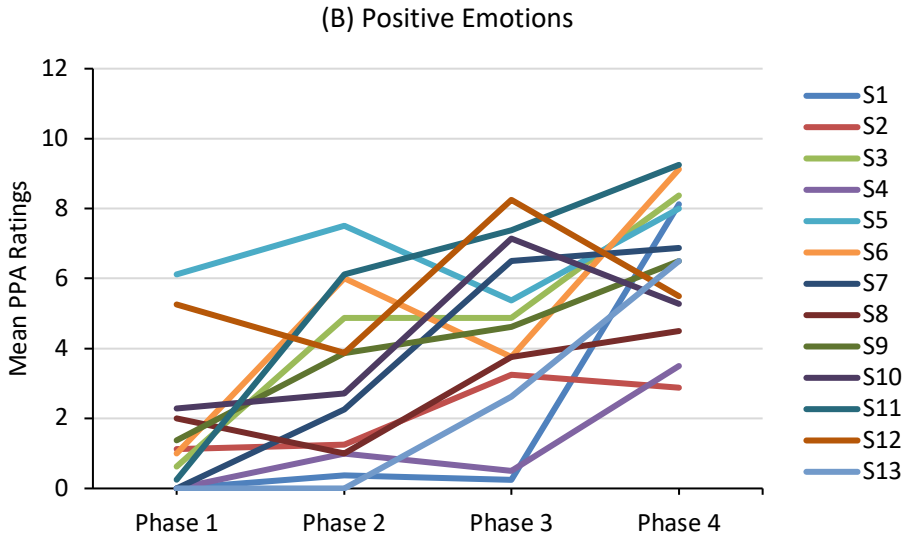
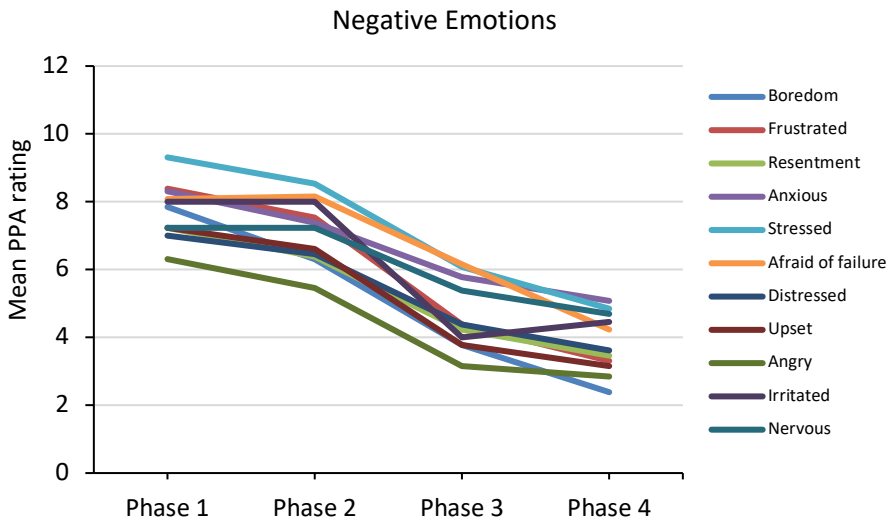
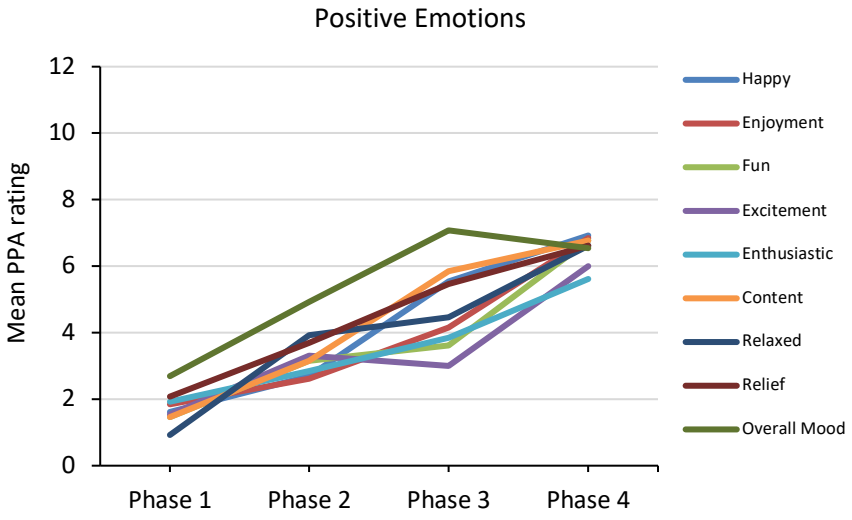


Figure 6-13

Mean PPA Ratings of Each Negative and Positive Emotion for 13 Students





Types of Irrational Beliefs Reported during Procrastination

When students were asked about beliefs, that is, how they justified their needless delay of the academic task, it was found that certain beliefs from the PPA were endorsed more than other belief. Students reported these beliefs when they described their experience of procrastination during the interview. They mentioned some of the belief items from the PPA as well as other beliefs they use to justify their procrastination. Students perceived their justifications as irrational which they explained during the interview. As such, there is support for the hypothesis that students who procrastinate would use irrational justifications to rationalize their needless delay of the academic tasks.

It is important to note that although these beliefs were coded from different stages of the interview, they were not categorized based on the four momentary phases. This is because there were individual differences in how students used these irrational beliefs to explain why they postponed working on their academic task. As such, irrational beliefs were collectively coded from the entire interview to determine the types of irrational beliefs and endorsement of these beliefs by students. These individual differences in students' irrational justifications of task postponement are discussed in detail in the next section where students' narratives of procrastination are thoroughly analyzed.

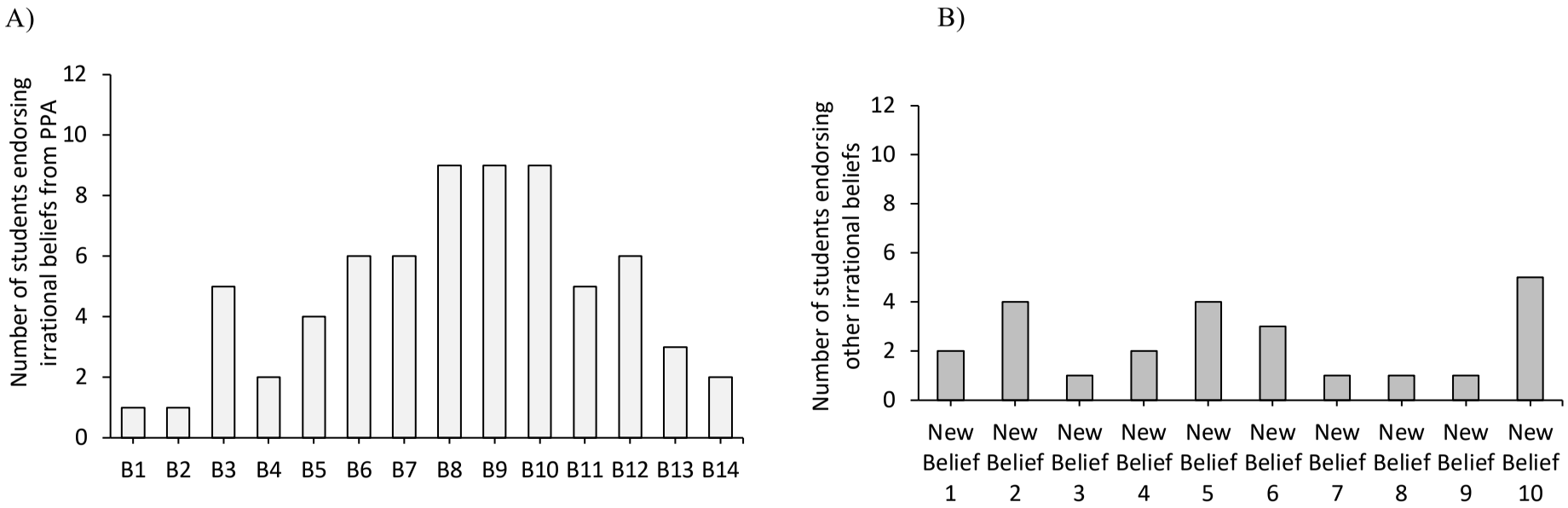
From the 13 students who were interviewed, nine students reported that they often use the following three irrational beliefs to justify their procrastination: "*I will work better on this academic task tomorrow* (B8)," "*I believe I will work better under pressure on this academic task* (B9)," and "*I think I will feel more like it tomorrow to work on this academic task* (B10)." About five to six students also endorsed irrational beliefs like, "*I*

think I need to be in a good mood to study for this academic task (B3)," "*This academic task is too difficult and so I decide to deal with it tomorrow* (B6)," "*This academic task is too difficult/challenging and so, I will not do well even if I start early* (B7)," "*Putting off this academic task helps me to relax* (B11)," and "*This academic task is too much to get into* (B12)." The remaining irrational belief dimensions were endorsed by only a few students (one to three students; see Figure 6-14A).

As expected, students also provided many other irrational justifications beyond the ones noted in the PPA (see Figure 6-14B). They discussed these irrational beliefs throughout the interviews which were then coded as additional irrational beliefs used to justify procrastination. About four to five students justified their procrastination by stating, "*I have already been productive from planning for other academic task or working on other academic tasks*," "*I have more time*," and "*I will work on it tomorrow*." Students also noted several other irrational beliefs which are relatively less common across students. About one to three students mentioned that they also use irrational justifications such as "*I am too tired to work on this academic task now or I don't have the energy*," "*Well, I'm not going to get it anyways. It's not worth even trying it*," "*I will be more motivated later/tomorrow*," "*I had a busy day/week, I deserve a break*," "*I will work hard on it tomorrow or do extra work tomorrow*," "*I need better headspace*," and "*I will be more relaxed later to work on this academic task*."

Figure 6-14

Number of students endorsing different types of irrational beliefs to justify their procrastination



Note. B1 = I think I am too smart to study for this academic task and so, I don't need it; B2= I don't think I will benefit from studying for this academic task and so I put it off; B3= I think I need to be in a good mood to study for this academic task; B4= I don't like forming habits to work on this academic task; B5= I need to have more free time and studying for this academic task seems to steal them; B6= This academic task is too difficult and so I decide to deal with it tomorrow; B7= This academic task is too difficult/challenging and so, I will not do well even if I start early; B8= I will work better on this academic task tomorrow; B9= I believe that I will work better under pressure on this academic task; B10= I think I will feel more like it tomorrow to work on this academic task; B11= Putting off this academic task helps me to relax; B12= This academic task is too much to get into; B13= I am too stupid to benefit from studying for this academic task and so, I will hangout on Facebook or do something else; B14= It is hopeless to study for this academic task; New Belief 1 = I am too tired to work on this academic task now or I don't have the energy; New Belief 2 = I have more time/lots of time/enough time; New Belief 3 = Well, I'm not going to get it anyways. It's not worth even trying it; New Belief 4 = I will be more motivated later/tomorrow; New Belief 5 = I will work on it later/tomorrow; New Belief 6 = I had a busy day/week, I deserve a break; New Belief 7 = I will work hard on it tomorrow/ do extra work tomorrow; New Belief 8= I will be more relaxed later to work on this academic task; New Belief 9=; New Belief 10= I have already been productive from planning for other academic task or working on other academic task or some other task.

Narrative Inquiry of Emotions and Irrational Beliefs during Procrastination

The goal of this qualitative study was to obtain personal narratives from students to further understand the mood-repair process that has been used to explain procrastination (e.g., Sirois & Pychyl, 2013). Students' experiences of positive and negative emotions and the explanations or justifications they provided in each momentary phase of procrastination were coded and analyzed to further understand the results obtained in the quantitative analyses of Study 2a. It was expected that students would report experiencing more negative and less positive emotions when they tried to work on their academic task they eventually procrastinated on (Phase 1). However, they would explain that they chose to not complete their academic task (Phase 2), formed an alternate plan of when they will do the task (Phase 3) and engaged in alternate activities instead of their academic tasks (Phase 4) to alleviate their negative mood and elevate their positive mood indicating mood-repair.

As explained earlier, students were asked specific questions pertaining to each momentary phase to understand how they really felt when they attempted their academic task and how they regulated their emotion when they made the choice to avoid the academic task at the moment, work on the academic task later (intention- update) and work on an alternate task. Based on the explanations students provided for each momentary phase of procrastination, there is strong evidence to suggest that procrastination is an emotion misregulation problem where students misappropriately manage the emotions that are generated by the aversive academic task. In the following sections, I provide students' unique narrative of their experience of emotions, how they

regulated these emotions and the irrational justification they provided to rationalize their needless delay of academic tasks during the four momentary phases of procrastination.

Students' Narratives of their Experience of Emotions and Irrational beliefs in Phase 1

Narrative Inquiry of Emotions in Phase 1. Students were asked to reflect on the moment when they specifically tried to engage in the academic task that they intended to do in Phase 1. More specifically, students were asked to answer the following question, "*Tell me about the moment when you intended to work on this academic task. You noted in the online study that you experience these specific emotions [name of the emotions the students noted in the online study were mentioned] when you think of engaging in this task. In your own words, can you elaborate on this, that is, how did you feel when you tried to engage in this academic task that you are procrastinating on the most?*" In response to this question, students typically reflected on why they found the academic task to be aversive and how the task triggered mostly negative emotions.

In addition to the negative emotions included using the PPA, several students discussed feeling overwhelmed and annoyed by the academic tasks when they tried to work on them. None of the participants mentioned experiencing any positive emotions when they attempted the academic task. Their explanation is consistent with how they rated the positive emotions in the online study where they either provided zero or very low ratings to the positive emotions. They only referred to negative emotions and, interestingly, the participants spontaneously discussed the thoughts they were having (irrational justifications) even though a question about irrational thoughts was asked separately in this phase. This indicates how the emotions experienced in attempting the academic task are intertwined with the irrational beliefs each student holds in

procrastination. Some of the typical responses that students provided about how they feel and think when they tried to work on the academic task are[18]:

> "So, when I wanted to engage, I recognize I need to but what made me not was the initial fear of failing. So, I was afraid of actually when I try not being able to even figure it out ever and feeling like, *Well, I'm not going to get it anyways. It's not worth even trying it.* So, I gave up again anyways." (Student #2)

> "So, a lot of times it really depends on the task I'm performing. Sometimes if it's a task that I know I haven't been studying for in the past but I gave myself all this time to study for in the future and I started, then I get really stressed and anxious. I haven't studied before and what if I don't do well studying now. That takes up a lot of my time in my head for that studying for that day. So, I just put it away and I'd be like, *I'll do it later.* Then other times, it can be different. Other times, if it's a simpler task that I know how to do it and I'm just kind of like, whatever. Then I'm like I don't really care at all. For chemistry, for example, if I've been putting it off and I had given myself this time to do it, I get really, really stressed sometimes even though I have all this time. In the past, it has never worked out for me. It's not going to work out for me this time and then I get really stressed and anxious. It makes me push it even more." (Student #4)

> "I just felt really stressed, frustrated, just because there's so many specifics that I just felt like I couldn't live up to. And then I got really down on myself that even if I did do it, it wouldn't be good. *So, there's no point in doing it right now. And I can do it later.* And just kind of like hopeless and trying to do it and is, you know, bored." (Student #7)

> "Well so before as I'm like, getting set up and stuff [to work on the academic task], you know. I'm like excited about it. I'll get this done and that [different parts of the academic task] very quickly turns into being like, overwhelmed. Because, you know, while I'm like opening up the documents and stuff [of academic task] and like really writing out here's what I actually need to do before I've actually done anything, but what I'm just sort of figuring out exactly what it is I need to do. You just slowly start to realize how much there is to do [within that academic task]. And then you just get really overwhelmed or like frustrated that it's not really simple. So, oh yeah, I would say that that was that was kind of what I felt." (Student #9)

> "Um, I'd say it was stress because I didn't really know what the papers [academic task] were about. It made me stressed to like, not have started it because like it

[18] Although all explanations students provided for all questions in the interviews have been transcribed verbatim, students' explanations for every emotion were not included in the result section of the dissertation to keep the result section concise. Students' responses that were relevant and comprehensive have been included in the dissertation.

> makes me stressed to start it up and I'm like, I don't know what it's about. So, I really have to, like start from scratch." (Student # 11)

> "The frustration and resentment were more of the thing. I was disappointed in myself because I couldn't think of anything. And I was sitting at my desk for like 2 hours and I'm just like I could really put my mind to it and applied myself but I'm not letting myself." (Student # 12)

> "If I feel like if I could add overwhelmed into that. It's like you go into doing something thinking it's going to require X amount of energy from you or this kind of work from you. And even though I've done past quizzes, I thought I was going to be like those. This time around. Before I even like got into the question part of the document, they had a big like half page thing going on about like summarizing the fact that this article in particular, is going to be a really hard one. I had to read it multiple times but don't even understand. . . .So, I felt overwhelmed and I'm like, it's going to take a lot more energy than I thought I was going to need to give it." (Student # 13)

As noted earlier, many students (n = 10) stated experiencing boredom when they attempted the academic task they found most aversive. Along with other negative emotions such as feeling anxious, stressed, annoyed, and overwhelmed, they referred to boredom frequently in Phase 1 stating that they found the academic task boring. It will be recalled that *boredom* was removed from the quantitative analyses as it loaded on its own on a single factor. However, when individual explanations of students are considered, boredom seems to play an important role in their procrastination. Some the excerpts of what student said about boredom are presented here:

> "I got a little annoyed because I really don't want to do this. I got *bored* and was kind of like thinking this topic is really something that I don't want to do. So, it was just like a lot of negative emotions. I really don't want to do this, a little reluctant I guess just to start it." (Student #1)

> "I feel overwhelmed and maybe a little anxious and nervous to do it, because I may not understand the task or what is expected. Then I get pretty stressed. . . .I think just it's more like the classes that you have in first year are not exactly what you want to do. So, I don't enjoy doing chemistry, not much. I just get really *bored* with the subject or just because it's hard. It's just boring, just like, *Oh, I don't want to do it.*" (Student #3)

> "I feel *bored* because It's not really what I want to be doing in that moment. And I find the work very boring. But usually like towards the nighttime, I'll get very stressed because like, *Oh my God! I still have to do all these stuffs* [academic task] and it'll run through my head and a bit *Oh my god!* Okay so and then I make a new list of like, all the stuff I'm going to do the next day. And yeah, that cycle just keeps happening. And then failure, I think it's because in high school I worked really hard and then by the end I was getting really good marks. So, it's just like, it would just be weird for me to not keep getting good marks even though it's like a different environment, but I don't know." (Student #6)

> "I get distracted really easily. So, when I'm doing something that requires a lot of like, not a lot but more brainpower than usual I get *bored* immediately. I can't focus. My, you know, I'll end up like looking at my phone and thinking, oh I'm just going to look at it for five minutes, but then five minutes becomes an hour. And, you know, I just, I end up just staring at my screen like in just total boredom and then I get frustrated because I'm bored with this thing. And then I just end up doing something different because I'm bored." (Student #7)

> "I was *bored* because I couldn't think of something. So just sitting there and made me think what else could I be doing with my time right now. And rather than just sitting here and not coming up with anything because I literally had an outline right beside me, so I tried to properly set up my essay and everything. So I had a title, I had an introductory sentence, I had first paragraph, I had like all these like little ideas for me to do but nothing would come to my mind. Nothing would be transferred on to paper." (Student #12)

When answering the Phase 1 question about how they feel when they try to work on the academic task, some students unintentionally discussed mood-repair when explaining their experience of procrastination. They reported feeling stressed or being in a poor mood when attempting the academic task they were supposed to complete. Then these students explained how they felt much better when they avoided the task or created a new plan of when they intend to do them next and engaged in something more pleasant.

> "I guess like a variety of emotions. I'm just thinking like, *Oh, this is a lot of work. I don't really want to do it right now.* I'm like stressed about the work but I'm also just thinking like, *Oh, I can stop now and I'll just feel so much better.* I can go do something fun, which will be more exciting or whatever and then so I would feel relief if I did that." (Student #3)

> "So, I was just bored because like there's other things to do out there. And there's better things to do than just start an essay. So, when I got engaged, I'm like, here's

> another essay, I guess I got to put some slack into it. But I'm just like, I'm really not in the mood for it. Like, I'm a very physical active guy as well. I just want to go out and play volleyball, soccer or basketball and baseball, any stuff really. And then when he said that, I'm just like, I really I'm not down to do essay or reading or researching." (Student #5)

> "Um, I think it's just me because it's just like hard. And I'd much rather be doing something else that I actually like, find something stress relieving, like watching something. I don't think I wouldn't want like, I don't want to work [work on the academic task]. Like I'm being forced to. So, I don't know." (Student #6)

One of the students who procrastinated on writing a response paper noted that she would work on the academic task a little bit to feel temporarily better. She explained that she would only find the topic she wants to work on to convince herself she has worked enough and use that as an excuse to put off the task.

> "I feel bad because like, basically, sometimes I talk to myself. And it would be like, okay, like you have you have time, like do it today, you know, what do you have today? Like might why not do it today? And then I would like, convince myself basically that I have more time so why would I do it today? And I kind of made myself feel better by like, *Oh, you know, I already picked something today to write about. So, I technically started, but I don't have to finish it right now*." (Student #8)

Narrative Inquiry of Irrational Beliefs in Phase 1. When students were asked to reflect on what they were thinking when they tried to engage in the academic task they eventually procrastinated on, some students described that they had previously procrastinated and that they are well aware of the consequences, but they work against their better judgement when they procrastinate. There seems to be a disconnection between their past experiences and present experience of procrastination. Other explanations included the ability to work under pressure even though they knew working on that academic task last minute is not good for their academic performance. Some students did not want to work on the academic task at the moment as they had to learn new ideas or concepts which they did not want to while others argued with themselves

that they have more time to work on the academic task as the deadline is far away. Again, students' narratives of their procrastination experience include both the explanation of how they felt and how they thought about the academic task they procrastinated on. In some instances, students explicitly explained how their emotions towards the academic task drive their thoughts of not working on the task at the moment.

> "I guess I just felt I wanted to do it. I booked a time for myself. I am going to do it. I felt great about having started it and then once I get there, I just realize or like remember how much work it is. Then I realized that it's not going to be that great and so I started feeling a little bit annoyed with it. I guess I start getting bored with the subject because I don't enjoy all of chemistry, I guess. Then I start just feeling a little anxious because I'm like, *Oh, I don't want to do this right now*. I think it's just overwhelming that I have to do it but *I really don't want to add the amount of work that is expected of it*. I have to somehow figure it all out and learn all this stuff that I just don't enjoy doing. Then I guess I just started to feel nervous about that part. I just kept pushing it away and then I get stressed from that." (Student #3)

> "If I tried to do something like start it and the deadlines far away, there are other deadlines that are closer. I know if I started early, little by little, I get it done. Other deadlines that are approaching closer, I feel like I should focus on those more. This is more of a useless task [Chemistry] that I can do later. Again, in the back of my head, I know that I shouldn't do that because I do it all the time and it never works out. In the moment, I always feel like this is useless [studying for chemistry midterm] at the moment, I should not be focusing on this. I kind of erase my past judgment to focus on my present judgment." (Student #4)

> "I guess it's a pretty like an irrational thought process because you know that pushing it off doesn't help, you're not going to be more motivated later. There's literally no positive to pushing it off at all. But you also just can't bring yourself to just do it anyways." (Student # 9)

> "And I, unfortunately, I know I do really good under pressure and it sucks because I know I could do even better like if I were just to put that much amount of energy and like determination ahead of time and get things up early." (Student #13)

Yet other students put effort elsewhere such as a trip to the library to work on their academic task. A few students reported that when they are at home, they are more likely to procrastinate. Knowing how they may not work on their academic task if they

are at home, they rationalize that if they go to the library then they will be able to focus better on their academic task. They even make a long trip to the library to study but they end up procrastinating when the deadline is still far away. For instance, one student said:

> "Um, just kind of angry at myself. Like just make you like, *Oh, I should be doing this*. *I should be a good student,* you know. And then I'll even go so far as to leave my house and I live in Orleans. So, it's a far drive. I'll leave my house and drive all the way here to go to the library just to kind of try and stop it. I figured that if I'm in a library, I can't procrastinate because I'm out of my bed and I'm out of my room and I'm out of my comfortable place. And it works sometimes, but majority of the time it doesn't I end up procrastinating the same amount." (Student #7)

Another question students were asked to reflect on in Phase 1 is "*What specific qualities of this academic task affected you the most?*" This question was asked to further understand how they think and feel about the specific academic task and which qualities specifically repels them away from the academic task and procrastinate. Through a narrative inquiry, students' perception of the academic task can be better understood for the academic task they have been procrastinating on. Students explained that the different parts or components of the academic task they had to complete were tedious or they did not simply find the task interesting. Several students explained that the time taken to complete the task or the effort they need to be put in made the task very unpleasant. Students also noted that they find some academic tasks better than other academic tasks and they need to work hard and put more effort on the academic task they are not very good at which affected their decision to work on the task, often leading to procrastination. Some excerpts of the explanations students provided to this question are presented below:

> "It's just the topic wasn't very interesting and it was just long. In psychology articles, there's a lot of like tables and numbers. You have to like, understand them and that's just I think a lot of what like makes me procrastinate, it's the preliminary stuff. So, things like reading the article or with essays it's coming up with a topic or with studying it's like writing my notes down. Because like once I

have all the notes, it's fine, but like writing everything out [study notes] is like really tedious [at the beginning].” (Student #1)

“It's the time that it takes to finish the task. I know it's going to take a long time. Not only the time that it takes to get it done, but the effort required to put into it.” (Student #2)

“Honestly, I don't even know. Like I did chemistry last year in grade 12 and it's a lot of very similar content. So, I know if I study it, I won't have a problem getting to it. But I just really like, for example, like math inclined, like math comes to me like very naturally, so I don't have to study too much but like I still study, right? But after studying it, like not much like I almost get it automatically versus chemistry, um, it's an online course. So, rather than just sitting and doing the assignments, I just sit on a computer and just stare at a screen for like 45 minutes and then do reading assignments. And I just have to stare at my screen for 45 minutes and then I have to do the assignment for another like 45 minutes, and I'm like, *this is like too much of sitting and staring at my screen*. . . . it's much more like complicated concepts to me [referring to chemistry] that I have to do much more like head wrapping around versus math that comes very natural to me.” (Student #4)

“I work the amount of work [referring to the academic task]. Yeah, like I think if it was less work like example my math, it's still like hard per se but it isn't like time consuming. I think the fact that all this work [academic task] is like time consuming just like I don't like it. I think that's the thing that annoys me about just the work.” (Student #6)

“I kind of [have] an issue in general with like writing. So, like essays, responses, all of that. Um, I guess the problem is kind of like how long it has to be, you know. Like I can, I can write, no problem, but if it requires, like a certain amount of like words or pages, it's just like, difficult to like write more. So that's what basically I have an issue with. And that goes for like essays, responses, [and] everything that has to do with writing. . . . The other thing would probably be like citing. So, I tried to not do that much research. So, I don't have to cite, which is bad. So, which honestly, like, I guess I make it harder for myself in that case. Yeah, I don't put that much effort into it. I don't want to, you know. I just want to get it over with. So basically, I procrastinate because I'm like, *okay, you know, it's not that big a deal.* Like I'll just like wing it basically, all the time. And then I just regret after.” (Student #8)

“Having it laid out in front of me and knowing in the back of my head that there's so much that I have to do to actually complete it. It's not like a simple task. It's like an assignment with maybe 8 questions that I can [do] only in like a few hours or something with some help. It's like a whole task [term paper] that I need to do and then there are things due before. And I think that just all kind of subconsciously is in the back of my mind all the time. So that just makes me like

> more stressed than I even need to be because I'm constantly like subconsciously thinking about that throughout my daily tasks, knowing that I need to complete all these things. And when I go to do it, it's just staring at it all and all those thoughts just come to like the front of you brain, *yeah, I can't do this right now*."

Students' Narratives of their Experience of Emotions and Irrational beliefs in Phase 2

Narrative Inquiry of Emotions in Phase 2. Students were specifically asked to discuss the moment when they decided that they do not want to work on the academic task right now in Phase 2. They were specifically asked to reflect on the following question: "*Now tell me about the time when you decided to postpone the academic task? How did you feel at that moment when you decided that you would put it off? You have noted some emotions in the online study [the list of emotions students reported were noted]. Can you please elaborate on this experience?*" In the explanations that students provided, they mostly referred to feeling more relaxed, happy or described a sense of relief at that specific moment when they made the decision that they are going to put off that unpleasant academic task. However, it is also important to note that students are not fully relaxed or relieved from making the decision to postpone their academic task. They still have the lingering thoughts that they have to complete that academic task. As a result, they feel stressed, anxious and frustrated, and remain conflicted with the choice to delay the academic task experiencing some level of guilt. It was also apparent from their explanation that they have previous experience of procrastination and they are aware of the consequences of unnecessarily delaying their other academic tasks. As such, they feel some level of relief from the decision to delay as they do not have to worry about the current academic task at the moment, but they do not experience a complete relief either at this momentary phase.

> "I'm like a little bit relaxed just because I'm not going to worry about it now. I'm just going to relax. I'm going to do whatever. But then I'm still like, in the back of

my head, super stressed because I'm thinking *this is not a good idea*." (Student #1)

"So, I think about it [writing Greek lecture notes] and I'm looking at my notes. I'm like I'm going to do this and I'm thinking about all the things that I have to work on. I think about all the things I have to understand. I think about the time it's going to take and I stress out. I'm like, *No, I can't do this. I have to deal with those stuff. I don't want to* and I forget about it. Then at the back of my head, I'm a little stressed but at the same time, my emotions just kind of go away. I know in the back of my head, I'm slightly stressed because eventually I have to go to it, but in that moment, I'm more relieved. . . . I felt relieved and then all those negative emotions faded. As soon as I decided that I'm not doing it anymore, I'm done. I forget [about the academic task] until I choose to go back to it." (Student #2)

"Yes. I felt a lot of relief just being like, *Okay, I don't need to do it right now.* I made up my mind. So, just kind of feels like the pressure of having to do it just like lifted off of yourself. Then I just feel a lot better and happier because I don't worry about it. I can do it later. I have more time. I can go do something I enjoy. Part of me still feels a little stressed like it's still in the back of my mind. Like every assignment that I have is kind of just always there. Yes, it's just there behind you like, *Oh, you got to do it still.* Then it's still like stressful in a way but also because it's so far ahead, I just can kind of push it away in the back which is rewarding."

"Part of me feels a little relieved because that initial stress that I have, I pushed it away. I don't have to deal with that now but at the same time that lingering stress is always poking at me and part of me gets a little more stress at the same time, but not as big of a stress increase, if that makes sense. So, it's kind of like a wibbly-wobbly. And it's again, like I don't feel like super happy about putting it off. But I know in that moment, I definitely feel like the first time at least, I feel like a sense of relief." (Student #4)

"So, when I didn't, when I just laid off, I felt like relieved because I wasn't really thinking too much about the essay. I was just like, let's just go talk to friends, play, do some sports, go to the gym, and do all that stuff. I didn't necessarily put my thoughts more on to doing this essay. It's just more, *let's just go out and do some like better things and rather than doing an essay*. So, I was really happy. But I wasn't necessarily happy with procrastinating, but I was happy at the moment where I could just not worry about an essay." (Student #5)

"I feel happy. Yeah, like I can finally do something that I want to or something. . . . Well, like I do feel happy but then also it's [academic task] always at the back of my mind. It's like okay, I'll just work hard tomorrow or something and I [am] really the least coolest person. It's like when I'm happy, it's like, I'll feel happy. But then later on like towards the end of the night like make the list. So, then I go like oh my god I actually like all this stuff and I'm like, get me anxious again. . . .

> Because it's again, it usually it's like, I didn't get as much work done as I intended to. That'd be kind of like would be frustrated." (Student #6)

> "I'd say the only positive feeling would just be because I feel relieved that I don't [have to work on the academic task]. It takes away a little bit of the stress just on surface level, but I know that it's just making it worse deep down." (Student #10)

> "I'd say I'm very conflicted because I know I'm going to have to do it eventually. But I'm happy that I'm not doing it in that moment. So, it's actually a mix of both." (Student # 11)

> "In that exact moment I think I feel like *Ugh!* It's like a puff of air just like I mean, I'm just dwelling on it. So, I decided to stop doing it. Like I'm not going to do it. I'm going to push it off and then like, just a little bit after that, I'm like okay now I'll watch some videos. I feel more relaxed. But at that time, it's not like it's free time because I still have that like lingering tension and stress of like, it's going to come, it's going to hit you, you're going to lose it." (Student # 13)

Some students even have an internal dialogue where they deliberate whether to do the task right now or to avoid the task, and the result of the deliberation always sways towards avoiding the academic task for them.

> "I think it's just knowing that I don't have to do it right now. Before, I've decided I'm just like going back and forth in my head like, *Should I do it? What should I do?* So, I'm still like feeling upset about it but then once I've like made up my mind for sure, I'm not going to do it, I just feel relieved and happier. Then it just feels a lot better and I can go do something else that I enjoy more." (Student #3)

> "Um, it depends if I have a plan to work on it later or not. And if I decide like, *Okay, I'm not working on it right now, but I'm going to get up early in the morning to do it*. And then I set my alarm for early in the morning. At that point, I am like, super relieved. And I'm like, thank God I don't have to do right now. I'm like, relaxed, happy, whatever. But there's still like an anxious part of me that's like, Oh my god, you should be doing this right now. It's like, honestly, like two sides. The angel and the devil just fighting. . . .I don't think I enjoy my decision. Like a zero when I don't enjoy the decision. It's just a decision I make like, *I wish I wouldn't. I wouldn't do that.*" (Student #7)

One student described that his decision to postpone the academic task gave him *bursts of good feeling.* This student unintentionally referred to mood-repair where he described that the supposed *relief* he experienced from not doing the academic task is in

fact a *fake short-term relief* [emphasis added]. In an important way, this participant speaks directly to not only the notion of mood repair but also the misregulation of emotion at the root of this avoidance coping. He described the attempt to feel good through needless task delay as a defense mechanism which helps him to deflect the aversive emotions triggered by the academic task. Although the unnecessary delay gave him an immediate, temporary relief from the unpleasant academic task, he mentions that the decision to procrastinate is nevertheless a bad one in the long-term.

> "It's a super fake I would say, like fake short-term relief. But it is that like, instant relief of like, you know. You've got this big task and you're looking at it, *Oh I have to do this*. And then you just sort of put it off for five minutes. You just get this release of like, *Oh, it almost feels like it's done, or you don't have to do it anymore*. Obviously, that only lasts for like, a couple minutes. And obviously, it's not done but it's that like, you know, it's like taking a piece of cake or whatever, it feels really good in the moment. Like, you know, it's like everything's good. I don't have to do this assignment anymore which obviously is very short-term, but there is that little burst of good feeling and I think that's why you do it [procrastinate] because you have all these negative emotions and this stress, and you know, fear of failure all this kind of stuff. So, you just try to counter it immediately with just the quickest thing you can do to feel good which is just put it off, put it off and like watch YouTube videos or something. And so, for a very brief moment you feel good. Obviously long-term, it's not a good thing, but I think it's just like a defense. It's like, I just want to feel good in this moment. I don't want to feel bad anymore. What am I going to do to feel good? So, you just procrastinate. It feels good." (Student #9)

Narrative Inquiry of Irrational Beliefs in Phase 2. Students were also asked about the thoughts they had at the moment when they were making the choice to delay the academic task. Some students explained that they already knew that they would regret the choice to delay later. However, they justified that they work better under pressure and so, they can finish it quickly before the deadline. Some students justified that they have other responsibilities to work on even though working on this particular academic task should have been the priority.

> "I'm going to regret this later. Yes, I know. It's going to backfire. I'm going to be upset at myself later. . . . I think my biggest justification is the pressure will make me work better and faster. The closer it gets to the date, the more I'm like, *Yes, I'm just going to start working on it. It's going to have to happen eventually*. So, I think one of my biggest motivators for like doing assignments is the pressure, which means I always tend to push things back until I have enough pressure to be like, *Well, I got to sit here for five hours straight and write an essay*." [Student #1]

> "That's pretty easy answer. I just decided as I have other responsibilities to get done, I'll work on it later. I would tell myself that I do it later once I finished my other work. I'd be like, *Oh, I have to cook dinner for the family or have all these other things* [alternate activities] *here*. I'm going to work these [work on the alternate tasks]. So, I don't have time or I always come up with like one excuse after another." (Student # 2)

Yet others rationalized that they still have more time to do the work or they had a busy week. These students tell themselves that it is not necessary for them to start right now or that they *deserve* a break. They think that they can work on the task some other time.

> "It's more just trying to reason with myself and prove to myself that it's okay if I don't do it. So, just like telling myself like, *Oh, it's fine. You have time. You can do it the next day or the next day that you have lots of time*." (Student # 3)

> "I usually look at my schedule and I say, *Oh, I'm stuffed all these days. I'll put it on this day,* right? And that didn't work out. I worked through a busy week and when that day comes I'm like, *Oh, I just had a busy week*. *I deserve a break*. So, I do end up doing that [taking a break]" (Student #4)

> "I tell myself, I need a break. Like, I've already worked too much on it. Like it's fine if I take a break or something like that. It's like I deserve it." (Student # 5)

Some students think they need to have a better headspace or in a better mood to get started with their academic task. They also think that they will work better later to produce their best work. They use these justifications to delay their academic task, in some cases despite feeling guilty.

> "I don't know I think it will…if the way I justified to myself is I need to be in a in a like better headspace to do this. And if I'm not into it right now then I that I

> won't produce my best work and like, stuff like that, that are just like lies that I know that convince myself but that's how I justify is *I'll work better later* or *I'll work better after I've gotten something to eat or you know*, or *I'll work better after I take a shower*, or *I'll work better after I work watch Netflix for a little bit*. That doesn't make sense but I still don't [work on the academic task].” (Student #7)

> “…So I guess I feel guilty, but at the same time, I kind of like justify it for myself. Like, okay, you know, you're fine. Like you're doing good. . . . Honestly, it's kind of like an argument with myself. It's like, honestly, I talked to myself out loud. And I'm just like, okay, like, why aren't you doing it right now. And then I would answer myself like, I just don't feel like it and I have time you know. So, it's like an argument with myself, okay, I know I have to do it now. I don't have anything better to do and it's a Saturday like, you know. It's not like I have classes or anything. So why not do it now but then I just decided not to.” (Student #8)

One student noted that sometimes he does not even justify why he should delay the academic task, instead he just delays the task. However, when he justifies why he does not want to work on the academic task at the moment, he thinks that he has the confidence to complete the academic task last minute. He has completed previous academic tasks when he did not have sufficient time and have done well and as a result, he thinks he can complete this task at the last minute as well, although he seems to recognize that he is not making a good choice.

> “I think I always do a thing where I guess I don't justify it because I know that there's no justification for it. And so, it sounds like you like turn your brain off. Like you push away those actual thoughts of like, this isn't justified at all. So, you know, I would say that's a part of it. But I mean, I guess sometimes you justify it. Usually, with things like studying for a test, I justify it with, *Well, there's still lots of time* and *I don't really need to start yet*. You know like, I'll think to myself like, *Oh I have a good mark in the course*. I don't really need to be studying [start studying for the test early]. Like, I know I'll pull it off if I do it tomorrow. So, it's like, it's fine, I could just do it later, [I have] like confidence in myself that I can do it without enough time. Be like oh you know, I've always managed to, because like, unfortunately, I can always sort of do okay by studying the night before, so I never learned my lesson. So, you know in that moment, I always go, *Oh well, I've done it 100 times where I just studied the night before, so I'll just do that again*. Like, there's no point in pushing myself to study now. I don't really need to.” (Student #9)

Another student explained that she does not even think about it as it has become more like an automatic behaviour. She has procrastinated before and as a result, when she made the choice to delay working on the academic task, she automatically acted on the choice to not work on it at that moment.

> "I honestly don't feel any like thoughts…I don't know what really happens. Obviously, I'm thinking about something and like at the time. It's kind of like an automatic thing now, which is the point that I never wanted to reach with procrastination, which I'm trying to get out of, because that's like not a very good thing when it's like automatic. Like, you're going to do something else. Like you kind of don't even think about it and you just don't do it. It's like a muscle memory, but it's just like for your mind through your tasks. Yeah, I've done it so much in the recent years, that I think it's become that at this point." (Student #10)

Lastly, only one student explained that putting effort in her previous academic tasks, more specifically essays, did not help her earn good grades and so, she put off the task until the last minute as she did not feel like putting effort into it.

> "Well, it's just that a lot of the time in the past, I've had essays like that I think are really strong or like I put a lot of effort into them, and then I still don't get the mark that I want. So that's probably why." (Student #11)

Students' Narratives of their Experience of Emotions and Irrational beliefs in Phase 3

Following the decision to not work on the academic task at the moment, students were asked whether they formed an intention update, that is, if they had made a plan to work on the academic task later or a plan on when they will work on it. In response to this question, *all* students said that they did form some kind of intention update about the academic task in that moment. Some students created an elaborate, specific plan of when and for how long they will work on the academic task whereas others formed a vague plan without indicating when they will work on the academic task (e.g., execute the alternate plan later or tomorrow). A few examples of the intention update students reported are presented below:

> "After I didn't follow through with that, I'd have to reupdate myself, which I do multiple times. For example, I wrote it down and I made a list of all the things I wanted to do get done today. Every big job [academic task] has lots of little tasks. So, I have to break it down into small bits to feel it's more manageable." (Student #2)

> "I'll like book time in my head like, *Oh, I'll do it between this time tomorrow, and then I'll work on this part the next day.* So, then I just justify in my head being like, *You can go watch a show now and then later, in an hour, you can go do the assignment.* So, I would just tell myself those things except that I would keep doing it. Then I never got there." (Student #3)

> "For the midterm, I know that I have to have like a good like, I don't have time to study for that. And because I procrastinated so much I'm like, *All right, this is what I'm going to do. I'm going to take everything I'm supposed to do for this week and everything else was to do for next week. Going to get it done this week, work twice as hard. So, the next week, I'll have like a full week to just focus on chemistry.* That's kind of my thought process." (Student #4)

> "Yeah, on Saturday when I decided not to do it [academic task], I told myself that I should go for Wednesday because Wednesday is the night before and I didn't want to do it the night before. So, I was like, *Okay, you have like a few days to do it* [work on the academic task]. Just figure out when you're going to do it and just, you know, work on and get it done. Then, yeah, then like, you know, the next day the next day I was like, okay, whatever like I'll have time so that basically that's what happened." (Student #8)

> "I do make a lot of lists or like schedules. I don't usually follow through with them as much as I used to. Yeah, I have like reminders on my phone, but I use my reminders as kind of a list. I just make a big list. Now I'm up to like 500 things that I don't even need to do anyway, that I just feel like I never fully complete. So, I never just delete them. I hate it. Like I have to go through it all the time." (Student #10)

> "Yeah, I'll write it in my planner and make sure that I write it on my big calendar on my wall. Then I'd be thinking to myself, *Okay I have it set on this day, I have to do it then and I'm going to make myself do it*. Then the whole procrastination rolls back in and just like, I don't know if you're really going to do it. So, it's just the same cycle and that's how it ends up being the night before." (Student #11)

One of the students provided a better understanding of why he did not create a specific plan and relied more on a rough plan. He rationalized that because he would not necessarily follow through with the plan, he did not find it important to create a specific

plan. The plan he created was not only vague, but he referred to his vague plan to study later as irrational.

> "Yeah, sometimes I'll do the thing where I'm like, *Okay well, really I only need a day*. *So, I'll start tomorrow night or something*. Other times, if I know I'm going to study in that moment, just later on, if I'm not doing the thing [working on academic tasks] where I completely push it off [academic task], and I'm just like, okay, I'll study in like an hour or something. Sometimes I'll do that where I'll you know, say it's like 4:49pm or something. I'll be like *Oh, get a nice round number*. *I'll study at five*. Then it gets to 5:02pm and I'm like, *Well I missed that. We're going to go for 5:15*. You know, just totally irrational, ridiculous stuff. But sometimes I'll do that where I'll pick a time or something. I guess the other thing I would do probably more often is just not have a plan at all. You know because it's such an irrational decision that I'm not really like, *Okay well, here's my actual plan and then this is a good plan. So, I'll stick with that, I'll study later.* Like, it's always just sort of like that, whatever. Like give me like 5 to 10 minutes and it's just like you know and then I'll take like, half an hour. So, I would say, I usually am not super planned about it. I'll get like a rough sense. I'll be like I'll do it in like a half hour. It's never there's never like a good, like a reasonable plan that works. It's always a horrible plan, like tomorrow." (Student #9)

Another student explained that he did not form an intention update as he thought he is going to procrastinate anyways given his past experience of procrastination. He mentioned that he is aware of his procrastination problem which is why he only checks how many days are left before the academic task is due instead of forming a new plan. In a sense, his intention update is a tacit understanding that "he will work on it at the very last minute." He noted,

> "I just looked at how close it was going to be for the day and then I just said, If I don't start now, like, it'll just be like what happened back in the past and I just don't want that again. So, I didn't really give myself a scheduled plan. I was just looking at it as how closer it is to the date." (Student #5)

Interestingly, one of the students referred to her intention update to do the task later as giving her a false sense of control. She creates elaborate plan to do her academic task, but she thinks the plan only provides a temporary solution where she feels that the everything is under control when it is not.

> "I plan it out so that it seems like I'm not really giving up on myself. I give myself kind of like a false sense of control on the situation because I have a very detailed agenda. Like literally, I have a physical agenda that I'm writing not just like one of my head where I try to convince myself that I'm taking control of the situation like I know when things are due, I know that this is going to happen. It goes out the window after the first couple weeks of using it." (Student #13)

Narrative Inquiry of Emotions in Phase 3. Next students were asked about how they felt when they formed the alternate plan they had created after deciding to not work on the academic task at that moment. As noted earlier, there are individual differences in how students experience mood-repair in the last three momentary phases. Some students do feel much better or experience an improvement in mood when they form an alternate plan or an intention update of when they will complete the academic task. They felt relaxed, happy, hopeful, calm and experienced other positive emotions compared to before when they made the choice to delay the academic task. Conversely, there are other students who felt better when they formed a plan of when to do the academic task next, but they still also experienced stress, guilt and other negative emotions as they know they have procrastinated before and despite this new plan they expect that they will not work on the academic task early, but continue to procrastinate until very close to the deadline. They described having persisting lingering thoughts that they have not completed the academic task.

> "It's more like I'm going to relax I'm like, *yay relax*! but at the same time I still know I'm going to have to rush myself and I'm going to have to like push myself to maybe not do my best work. So, there are some negative emotions because I'm like, *Oh, I'm a little more stressed because it's getting closer to the due date and I'm still nothing on the page*. I do get a little stressed and a little nervous about that decision." (Student #1)

> "I just felt a little nervous but I think I felt good that I was actually going to do it. It feels official right now because I'm actually here and I'm doing it. It feels official. . . . So, I came up with the plan. I was like, *Okay, deep breath. It's going to be okay. We're going to get it done because you have a plan and you can do*

this. So, I was calm because I felt like I could be successful. Then the idea of being relaxed is I know that once I get this done [review paper for Greek Study], I'll feel good about it. It'll be out of the way and it'll be done and I'll be calm." (Student #2)

"I think I felt good about it. I was like, *Yes, I can follow this plan. I won't procrastinate again.* It felt like a solid plan like I could do it. So, I probably felt relieved and happier. Again, I'm probably still felt a little bit stressed. Just like in the back of my mind still knowing that I haven't started it, but I think it'll overall make me feel better." (Student #3)

"Probably like more relaxed and better because just knowing that I won't have to do it in the moment just chills me out. Although there's always, like I said before, the anxiousness in my brain but I know, it's always in my brain even when I'm just going about my day. It's always in my brain, like, *Oh, we should be doing this task*, even when I'm doing something else. Like even when I'm in class, it's like, *Oh, you should be doing this*. You should be doing this constantly but feel more relaxed whatever because of the decision to not do it." (Student #7)

"I would say it is positive because you manage to lie to yourself and say that whatever your rough plan is, is like a good amount of time. So, it's like you know, *I'll study at 6pm,* but you were supposed to be starting at 4pm and push it off. And it's like, *Okay 6pm, that's a great amount of time*. I'll study for two hours and I'll go get dinner and then like, whatever, you know, that kind of thing. So, it's like, it makes sense. You're like, *Oh yeah, that's a good idea, that's [a] good plan*, even though it's a horrible idea, and you're just going to procrastinate more. But I'd say it does feel positive about like telling yourself you are on top of things." (Student #9)

"I think I feel a little bit happy and content because I do like getting things done like completing lists. I know eventually if I can do it like that, and I [can] really stick to the list that day like my plans; I will like get it done. So, then I'll be like, I'll know that I'm going to have at least like having it written down somewhere. It's like it's there [written down]. Like there's the option for me to do it this time, so I can do it. So, it makes me feel a little bit more relieved, because then I'll know that I can get it done." (Student #10)

"Yeah, so with those feelings every time I would update myself, I would be excited, enthusiastic and ready to go and do it and correct the mistake that I made the prior time. And I would think to myself, *Okay cool, you know you made a mistake. You know you did something bad, you didn't do it [working on the assignment]. Now, correct your mistake and actually get it done this time.*" (Student #12)

During the interview, one student reported that she felt relaxed, relieved and happy because she has a plan to do the task. Although she mentioned that she still had lingering thoughts about the task and consequently felt stressed, she also said that she experienced less guilt compared to before because she has a plan now. This was one of the clearest explanations from the participants' perspective on why the intention update enhances the mood repair associated with procrastination. She noted that . . .

> "Yeah, relieved and relaxed, that's because I like I had the intention to do it the night before, you know, like before Wednesday night. But again, it goes back to like, the stress of I don't know what I'm going to be doing that day. But like I felt kind of relieved and happy. I felt less guilty because I still have a plan to do it before you know. That I'm still going to finish it. . . . the intention to do it early is definitely making me feel good." (Student #8)

Interestingly, two students explained that while they were creating the schedule to incorporate their new plans to do the academic task, they experienced negative emotions. However, they experienced an uplifted mood or positive emotions when they finished creating their plans, providing another example of the role of an intention update in the mood-repair process. These students said,

> "I feel, well, not super happy. Again, I'm putting it off even more but at the same time, now that I've redone my schedule. I'm like, *Wow, look at me! Now. I'm really getting stuff done. Now, it's actually going to happen. I'm proud of myself.* . . . while I'm rewriting my schedule, I'm frustrated on myself. When I'm done reading my schedule, I'm like, *But you know what, that's okay, because I finished it* [rewriting my schedule] and it's almost like having like a substitute of feeling. Instead of finishing my work, I finished redoing my schedule. So, I feel proud of myself and then I'm like, *All right, we're good for today,* if that makes sense." (Student #4)

> "Like when I'm making the plans like it in the beginning, beginning part of making that plan for that first initial attempt of the actual topic, and then concerned with that at the moment, I feel a bit like I think, again resentful is the best word. But then I know that I'm like, gonna hate myself later. But after, as soon as I start getting more into like, more detailed planning and more, it becomes a bit more, you could say it's more realistic to put into action, as was just saying it and then thinking of it. Then I say to myself, okay I'm good. And that's when the

positive emotions kind of come in a little bit more." (Student #13)

Narrative Inquiry of Irrational Beliefs in Phase 3. All students were also asked to answer a question about their thought processes in this phase when they were creating an alternate plan. They were specifically asked "*What tends to come to mind in terms of thoughts that justifies the delay of this academic task at that moment?"* The responses students provided include some new irrational justifications such as now that they have a plan, they will work on it, or after taking a break, they can start with their alternate plan. Other justifications are similar to the thought processes they explained in the first two momentary phases, indicating overlaps in their justification across the phases. They provided reasons such as they will be more motivated, inspired, or be in the right mindset later/tomorrow, they will work better under pressure or they are too tired to work on the academic task, to rationalize their delay of academic task. In some ways, these participants reflected common errors in affective forecasting discussed by Wilson and Gilbert (2003), as their good feelings at the moment fuel the presentism bias to expect that they will feel good and motivated in the future. These participants note that . . .

> "I have a plan I will get to it. Because it's there, I've written it down and I have a plan. It's going to get done. So, if I'm not doing it now, it's okay. I'll do it, it's planned out." (Student #2)

> "I usually justify my decisions like, *You know, you'll work on it better when you are more under pressure or when you are not as tired, if you get a good night sleep.* Then I always stay up late. I never get a good night sleep. And like, *Oh, you know, if you're feeling more up to it or you're feeling more inspired or to write or read or whatever, you'll do a better job. You should wait until you're feeling more motivated*." (Student #1)

> "Yeah, I just essentially, it's like, I just need a break right now. And like maybe like if I just take a break, I'll be able to because I feel like, sometimes I just get super frustrated and probably thinking, like, if I come back to it, I'll be like relax and be able to tackle it. . . . Like, all right it's like I'm going to do extra work tomorrow. I don't know if I will actually get it done." (Student #6)

> "Yeah, so my biggest one that, Yeah, because I guess I write well. So I um, even if I procrastinate something I'll usually get like a good mark, which kills the procrastination as always been like that. All through college and now even. So, I'm waiting for a really bad mark to maybe set me straight but hopefully not. . . . Yeah, I really just think like, I don't want to do this right now. And if I do it later, it'll be better. Because I'll be in the right mind space or whatever. If I do it later 100% would be in a better mindset or if I do it tomorrow morning, I'll be fresh and awake and I'll be able to think. A big one that I always do is that I think, *okay, when I do it later, I'll have new ideas*. So, it'll be easier because I won't be stuck in the set, which I mean sometimes does work if you take like a 15-minute break from your work and then come back with fresh ideas. But I mean, like, usually if I take like an hour to 2 hours to you know, 12-hour [long] break, I will not come back with anything different. It'll be the same, but that's just why I tell myself that's how I justify it is that I'll have new ideas and but not necessarily that is the case." (Student #7)

> "On top of what I said about like lowering your standards and stuff, you also just pretending for some reason that you know, you'll have more motivation later or I would say the biggest thing is that, *oh, if I just take this little 20-minute break, I'll be relaxed and you know, chill enough to get started*. Then the second you go to get started again, you're stressed again and go back and procrastinate. So yeah, I would say that that's another big thing in the thought process of like, *by procrastinating, it'll let me get it done better like when I start*, which obviously not even close, but I think that's what's going through my head." (Student #9)

> "I'm just like, I could be working on it now. But like, since I have lots of time, I can just, I can put it off a little bit. So, it never ends up being a little bit. It's always a lot." (Student #11)

Students' Narratives of their Experience of Emotions and Irrational beliefs in Phase 4

In the final phase, students were asked to report on the alternate tasks they engaged in when they procrastinated on the academic task they had intended to complete. It will be recalled that students were asked to report the types of alternate tasks they engaged in when they procrastinated on the specific academic task during the online survey. They were asked to report a maximum of five alternate activities. The specific alternate activities reported by the 13 students who were interviewed are presented in Table 6-13. The alternate activities students noted were categorized to determine their frequencies. The most common alternate activities students noted at least six times were socializing with friends or family, watching

Netflix, engaging in productive tasks (e.g., cleaning, work on an easier academic task, working out at the gym), browsing social media and going on the phone (e.g., texting, FaceTime). Other less common alternate activities that were mentioned five or less times were playing video games, sleeping, eating, self-care and other tasks such as shopping, playing with dogs, and participating in psychology studies (see Figure 6-15).

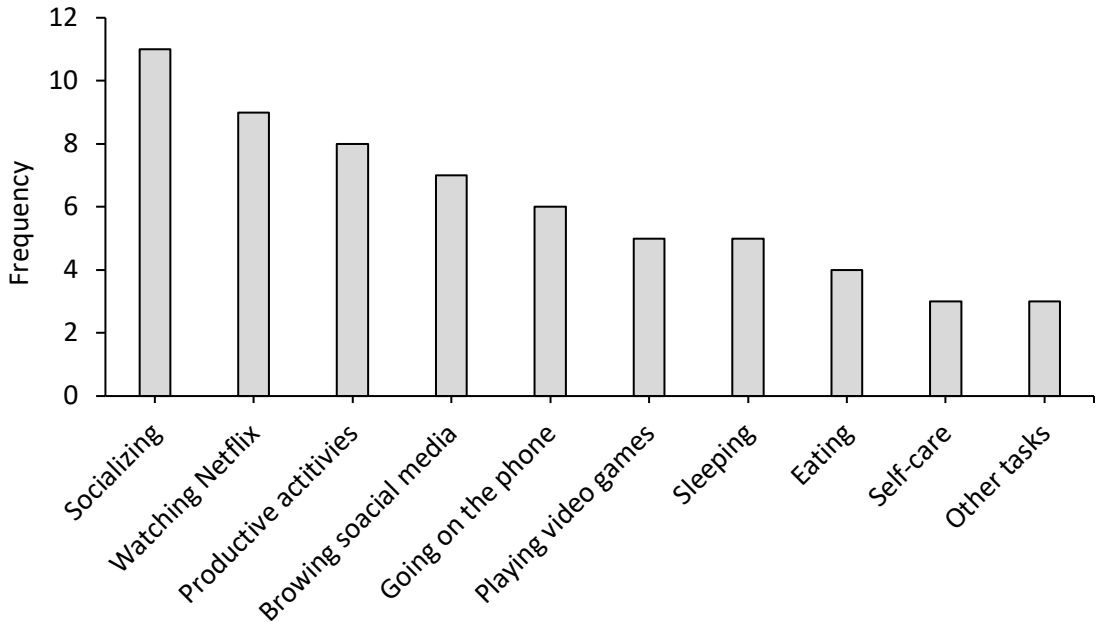
Table 6-13
Alternate Activities or Tasks that Students Engaged in When They Procrastinated on the Academic Task

Students' ID	Alternate Task 1	Alternate Task 2	Alternate Task 3	Alternate Task 4	Alternate Task 5
S1	Watching Netflix	Playing video games on the phone	Browsing social media	Texting people on phone	
S2	Watching Netflix	Browsing social media [19]	Socializing with friends or family	Sleeping	Eating
S3	Browsing social media	FaceTime with boyfriend	Working out at the gym	Socializing with friends or family	Cleaning
S4	Watching Netflix	Being on Phone	Socializing with friends	Taking a nap	Going to a coffeeshop
S5	Play video games	Socializing with significant other	Browsing social media	Playing sports (e.g., volleyball)	Working out at the gym
S6	Watching Netflix or YouTube	FaceTime with friends	Socializing with friends or family	Doing makeup	
S7	Watching Netflix	Sleeping	Going on the phone for hours	Participating in SONA studies	Playing video games on the phone
S8	Napping	Watching YouTube videos	Texting people on phone	Cleaning	Socializing with friends
S9	Browsing social media	Working on a much easier academic task	Playing video games or watching Netflix	Doing small productive things (e.g., organizing desk or putting away clothes)	Texting friends or calling family
S10	Eating	Socializing with friends or family	Sleeping	Watching Netflix	Socializing with friends or family
S11	Taking a shower	Socializing with friends or family	Socializing with significant other	Watching Netflix	Eating
S12	Working out at the gym	Eating	Browsing social media	Socializing with friends	Shopping
S13	Cleaning my room	Doing Aesthetic self-care regimens	Watching Netflix or YouTube	Playing video games on phone	Playing with my dogs

[19] The social media examples students mentioned were YouTube, Pinterest, Instagram, Snapchat

Figure 6-15

Frequency of Alternate Activities or Tasks Students Reported in Phase 4



During the interview, students were asked to elaborate on the alternate activities or tasks they engaged in. More specifically, they were also asked to explain why they chose these tasks and what qualities of these alternate tasks attracted them. Students explained that some of these alternate tasks were mind numbing (e.g., Netflix, playing video games on phone), whereas other tasks were very engaging making them lose track of time (e.g., socializing, browsing social media). Interestingly, in both cases, these tasks provided students with a mental distraction either through “mind numbing” or “mind absorption.” Students also explained that reaching to their phones is more like an automatic behaviour when they feel stressed from attempting their academic tasks. They clarified that it is a coping mechanism that helps them to avoid their academic task easily. Some explanations of why students preferred these activities are provided below.

"My usual go to is watching Netflix or something on TV because it's just very mind numbing for me. I like to have noise in the background. I always walk with music or have something on while I'm at home just because I like having the background noise. I usually end up just like doing something on my phone. But the noise is just very mind numbing and it zones me out kind of thing. I like lying in bed and just not focus on anything, not use any brainpower for anything important." (Student #1)

"It's so funny that on Pinterest, I check how to not procrastinate. I don't know about you but I look up psychology charts on Pinterest and so, I'm looking at all these emotion stuff on Pinterest trying to help myself to do better. Do I follow through? Probably not!. . . . We'll go to the food. It's a big one for me. Um, I'm an emotional eater to an extreme. When I am upset or I'm stressed out or feeling any negative emotion, I'll search for comfort and food. Usually, I get upset with myself after eating and then that's a whole another thing. So, I eat a lot to avoid it [academic task]. . . . I plan out a meal and then I take the time to cook it, but to cook it, it takes hours. When that happens, it's delaying me to the extreme. Sometimes I'm emotionally exhausted from dealing with it [academic task]. When I can't do anything at all, I'll go to sleep. My naps are three hours long. Well, I don't know if anyone else takes naps like that. I think it's because I don't sleep very much at night. It's probably because at night, I stay up and I'm on my phone and I go to bed late. . . . I don't want to think, I don't want to do anything. I watch Netflix and I go on social media. I call like my boyfriend or my friends on the phone and I avoid it [academic tasks] to the extreme." (Student #2)

"I think when it comes to my family, I just can forget about what my other tasks [academic tasks] are. I can hang out with my sisters during reading week. I can just do that instead and so I'll just completely forget about my other stuff. With my friends, we're all kind of procrastinating together. Then it'll just be like, *Oh yes, like I haven't started,* and my friends will be like *"*neither have I,*"* and so, you feel good about yourself. It's just like a good place for procrastinating. I go to the gym, I try and do that when I'm procrastinating just to make myself feel like I am doing something useful, not just wasting my time. Then Netflix is like the easy option when you're just like, *Oh, I don't want to do anything.* So, you just want to lay in your bed and watch Netflix. Then cleaning is a big thing that I do. I've always like kind of stress clean. When I have assignment or something, I'll just go and clean my room." (Student #3)

"So, when I engaged in it, I was like, Okay, I got to find a topic first. And then I believe I found the topic right after class. Okay, this sounds like a good topic. Okay, I'll just leave it for that. Let's just go on YouTube, go on Facebook, going Instagram, all the social medias that's sort of available for us. I just went on there and then I kind of lost track of time. And the next day I'm just like, I don't really even bother thinking about anthropology. I'm just like, okay, let's see what's happening again in the social media world maybe something different, something has change. And I'm a very like, I really love sports. So, I really like a lot of

sports, like soccer and all that. So, I really didn't touch anthropology." (Student #5)

"Um, well I really like watching [Netflix] and talking to my friends on FaceTime." (Student #6)

". . . . I was procrastinating by participating in SONA studies and playing games on my phone. . . . Honestly, I just do them because they make me feel less bored and also like I don't have to really do anything when I'm doing them. Like watching Netflix, I just want to watch Netflix and like not have my mind on a thing. So, playing on my phone is also mind numbing. I'm participating in SONA because I just find them fun. Like I needed the, I just, I was at like at 2am or something and then I was procrastinating on my work. So, I got all my all my credits or almost all my credits. So really, procrastination came in handy there for getting my credits. But yeah, no, it's just like stuff [academic task] that I don't really have to focus on." (Student #7)

"Yeah, so social media, like on my phone kind of thing. That one's almost like just a completely unconscious reaction. Like I'll do that where I'll, you know, flip something open and start reading [referring to the academic task] and then it's almost like my hand just immediately goes and pulls out my phone. Because it's just that like I guess a coping mechanism with stress, which is probably stuff not so great. But that's just that's such an unconscious thing for me, you know. If I really want to get something done, I have to just get rid of my phone. Because even though like I'll be doing questions, and you know, I'll do three questions and then the fourth one is kind of hard, like, I'll like instantly pull out my phone. You know, it's just like I don't want to deal with this [academic task], I immediately distract myself and like play on my phone is like the quickest, easiest thing for me." (Student #9)

"Well, on res [school residence] it's like really hard for me because like my whole floor is like really close. So, it's really distracting and I always just want to hang out with them instead of doing my work [academic task]. And then watching TV, like I'll just feel sometimes like I can't even think about my papers [academic papers]. Like, I'll just want to watch the TV show or whatever, like so badly that I can't even like focus on my work [academic task]. And then like eating like I'll just be hungry. I can't work when I'm hungry. For showering, I'll literally be like, I need to work on this [academic task] but like showering is also important. So, maybe I I'll just shower instead of doing the work." (Student #11)

"I do face mask a lot. I'll do my brows, like wax everything I can, tweeze everything I can and shave everything I can. I'll fix my nails or clean my room. The problematic part is when I clean, I clean like the areas that don't exactly matter. So overall, my room does not look clean. You think it would because I procrastinate so much but it does not. It's more like I clean a very small section to incredible detail, but overall, in big picture, nothing looks clean." (Student #13)

Narrative Inquiry of Emotions in Phase 4. Following the discussion of the types of alternate tasks students engaged in, students were asked to describe the specific emotions they felt when they engaged in these alternate activities. During the narrative inquiry of the emotions, students' explanation revealed that they preferred some alternate tasks more than others and they did not experience the same level of positive or negative emotions for all tasks. They found certain alternate tasks more comforting and stimulating than others which more easily improved their mood. Typically, these alternate tasks are those that help them to "zone out" or help them take their mind completely off the academic tasks that led to their poor mood. They experienced more positive emotions and less negative emotions compared to before when they attempted the academic task. They explained up-regulation of positive emotions and down-regulation of negative emotions.

> "Usually, it's relaxing, it's kind of fun. It's like stress relieving in a way because you are just going to forget about everything for a little bit. I'm going to have me time and stuff like that. That's the time that I take to talk to my friends and text my friends and everything like that. So, I always I get to have that social interaction and like converse with people and chat with all my friends. We go to different schools and so I get to see them and talk with them and stuff like that. So, I do have a lot more fun and it definitely eases some of the stress. . . . I feel like sometimes that I'll be like sitting there and I'll be like, *Oh, I should probably do something.* So, I'm like constantly thinking about the other thing. It's not necessarily like anxious or nervousness. It's just like, I don't know how to put it, kind of upset that I'm like distracting myself from the tasks that I should be doing." (Student #1)

> "With everything else excluding food because that's usually when I'm happy. They give me a positive mood and when they help uplift my mood, which actually motivates me and makes me feel better about myself, and makes me feel I can do the task. I'm also a creative person, sometimes I'll draw and so, when I deal with my emotions that way, I guess, its stimulating creativity or intellectual abilities in a different way." (Student #2)

> "I think most of the tasks makes me feel better because I'm able to forget what I'm doing [Procrastinating]. I just don't remember that I have to do that [work on

academic tasks]. It's just like a way to escape from the stress and anxiousness of having to still do it. . . . I feel just better and happier. Like, I'm having fun doing whatever it is and I'm not thinking or talking about the assignment. So, a lot of those negative feelings associated with the assignment are just kind of gone. . . . It just allowed me to forget about the tasks really, the homework that I haven't done yet. So, any school activities I have not completed yet, I just kind of forgot about and was able to enjoy like fully what I was doing with my friends or whatever I was doing. I just was trying to escape that work [academic task]. I can clearly forget about whatever I was doing." (Student #3)

"I feel happier, content because again, I'm doing these activities that I like, but then especially with like relax, I don't feel as relaxed anymore because again, I know time is like going by and I know that I'm taking up all of this time that I have that it should be doing my work. And that's when like the nervousness and anxiety kicks in. And so, it's really hard for me to feel super relaxed when I'm doing these activities. But It's not as bad as when I actually do like the chemistry work. And it's like I'm really stressed out. So, part of me is actually like glad because I'm like, *Hey, I'm like hanging out with friends*, but I also don't feel like I deserve it. And so, I feel like that like anxious tick. So, I can't like actually feel like entirely relaxed unless I go out after finishing all my work, which I never do." (Student #4)

"I feel great because I don't like I don't even overthink about anything. I'm just focused on the main task [alternate task] what's happening, which is just being with someone, playing games with my friends, being physically active, and I just really feel good about them. I'm zoned into one specific activity. I am really zoned in on something else than academic tasks, a way to kind of escape." (Student #5)

"Um, it's like stress relieving honestly. Like it's just that for those things it's no brainer, I don't have to use my brain intensely. So, it's like just, yeah, I don't know. . . . Um, I feel more relaxed, and I feel more happy and overall better I guess." (Student #6)

"I think if we're doing something that's very engaging and something that I actually like doing. Like maybe we'll go bowling one night, I don't know. And it's just like something new, something fun. I'm so preoccupied with that, that it makes me like happier, it makes me not stressed because I kind of forget about it a little bit. But if we're just sitting there, we're not doing much. We're like in the car or maybe eating food. It's kind of like subconsciously in the back my head I still know actually that paper because nothing is like distracting me now." (Student #10)

"The positive emotions would be more of the enjoyment. So, I'm kind of happy because I'm watching things that make me laugh and kind of feel better about the bad decision I'm making. . . . I was disappointed too and it would be like high.

> Like all those negative emotions because I know that it's not a productive thing to do. Because what is social media going to do for me in the long run." (Student #12)

> "I don't feel excited but more like relaxed. I was relaxed and happy sometimes. Because I can forget about what my responsibilities were for that split second, but it's nice to feel like that for a little bit, I don't have that much like stress on me or something." (Student #13)

For most students, Netflix was not as pleasant as anticipated. They do feel better compared to Phase 1 when they attempted the academic task, but they often explained watching Netflix as less stimulating, boring, or mind numbing. They are not as rewarding as some of the other tasks that help them to completely forget about their academic task they needed to work on. Students reported that they had lingering thoughts about their academic tasks when they watched Netflix and as a result, felt guilty to some extent for not working on their academic task they should have worked on.

> "I'll go through the list. When watching Netflix, usually I'm bored. I don't enjoy watching TV too much. It's mostly something to not think, to numb my brain and give it a chance to relax. So, I don't always enjoy what I'm watching. I'm just going to be bored while I'm watching Netflix. . . . So, different activities affect me differently. I find the more mind-numbing activities, the ones where I choose not to think, don't affect or help me in any way. They are just to not have to deal with it, not have to think or not have to feel. I know other people probably engage in, I think, like smoking to deal with it and I am not a smoker. Netflix, I guess, is my version of that." (Student #2)

> "I think one big one is when I watch Netflix, it's still there [lingering thoughts about the academic task]. Like it doesn't work as well. I'm just like, thinking about it that I have to do it and so, I still kind of feel very bad about it [academic task] I guess." (Student #3)

> "I mean, yeah, you do feel good because you know, obviously you don't have to work on the task and you do feel relieved, but it like it wanes pretty quickly. You know, especially like the longer you go on, the more you really just aren't enjoying what you're procrastinating with, because you just feel bad. So, yeah, like degrades as you go on. At first when you know, I guess that's closer to that phase of making the decision. But you know, for the first couple minutes or whatever, procrastinating feels really good, which I guess is why we do it. But yeah, the longer it goes on it, just you know, you can end up where you're just not

enjoying it at all, but you keep doing it, keep doing it." (Student #9)

Some students described that multitasking helps to distract themselves better from the lingering thoughts about the academic task they are procrastinating on. In particular, they experience guilt when they are not working on their academic task and instead, they are watching Netflix. A combination of alternate tasks helps students to avoid the academic tasks better while experiencing a better mood. A couple of examples of what students said are presented below:

> "A lot of the things I do is at the same time, so like, if I'm watching TV or watching a movie [on Netflix], I'll also be on my phone either talking to someone or scrolling through my phone or playing games or whatever. Like just kind of dividing my attention so I have more to distract me of the fact that I'm not doing my work [academic task]." (Student #1)

> "Like Netflix and going on my phone, it always happens, like stuff like that. Things that are happening like simultaneously together, I would say it's like the positive impact. But not like positive but like you know, they kind of go together." (Student #7)

Narrative Inquiry of Irrational Beliefs in Phase 4. Similar to the previous phases, students were also asked to describe how they rationalize their decision to engage in the alternate tasks they described. Their narratives revealed that many of the irrational beliefs that they already mentioned in the previous phases applies to this phase as well. The irrational beliefs students used to justify their procrastination in the different momentary phases are not mutually exclusive, perhaps simply because there is a limited set of beliefs that apply in this context. These justifications overlap across the phases as students make a series of decisions quickly during these momentary phases. Some examples are:

> "I deserve this because I worked on my on my assignment for like 5 minutes, like, stuff like that. But half of me is like, *oh yeah! like this is good* and the other half is like, *why are you like, why are you procrastinating!* Just do your work. So

> that's, that's really like the whole time, or until my brain gets so numb from watching so many hours of Netflix that I just tune it out. Like I just, I just focus on Netflix." (Student #7)

> ". . . . it just goes back to like I have more time. So why not engage those activities you know. Like, I would rather clean than do my work. So yeah, it's not like I planned to do those activities and then you know, ignore my work. It was more like I just do them when I don't do my academic work. . . . Sometimes I feel like I deserve the break." (Student #8)

> "Even like sometimes I'll you know have to get stuff done and so, I'll like write a to-do list and then just to cross a bunch of stuff off that I've already done. This is like wow, like I've already been productive. So I'll do that it's sort of my like, how I lie to myself to think that I am being productive to get over that like guilt of like, not actually doing anything that day." (Student # 9)

Study 2b: Summary

The results of the qualitative study are consistent with the quantitative study that both affective and cognitive processes are related to students' task avoidance in procrastination. Students' description of their procrastination underscores how the aversive emotions they experience when they try to work on the academic task are regulated improperly in an attempt to feel better. A series of momentary choices driven by emotions and justified by their beliefs help achieve short-term relief from a bad mood. Since the four momentary procrastination phases included in my study design were predetermined, students' experience of emotions and thoughts were examined as they progressed through these predetermined phases. In response to the questions pertaining to emotions and thoughts in each phase of procrastination, students explained that they did feel better when they decided to delay the academic task, formed an intention update to work on the task later and participated in alternate activities instead of the academic task that made them feel bad.

During the interview, positive emotions that were discussed often by most students across all momentary phases of procrastination were feeling happy, relaxed and relieved. Once the decision was made to put of an aversive academic task, mood improved, and this was further enhanced when accompanied by an intention update and a distracting alternative activity. Among the negative emotions, most students reported feeling stressed and anxious across all momentary phases. Boredom was discussed by most students only in Phase 1 when they attempted to work on the academic task. Although, there were individual differences in how students endorsed emotions across the four momentary phases as well as how they rated these emotions across the phases, overall, students did report mood-repair in their explanations of emotions across the four phases of procrastination.

When discussing irrational beliefs, two of the PPA irrational beliefs that were endorsed and discussed by most students during the interview were the same ones that predicted all measures of procrastination in the quantitative analysis: "*I believe I will work better under pressure on this academic task,*" and "*I think I will feel more like it tomorrow to work on this academic task.*" Other PPA dimensions of irrational beliefs were noted by students, but there were individual differences in how they were used to rationalize procrastination.

Interestingly, as students were interviewed, they weaved the discussion of their emotions and thoughts together in all the momentary phases of procrastination indicating that both emotions and cognitions are working together contributing to their procrastination. In Phase 1, students discussed how their attempt to work on the academic task at the moment did not make them feel good. They did not experience any positive

emotions, but experienced only negative emotions like anxious, stressed, annoyed, overwhelmed and even bored. They justified their procrastination by saying they have more time left for this task, they work better under pressure or they do not want to spend time learning a new concept. These students explained that they knew the consequences of procrastinating based on their previous experience of procrastination, but they acted against their better judgement and decided not to work on their academic tasks at the moment. When students were asked about the qualities of the academic task they did not specifically like, a typical answer was that they simply did not want to put in too much effort. Students found the academic tasks that required more hard work as unpleasant and aversive, specifically the ones they perceived as less interesting.

After students made the decision to delay their academic task, they reported that they did feel happy, relaxed and relieved to some extent, an obvious indication of mood repair. However, in many cases, they also noted that they continued to have lingering thoughts about the pending academic task that they still had to complete eventually, and thus, the concomitantly reported feeling stressed and anxious to some extent. However, they explained that they still enjoy the momentary good feeling of not having to work on the academic task at that moment. In an important sense, notwithstanding the anxiety of the pending deadline, the net effect was mood repair.

All students reported that they created some form of intention update or an alternate plan to work on the academic task after they have made the choice to delay the academic task at that moment. Some students noted that they created specific plans of when and how they would work on it using a notebook, calendar or to-do list, whereas others created vague plans that they would work on it “later” or “tomorrow” without

specifying the details. Sometimes the plan gave them a false sense of hope that they could get started with the academic task, but when it came to executing the plan, their inactions further delayed the task. They postponed the academic task even the next time they attempted the task. When students were asked about how they felt when they formed the intention update, they reported feeling much better than when they decided to delay. Again, they reported feeling happy, relaxed, relieved, calm as well as some other positive emotions. Somewhat paradoxically, all students reported that they are aware of their procrastination problem and so they already knew that they were not going to work on their academic task despite their new intention. Although they experienced positive emotions because of the plan they have created, they also experienced negative emotions like stress and guilt because they knew themselves well enough to expect that they really were not going to take action as planned in the intention update. Still, some students expressed that having a plan lessened the guilt compared to when they only decided to delay the academic task.

When students were asked about the alternate tasks that they engaged in when procrastinating, the tasks that were frequently reported by most students were socializing with friends and family, watching Netflix, productive activities (e.g., cleaning, studying for another academic task) and browsing social media. Students further explained that engaging in certain alternate tasks even becomes more automatic in nature, for example, feeling stressed about academic task makes them reach out for their phone automatically. Such behaviour helped students to avoid their academic task rather easily and helped them forget about the task in the moment.

Students also reported that they did not find all tasks as equally rewarding. Certain alternate tasks such as Netflix or playing video games on phone were described as mind-numbing, whereas other tasks were explained as more engaging. The alternate tasks they found more stimulating helped them to improve their mood more so than alternate tasks that were less stimulating. Students' narratives of the use of alternate tasks provided some insight into the moderate effect found in the quantitative study for the improvement in mood from the intention-update phase to alternate task engagement phase.[20] It seems that the extent to which their mood improves depends on the types of alternate tasks students engage in. Students' explanation of their mood in this moment nevertheless reflected that they experienced an up-regulation of positive emotions and down-regulation of negative emotions. They felt much better compared to when they decided to delay the academic task and formed an alternate plan.

Interestingly, despite the popularity of Netflix, it was endorsed as a less stimulating, mind-numbing activity by most students and they explained that they mostly had lingering thoughts and guilt that they still have to work on the academic task they are procrastinating on. With more stimulating activities, students did not have such thoughts. To get rid of the thoughts related to the academic task, students reported that they often make use of multitasking that helped them to forget the academic task more easily (e.g., texting while watching Netflix). Thus, depending on the types of alternate tasks or combination of alternate tasks students engage in, their extent of mood-repair can vary. However, regardless of the alternate tasks they engaged in, they felt better compared to when they tried to work on the academic task. Students also noted that they felt quite

[20] It will be recalled that results of mood-repair mostly showed large effects, with the exception of the change in mood from forming an intention-update to engaging in alternate tasks.

good to engage in alternate tasks when there was sufficient time left to work on their academic tasks. However, as might be expected, as the deadline approached, they started to feel more stressed and anxious.

There were overlaps in how students justified their procrastination across the different momentary phases. When students were asked about the types of thoughts they had in the last three phases, they still rationalized their needlessly delay of the academic task by telling themselves that they have more time, they can pull it off last minute as they can work better under pressure, they need to be in a good mood, they need to have a better headspace to produce better quality work or they think they simply deserve a break even when they do not need a break or have had sufficient break. There were a few instances where students noted that they do not even think about a reason, they simply procrastinated. They have procrastinated before, and it had become more of an automatic behaviour to simply put off the academic task when they found the task aversive.

Taken together, the results of quantitative and qualitative studies provided strong evidence that procrastination is best understood from a mood-repair perspective and that both emotions and cognitions work together in this irrational delay. In addition to the findings noted, students who participated in the interview sessions described that the deadlines played a critical role for them to finally begin working on their academic task. Despite their renewed intentions and failure to act on those intentions during procrastination, students reported that they did complete the academic task but very close to the deadline. They acknowledged that they knew they were going to procrastinate until the deadline loomed large. Although the discussion of deadlines briefly emerged during the interviews with these students, the particular role that deadlines play in reversing

students' preference from needless delay to working on the academic task was not examined. Understanding this reversal from procrastination to action is the focus of the next chapter and my final study.

CHAPTER 7

APPRAISALS OF EMOTIONS AND COGNITIONS DURING PREFERENCE REVERSAL IN PROCRASTINATION

STUDY 3: METHOD AND ANALYSES

The main goal of Study 3 was to determine the self-reported reasons for why individuals who procrastinate on their academic tasks become motivated to complete their tasks near the deadlines. Again, I implemented a mixed-methods design and PPA in this study. This study was based on a retrospective account of participants' recent experience of procrastination on an academic task. I conducted both qualitative (Study 3a) and quantitative (Study 3b) studies.

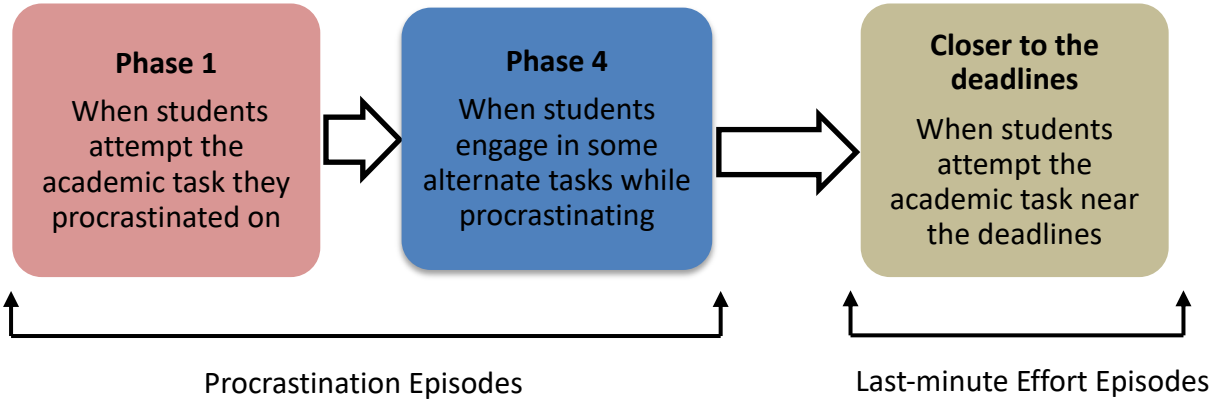
In the quantitative study, students completed a self-report questionnaire of PPA that included the dimensions of emotions that were obtained from the factor analyses conducted in Study 1 and additionally, included some dimensions of motivation and cognitions (Study 3a). Contrary to Study 2a, students reported their emotions during two of the phases of procrastination episodes (i.e., when they attempted the academic task that they procrastinated on [Phase 1] and when they engaged in alternate tasks [Phase 4]) and during the episodes of "last-minute efforts" (i.e., when they started working on their academic tasks they procrastinated on) closer to the deadlines (see Figure 7-1). Only Phases 1 and 4 from the Study 2 were included in these analyses to keep the questionnaires short to avoid respondent fatigue when completing the questionnaires and maintain data quality.

Using PPA and the mixed methods design, the difference between participants' emotions, motivation and cognitive appraisals of this academic task *during* the

procrastination episodes and *during* the last-minute efforts episodes near the deadlines were examined to explain why individuals who procrastinate changes their preference, that is, task avoidance to task engagement closer to the deadlines.

Figure 7-1

Two of the Four Momentary Phases of Procrastination Episodes and the Last-Minute Efforts Episodes Examined in Study 3



As discussed in Chapter 4 of my dissertation, I tested a number of hypotheses in Study 3a to investigate appraisals of emotions and cognitions in preference reversal during procrastination. A summary of these hypotheses is presented here. I expected that individuals who procrastinate *would not* significantly differ in terms of the dimensions of reduced positive emotions and increased negative emotions between the procrastination episodes and the episodes of last-minute efforts. However, within the procrastination episodes, students would report mood-repair (elevated positive and reduced negative affect) when they engage in alternate activities compared when they attempt their academic task they procrastinated on (H3-1a). It was also expected that students would

not differ in their overall mood during the procrastination episodes and when they attempt the academic tasks during the last-minute effort episodes, but they would differ in perceived *threat* due to approaching deadlines of academic tasks between the procrastination episodes and the episodes of last-minute efforts (H3-1b).

Individuals who procrastinate would also significantly differ in their experience of motivation, autonomy, competence and control to engage in the academic tasks during the procrastination episodes and the episodes of last-minute efforts. I hypothesized that individuals who procrastinate would significantly differ in their experience of motivation to engage in the academic tasks during the procrastination episodes and the episodes of last-minute efforts where motivation to engage in academic tasks would be greater closer to the deadline compared to the procrastination episodes (H3-2a). However, within the procrastination episodes, students would report more motivation to engage in alternate tasks compared to academic tasks (H3-2b). I also expected that students would report less autonomy, competence and control over their academic projects during the procrastination episodes compared to the episodes of last-minute efforts (H3-2c). Additionally, they would report having significantly less autonomy, competence and control to work on their academic task compared to the alternate task they engaged in to repair their mood during the procrastination episodes (H3-2d).

I also tested some hypotheses that specifically examined students' cognitive appraisals of their academic tasks during the procrastination and the last-minute effort episodes. It was expected that cognitive appraisals of academic tasks assessed on a number of dimensions of PPA (e.g., difficulty, challenge) would significantly differ between the procrastination episodes and the last-minute effort episodes for individuals

who procrastinate. These individuals would appraise their academic tasks to be less difficult and less challenging, with better outcomes once they are engaged in their academic tasks compared to the procrastination episodes (H3-3a). However, their appraisal ratings of how important and value congruent the academic tasks are would not change between the procrastination and the last-minute efforts episodes (H3-3b) I also hypothesized that students would appraise their academic task as more important and value congruent but more difficult and challenging and having poor outcomes than the alternate task they engaged in during the procrastination episodes (H3-3c).

In the qualitative study, students took part in a semi-structured interview where they reported an academic project that they have already completed but on which they procrastinated (Study 3b). Similar to Study 2b, participants answered some open-ended questions to report the positive and negative emotions they experienced during the procrastination and last-minute effort episodes. Students' narratives of their experience of these emotions during the episodes of procrastination and last-minute efforts were noted. Furthermore, students were asked to report on how motivated they were to do this academic task and how they appraised their academic task on various cognitive dimensions during the procrastination and last-minute effort episodes.

Like Study 3a, similar hypotheses were tested. Individuals recounting their procrastination would report a process of mood-repair by engaging in alternate tasks instead of academic tasks during the procrastination episodes (i.e., when they attempted the academic task they procrastinated on), but not during the episodes of last-minute efforts (i.e., when they worked on their academic tasks) closer to the deadlines (H3-4a). It was also expected that individuals who procrastinate would perceive the deadlines of

their academic tasks as signalling a threat when the deadlines were nearby, shifting their focus away from alternate tasks to their academic tasks to complete the tasks near the deadlines (H3-4b).

I expected that students would report experiencing low motivation to engage in academic tasks during the procrastination episodes and high motivation to engage in their academic tasks near the deadlines (H3-5a). However, students would report higher motivation to engage in the alternate tasks compared to the academic tasks during the procrastination episodes (H3-5b). Furthermore, I expected that students would report to have less autonomy, competence and control when engaging in their academic tasks compared to the alternate tasks they engage in to repair their mood during the procrastination episodes (H3-5c).

For cognitive dimensions like task difficulty, challenge and outcome, it was expected that students would report their academic tasks to be less difficult, less challenging and having positive outcomes once they engage in their academic tasks during the last-minute effort episodes compared to the procrastination episodes (H3-6a). However, they would perceive their academic tasks as more difficult and challenging, and having poorer outcomes compared to the alternate tasks during the procrastination episodes (H3-6b). Students' reports of the perceived importance and how value congruent these academic tasks were not expected to change between the procrastination episodes and episodes of "last minute efforts" (H3-6c). Conversely, I expected that students would report their academic task as more important and value congruent than the alternate tasks they engaged in during the procrastination episodes (H3-6d).

Affective and Cognitive Appraisals during Preference Reversal in Procrastination using Quantitative Analysis

Study 3a: Method

Participants

Participants recruited in this study were also undergraduate students from Carleton University. A total of 422 students were recruited. Again, using the software G*power, *a priori* power analyses were run to estimate the sample size needed to run a series of MANOVAs where the power was set to 80% for one-tailed hypotheses at an alpha level of .05. I chose a small effect size to determine the sample size because the hypotheses on experiences of emotions in relation to preference reversals during procrastination in this study are novel and have not been tested in previous studies. Power calculations revealed that a total of 280 participants were needed to obtain sufficient power for all analyses. Again, I over-recruited to compensate for the possibility of participant exclusion, that is, to confirm that a minimum of 280 participants data could be retained to complete the final analyses following exclusion of problematic data. From the 422 participants, 126 participants were excluded due to incomplete data, duplicate data and time spent on the questionnaires. The final sample consisted of 296 participants.

In the final sample, 227 participants were women (76.7%), 68 participants were men (23.1%), and 1 person did not identify their gender (.3%). The mean age of participants was 19.61 years (*SD* = 2.94) ranging from 17 to 55 years old. Of the 296 participants, 55.7% of the participants identified themselves as Caucasian with a European descent, 12.2% as African Canadian, 5.4% as Middle Eastern, 7.4% as South Asian, 6.1% as East Asian, 2.7% as Latin American, 1.4% as Indigenous, 6.4% noted

having a Bi- or Multi-racial background, 2.0% identified as other and .7% did not prefer to answer.

Procedure

Participants signed up for this study through the experimental sign-up system of the Department of Psychology (SONA) at Carleton University. Participants completed an online informed consent following which they completed a battery of questionnaires (see Appendix N). First, participants completed a demographic questionnaire, the same as Study 2a; see Appendix C). Then they were asked to read a scenario about a student who procrastinated on writing an essay for a psychology course. Similar to Study 2a, a scenario approach was adopted to provide participants a clear understanding of how procrastination is different from other forms of delay such as purposeful delay where tasks are strategically scheduled and prioritized to ensure all tasks can be completed on time without affecting performance. After reading the procrastination scenario, participants were asked to recall a very recent event (i.e., took place within the past month) where they procrastinated on an academic task.

Following the description of their own procrastination event, participants were asked a few task-related questions such as "*Please name and describe the academic task that you delayed. What were the specific requirements of this task*," "*How many days were given to complete the academic task you procrastinated on?*," and "*When did you actually start working on the task*?." Then participants were asked to complete the PPA questionnaire where they rated the academic task they needlessly delayed on affective and cognitive dimensions (see Appendix O). Similar to Study 2a, participants then completed the Multifaceted Measure of Academic Procrastination (MMAP, Haghbin &

Pychyl, 2015; see Appendix I). All data were collected using Qualtrics and participants took approximately 60 - 75 minutes to complete the online questionnaires.

Measures

Demographic Questionnaires. This questionnaire is the same as Study 2a (see Appendix C).

Personal Project Analysis (PPA). PPA was used to assess affective and cognitive appraisals of academic tasks that participants have recently procrastinated on (see Appendix O). Participants were asked to provide retrospective appraisals of their academic tasks on different affective and cognitive dimensions during the procrastination episodes as well as appraisals of the same task on the same dimensions when they took action to complete the task near the deadlines (i.e., the last-minute effort episodes). During the procrastination episodes, participants also noted five alternate activities they engaged in when they were procrastinating on their academic task and rated these activities collectively on the same affective and cognitive dimensions. All dimensions were rated on an 11-point Likert-type scale of 0 (Not at all) to 10 (Extremely). The same positive (e.g., happy, fun) and negative (e.g., anxious, stressed) dimensions of affect that were obtained using factor analyses in Study 1 were included in this study. I also included the overall mood dimension which participants rated during the procrastination episodes and last-minute effort episodes to reflect on how they felt about their academic tasks during these episodes.

A new affective dimension called “threat” was also included in this study to determine if participants change their preference from delaying the academic tasks to engaging in the academic tasks near the deadlines in order to avoid the possible

punishment (threat) of not getting the academic project done. As discussed earlier, when the deadline is close, it is possible that students perceive the deadline as a threat as there might be negative consequences associated with not meeting the academic deadlines. These consequences could include receiving a failing grade, negative impact on overall GPA, withdrawal from the course, or financial penalty for failing the course. As such, participants were asked to assign an appraisal rating on a scale of 0 (Not at all threatened) to 10 (Very threatened) for the "threat" dimension during the procrastination episodes as well as the last-minute effort episodes. For example, during the procrastination episodes, participants were asked to rate the following statement: "*During the time when you procrastinated on this academic task, how threatened did you feel for not completing this academic task? By threatened, I mean did you consider fear of failing, poor academic performance, withdrawal from the course, financial penalty of repeating this academic course or any other reason as possible threats that motivated you to finally complete the task?*" Then participants were asked to answer an open-ended question of why they thought they felt threatened or not threatened. If they indicated that they felt threatened (i.e., rated the dimension as 6 or higher), they were asked to answer a second question where they were needed to select a reason (e.g., fear of failing, withdrawal from the course, financial penalty of not completing this course) for feeling threatened from a list provided.

In addition to the affective dimensions, participants who procrastinated appraise their projects on a variety of cognitive dimensions (e.g., importance, difficulty, value congruency) to reflect on how they thought of their academic tasks and alternate activities during the procrastination episodes, and how they thought of their academic

task during the last-minute effort episodes. Additionally, participants were asked to recall and rate dimensions such as how much autonomy they experienced, how competent they perceived themselves to be to complete the academic task as well as how motivated they were when they attempted to work on their academic tasks (procrastination episodes) and when they acted on their academic tasks near the deadline (last-minute efforts episodes).

Multifaceted Measure of Academic Procrastination (MMAP). Procrastination was assessed using the same measure of MMAP like Study 2a (for details of this measure see Chapter 6 of this thesis and Appendix I).

Study 3a: Results of the Quantitative Analyses

It will be recalled that the purpose of Study 3a was to examine preference reversal between procrastination episodes (i.e., when students attempted to work on the academic tasks they needlessly delayed) and during the episodes of last-minute efforts (i.e., when students started working on their academic tasks). I specifically examined differences in students' emotions, overall mood, perceiving deadlines as a threat, cognitive appraisals of tasks, and motivations during procrastination episodes and last-minute efforts episodes. To test the hypotheses relevant to this study, I ran a series of MANOVAs following which I ran specific *a priori* pairwise comparisons.

First, I provide a summary of how data cleaning was completed in this study. Second, I provide the results of the preliminary analyses to demonstrate whether assumptions of MANOVA were met to conduct these analyses. Lastly, I provide the results of a series of MANOVAs and the corresponding follow-up analyses assessing how emotions, perceived threat related to deadlines, overall mood, cognitive appraisals of academic tasks and motivation differ during the apparent preference reversal of last-

minute efforts to complete academic tasks.

Data Cleaning

Missing value analysis was conducted on the 296 participants' data to determine the percentage of missing values in the sample. I conducted Little's MCAR test using SPSS version 27 software package. This analysis showed that across all measures only .3% to .7% data were missing. The missing data were attributed to random omissions (MCAR) as Little's MCAR test generated a non-significant result. Therefore, missing values were not considered to be an issue in the present study.

Preliminary Analyses

All assumptions to conduct MANOVAs were checked using the SPSS version 27 software package. I examined the presence and absence of univariate and multivariate outliers, univariate and multivariate normality, linearity and multicollinearity. The results of the assumptions for MANOVA are discussed next.

Univariate and Multivariate Outliers

Examination of the outliers revealed no univariate outliers for any of the variables. That is, none of the Z-scores calculated for the three emotion factors, overall mood and perceived threat dimensions, cognitive and motivation dimensions during the procrastination episodes and last-minute effort episodes exceeded the threshold of $z = 3.29$ at $p < .001$ for univariate outlier (Tabachnick & Fidell, 2013). Multivariate outliers were determined using the Mahalanobis Distance. For the three factors of emotions (frustration intolerance during procrastination [FI-Proc]; fear of failure during procrastination [FoF-Proc]; positive affect during procrastination [PA-Proc] [21]), five

[21] In the subsequent sections, I used the acronym of the three factors of emotions

multivariate outliers were found as the Mahalanobis Distance calculated for each participant exceeded the cut-off value of $\chi^2 = 27.88$ at $p < .001$ for 9 degrees of freedom (i.e., three factors of emotions measured during the two phases of procrastination episodes and one phase of the last-minute effort episodes). For the dimensions overall mood and perceived threat, one multivariate outlier was found that had a value greater than the cut-off value of $\chi^2 = 18.47$ at $p < .001$ for 4 degrees of freedom (i.e., overall mood and perceived threat measured during the procrastination episodes and the last-minute effort episodes). I also calculated the Mahalanobis Distance scores for the five cognitive appraisal dimensions and found 11 multivariate outliers that had scores above $\chi^2 = 37.70$ at $p < .001$ for 15 degrees of freedom (i.e., five cognitive appraisal dimensions measured during the two phases of procrastination episodes and one phase of the last-minute effort episodes). Similarly, 7 multivariate outliers were found for the four motivation dimensions that had the Mahalanobis Distance scores greater than the cut-off score of $\chi^2 = 32.91$ at $p < .001$ for 12 degrees of freedom (i.e., four dimensions of motivations measured during the two phases of procrastination episodes and one phase of the last-minute effort episodes). However, running the MANOVAs with and without these multivariate outliers did not change the results and as such, so these data were retained.

Univariate and Multivariate Normality

I examined univariate and multivariate normality of data for all variables during the procrastination and the last-minute effort episodes. Using *z*-tests of skewness and kurtosis, most of the variables demonstrated a significant skewed and kurtotic distribution, and the Kolmogorov-Smirnov test (test of normality) also revealed similar

results indicating significant deviation from normality (see Table 7-1 to 7-3). Given that a large sample size can affect the results of these tests[22], I chose graphical methods using histograms and Q-Q plots for this study as well to examine univariate normality.

First, I assessed the univariate normality of the three emotion factors, overall mood, perceived threat, cognition and motivation dimensions for the academic task that students noted they procrastinated on the most recently. The plots for the three emotion factors and perceived threat dimension showed that the distributions of PA-Proc having moderate positive skews, and FI-Proc and FoF-Proc factors and perceived threat dimension having slight negative skews during the procrastination episodes and the last-minute effort episodes. Among the cognitive dimensions, importance, challenge, difficulty and outcome expectancy showed distributions with slight negative skews during the procrastination episodes and the last-minute effort episodes. The dimension motivation and competence revealed distributions with small positive skews during the procrastination episodes whereas competence showed a small negative skew during the last-minute effort episodes. The dimensions, value congruency and autonomy during the procrastination episodes and value congruency during the last-minute effort episodes showed leptokurtic distributions. Only the dimension control showed an approximately normal distribution during the procrastination episodes and the last-minute effort episodes.

The distributions of different PPA dimensions for alternate tasks that students engaged in when they procrastinated in Phase 4 were assessed during the procrastination episodes. For the PA-Proc factor, the distribution showed a slight negative skew and

[22] Rationale for this decision is explained in Study 1a, Study 1b and Study 2a

conversely, for the FI-Proc and FoF-Proc factors, the distributions showed small positive skews. For the importance dimension, alternate tasks showed a small positive skew and for the difficulty and challenge dimensions, moderate positive skews were apparent in the distributions. For the dimensions, control, motivation, competence and autonomy, all showed small negative skews in the distributions. The dimensions, value congruency and outcome expectancy, showed small leptokurtic distributions.

Multivariate normality of all variables, three emotion factors, overall mood and perceived threat, cognitive appraisal dimensions and motivation dimensions, were examined using the Small's test, and results showed significant deviation from normality. As explained earlier, multivariate normality tends to fail when univariate non-normality is detected. Given that small to moderate skew and kurtosis was mostly detected for some of the variables and normality was not considered to be an issue (Tabachnick & Fidell, 2013).

Using a Q-Q plot, I also plotted observed standardized residuals of the variables against their expected standardized residuals to determine the normality of the residuals. I plotted the observed and expected standardized residuals of the three emotions factors, the observed and expected standardized residuals of the mood and perceived threat dimensions, the observed and expected standardized residuals of the five cognitive dimensions and the observed and expected standardized residuals of the four motivation dimensions. All plots demonstrated normal distributions of the residuals with slight leptokurtosis indicating that MANOVA could be conducted.

Table 7-1
Mean, Standard Deviation, Skew, Kurtosis and Test of Normality Results for the Three Factors of Emotions during the Two Phases of Procrastination Episodes and the Last-Minute Effort Episodes

Episodes	Factors of Emotions	*M*	*SD*	Skew (*SE*)	Kurtosis (*SE*)	Kolmogorov-Smirnov
Procrastination episodes (Phase 1: When students attempted their academic tasks)	FI-Proc	5.50	2.42	-0.38(.14)	-0.43(.29)	.07***
	FoF-Proc	6.25	2.63	-0.62(.14)	-0.43(.29)	.09***
	PA-Proc	2.39	2.09	0.78(.14)	-0.09(.29)	.13***
Procrastination episodes (Phase 4: When they engage in some alternate activities while procrastinating on their academic tasks)	FI-Proc	2.56	2.47	0.78(.14)	-0.20(.29)	0.15***
	FoF-Proc	3.91	2.77	0.10(.14)	-1.09(.29)	0.10***
	PA-Proc	6.11	2.36	-0.58(.14)	-0.02(.29)	0.07***
Last-minute effort episodes (When students start working on their academic task near deadlines)	FI-Proc	5.75	2.59	0.49(.14)	0.46(.29)	0.09***
	FoF-Proc	6.52	2.65	-0.84(.14)	-.09(.29)	0.12***
	PA-Proc	2.45	2.15	0.90(.14)	0.48(.29)	0.13***

Note. FI-Proc = Frustration Intolerance during Procrastination; FoF-Proc = Fear of Failure during Procrastination; PA-Proc = Positive Affect during Procrastination.

Table 7-2
Mean, Standard Deviation, Skew, Kurtosis and Test of Normality Results for Overall Mood and Perceived Threat during the Procrastination Episodes and the Last-Minute Effort Episodes

Episodes	Factors	*M*	*SD*	Skew (*SE*)	Kurtosis (*SE*)	Kolmogorov -Smirnov
Procrastination episodes (Phase 1: When students attempted their academic tasks)	Overall mood	4.06	2.11	0.30(.14)	-0.10(.28)	.13***
	Perceived threat	6.18	2.92	-0.61(.14)	-0.58(.28)	.16***
Last-minute effort episodes (When students start working on their academic task near deadlines)	Overall mood	5.15	2.44	0.07(.14)	-.48(.28)	.10***
	Perceived threat	6.55	2.76	-0.79(.14)	-.05(.28)	.15***

Table 7-3
Mean, Standard Deviation, Skew, Kurtosis and Test of Normality Results for the Cognitive Appraisal Dimensions during the Two Phases of Procrastination Episodes and the One Phase of Last-Minute Effort Episodes

Episodes	Cognitive and motivational dimensions	*M*	*SD*	Skew (*SE*)	Kurtosis (*SE*)	Kolmogorov -Smirnov
Procrastination episodes (Phase 1: When students attempted their academic tasks)	Importance	7.06	2.39	-0.73(.14)	0.19(.28)	.12***
	Challenge	5.65	2.77	-0.39(.14)	-0.71(.28)	.12***
	Difficulty	5.67	2.70	-0.43(.14)	-0.54(.28)	.13***
	Outcome expectancy	6.26	2.12	-0.62(.14)	0.44(.28)	.13***
	Value congruency	4.96	2.24	-0.40(.14)	0.02(.28)	.24***
	Motivation	3.50	2.33	0.34(.14)	-0.45(.28)	.10***
	Competence	6.04	2.42	-0.31(.14)	-0.49(.28)	.11***
	Autonomy	5.34	2.58	-0.20(.14)	-0.39(.28)	.15***
	Control	5.44	2.36	-0.25(.14)	-0.22(.28)	.13***
Procrastination episodes (Phase 4: When they engage in some alternate activities while procrastinating on their academic tasks)	Importance	3.38	2.60	0.42(.14)	-0.69(.28)	.14***
	Challenge	1.67	2.15	1.36(.14)	1.18(.28)	.26***
	Difficulty	1.60	2.07	1.41(.14)	1.45(.28)	.25***
	Outcome expectancy	4.91	3.18	-0.06(.14)	-1.06(.28)	.14***
	Value congruency	4.57	2.83	-0.08(.14)	-0.83(.28)	.16***
	Motivation	6.04	2.86	-0.46(.14)	-0.56(.28)	.11***
	Competence	6.50	3.01	-0.62(.14)	-0.59(.28)	.13***
	Autonomy	6.83	2.97	-0.80(.14)	-0.31(.28)	.16***
	Control	6.49	2.85	-0.64(.14)	-0.35(.28)	.12***
Last-minute effort episodes (When students start working on their academic task near deadlines)	Importance	7.45	2.22	-1.08(.14)	1.27(.28)	.17***
	Challenge	5.89	2.45	-0.54(.14)	-0.20(.28)	.13***
	Difficulty	1.27	2.42	-0.45(.14)	-0.25(.28)	.14***
	Outcome expectancy	6.45	2.10	-0.65(.14)	0.43(.28)	.15***
	Value congruency	5.29	2.32	-0.38(.14)	0.04(.28)	.19***
	Motivation	5.53	2.67	-0.19(.14)	-0.76(.28)	.10***
	Competence	6.34	2.35	-0.73(.14)	0.28(.28)	.13***
	Autonomy	6.17	2.69	-0.59(.14)	-0.19(.28)	.14***
	Control	5.98	2.44	-0.54(.14)	0.04(.28)	.12***

Sphericity and Homogeneity of Variance-Covariance

I did not examine the assumption of sphericity for the MANOVAs as this assumption is not required for one-way repeated measures MANOVA (O'Brien & Kaiser, 1985). The assumption of homogeneity of variance-covariance matrices was also not examined because when the sample sizes are equal in each level of the independent variable for all dependent variables, this assumption does not need to be tested (Tabachnick & Fidell, 2013). In this study, the sample sizes were the same for the procrastination episodes and last-minute effort episodes for all dependent variables (three emotion factors, overall mood, perceived threat, cognition and motivation dimensions), thereby, passing the assumption of homogeneity of variance-covariance matrices.

Linearity and Multicollinearity

The relation between different pairs of variables during the procrastination episodes and the last-minute effort episodes were examined using scatterplots to check the assumption of linearity. Linearity of all three emotion factors, overall mood, perceived threat, cognitive and motivation dimensions between the procrastination episodes and the last-minute effort episodes showed linear relations to proceed with a MANOVA. Linearity of all emotion factors, overall mood, perceived threat, cognitive appraisal and motivation dimensions were also examined within the procrastination episodes and the last-minute effort episodes and these relations were all linear and therefore, *a priori* pairwise comparisons can be carried out.

Correlations among all variables for each MANOVA model were also calculated which ranged from moderate to large, however the magnitude of these correlations were not greater than 0.9. Thus, multicollinearity was not considered to be an issue in the

present study. Multicollinearity was also checked using the tolerance values and for the variables in each MANOVA model; none of these values were greater than the threshold of 0.1 to suggest multicollinearity. Therefore, MANOVA could be conducted based on this assumption to test the hypotheses of this study.

Examining Preference Reversal using Multivariate Analysis of Variance

I conducted a series of one-way repeated measures MANOVAs to examine changes in the emotion factors, overall mood, perceived threat, cognitive and motivation dimensions during the procrastination episodes and the last-minute effort episodes. In the first hypothesis of Study 3a, I hypothesized that individuals who procrastinate would report mood-repair (elevated positive and reduced negative affect) when they engage in alternate activities [Phase 4] compared to when they attempted their academic task they procrastinated on [Phase 1] within the procrastination episodes, but they would not differ in terms of their positive emotions and negative emotions between the procrastination episodes and the episodes of last-minute efforts. Results of the MANOVA showed a significant difference in the positive emotions (PA-Proc) and negative emotions (FI-Proc and FoF-Proc) across the two phases of the procrastination episodes (when they delayed their academic task vs when they engaged in the alternate tasks) and the last-minute effort episodes (completing the academic task near the deadline), $f = .70$, Wilk's $\lambda = .44$, $F(6, 290) = 98.02$, $p < .001$, partial $\eta^2 = .33$. I followed-up this analysis with a series of *a priori* pairwise comparisons. I used the Bonferroni correction to ensure familywise error rate was restricted to .05. The α used to determine significance for each pairwise comparison was therefore .008 for the six comparisons that were carried out.

Additionally, I placed more emphasis on the effect size[23] for each *a priori* pairwise comparison to account for the possible Type I error rate due to the large sample size that was collected to run a series of MANOVAs in this study.

First, I examined whether mood-repair is evident during the procrastination episodes and whether the result of the Study 2 can be replicated especially between the phases when students attempted their academic task and when students engaged in some alternate activities when they were procrastinating. Similar to Study 2a, students experienced significantly higher level of positive affect, $d = 1.26$, $t(295) = 21.68$, $p < .001$, lower levels of frustration intolerance, $d = 2.02$, $t(295) = 17.32$, $p < .001$, and fear of failure, $d = 1.62$, $t(295) = 13.89$, $p < .001$, when they engaged in alternate activities during the procrastination episodes (Phase 4) compared to when they tried to work on the academic task they found aversive (Phase 1). When positive and negative emotions were compared between the procrastination episodes (i.e., when students tried to work on the academic task [Phase 1]) and last-minute effort episodes (i.e., when they actually engaged in that academic task near the deadline), no significant differences in positive affect, $d = 0$, $t(295) = .34$, $p = .74$, frustration intolerance, $d = .24$, $t(295) = 2.10$, $p = .04$,[24] and fear of failure, $d = .30$, $t(295) = 2.52$, $p = .01$, were found (see Figure 7-1).[14] Again, these results showed support for the mood-repair model during the procrastination episodes indicating an up-regulation of positive emotions and a down-regulation of negative emotions. Students improved their mood by avoiding the unpleasant academic

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[23] Similar to Study 2a, I used Cohen's (1988) conventions in order to interpret the magnitude of the effect sizes for the MANOVA and *a priori* pairwise comparisons where partial $\eta^2 = .01$, partial $\eta^2 = .06$ and partial $\eta^2 = .14$ were considered small, medium and large, respectively, and $d = .2$, $d = .5$ and $d = .8$ were considered small, medium and large, respectively.

[24] Significance was assessed using Bonferroni corrected per-comparison $\alpha = .008$ to control for family-wise error rate to 5% over the family of 6 tests.

task and engaging in more pleasant activities instead. The effect sizes were also found to be large for these results. As predicted, no differences in positive or negative emotions were found when students tried to work on their academic task during the procrastination episodes versus when they actually worked on the academic task closer to the deadline during the last-minute effort episodes. The means and standard deviations of the three emotion factors are presented in Table 7-4.

Table 7-4

Means and Standard Deviations for the Three Factors of Emotions, Overall Mood and Perceived Threat during the Two Phases of Procrastination Episodes and the One Phase of Last-Minute Effort Episodes

Episodes	Variables	FI-Proc		FoF-Proc		PA-Proc		Overall Mood		Perceived Threat	
		M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Procrastination episodes	Attempted to work the academic task (Phase 1)	5.43	2.45	6.18	2.68	2.39	2.09	4.06	2.11	6.16	2.94
	Engaged in alternate tasks (Phase 4)	2.54	2.50	3.88	2.79	6.10	2.37	-	-	-	-
Last Minute Effort Episodes	Completed the academic task near the deadlines	5.71	2.63	6.51	2.68	2.44	2.16	5.15	2.44	6.53	2.77

Note. FI-Proc = Frustration Intolerance during Procrastination; *FoF-Proc* = Fear of Failure during Procrastination; and *PA-Proc* = Positive Affect during Procrastination.

Figure 7-1

Mean (A) Positive Affect, (B) Frustration Intolerance and (C) Fear of Failure during the Two Momentary Phases of the Procrastination Episodes and the Last-Minute Effort Episodes

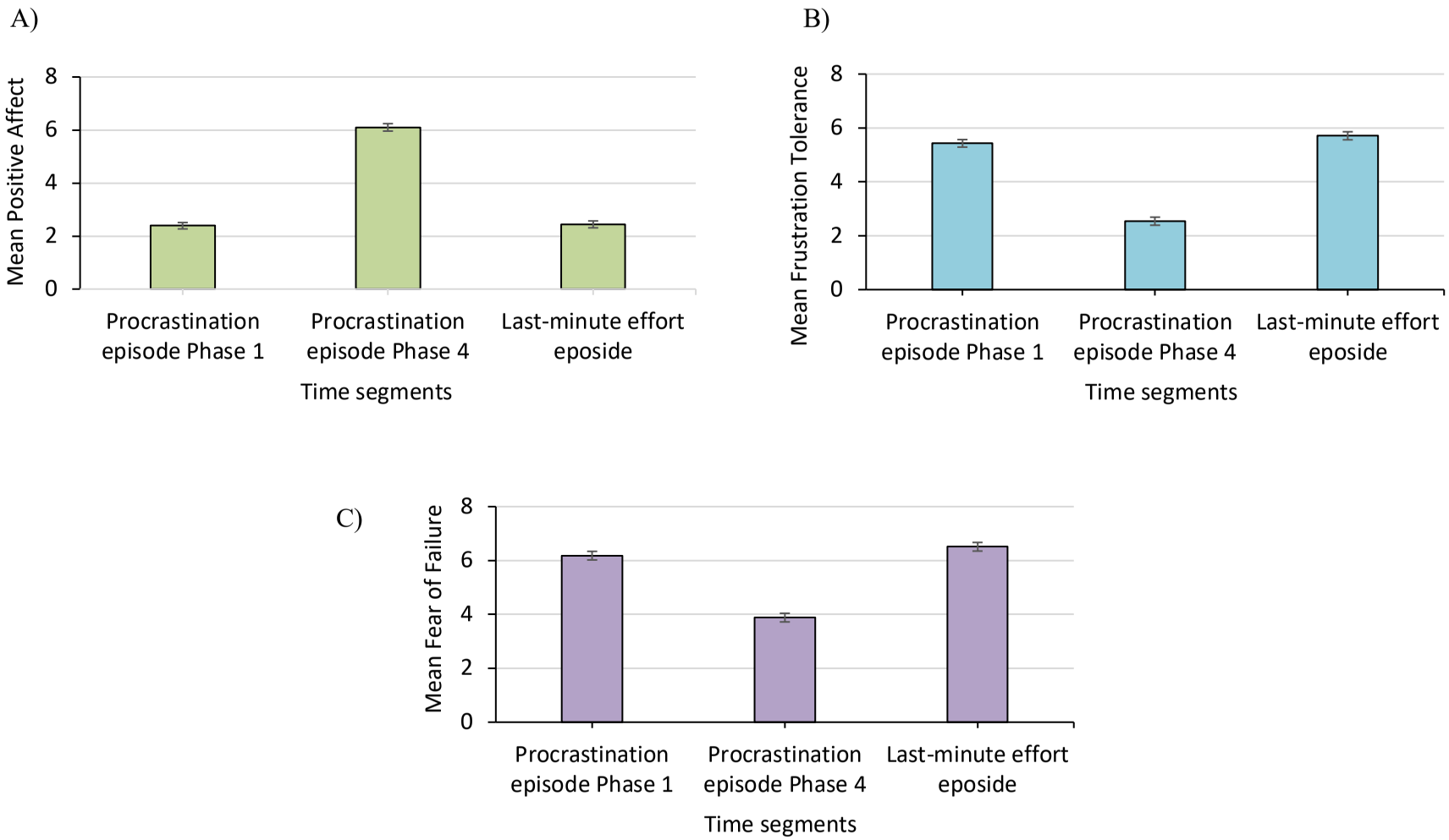
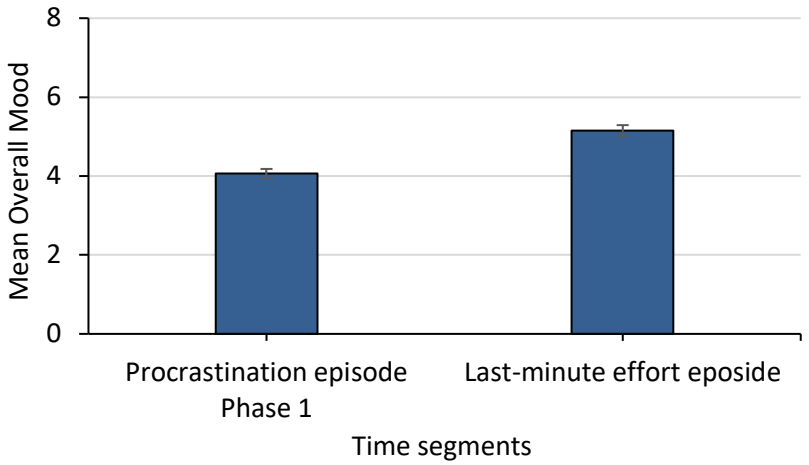


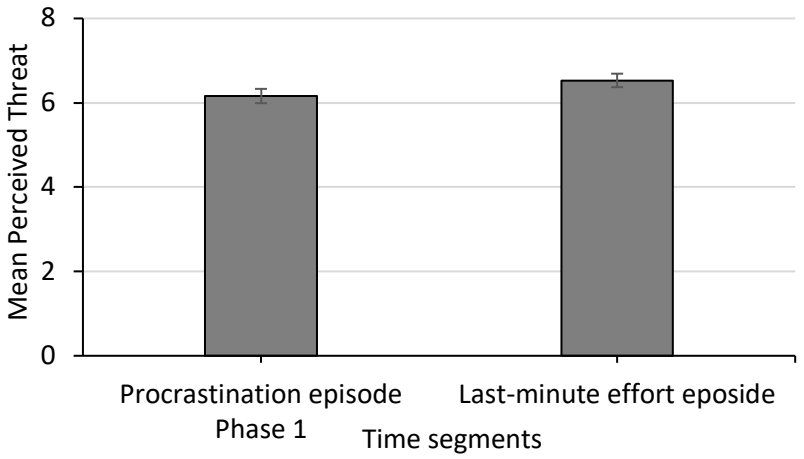
Figure 7-2

Mean (A) Overall Mood and (B) Perceived Threat during the Procrastination Episodes and the Last-Minute Effort Episodes

A)



B)



I ran a MANOVA to investigate whether students' overall mood and their perception of deadlines as a threat alter between the procrastination episodes and the last-minute-effort episodes. I specifically hypothesized that individuals who procrastinate would not differ in their overall mood during the procrastination episodes and the last-minutes effort episodes, but they would differ in perceived threat due to approaching deadlines of academic tasks between the procrastination episodes and the episodes of last-minute efforts. Given that the independent variable has two levels, Hotelling's Trace was used to test the overall effect of time segments on mood and perceived threat dimensions. Results of the one-way repeated measures MANOVA showed that overall mood and perception of threat significantly differed between the procrastination episodes and the last-minute effort episodes, $f = .44$, Hotelling's Trace = .19, $F(2, 294) = 27.16$, $p < .001$, partial $\eta^2 = .16$. This significant difference observed in mood and perceived threat between the two time-segments was probed with two *a priori* pairwise comparisons. Again, a Bonferroni correction was applied to keep the familywise error rate at $\alpha = .05$. The per-comparison Type I error rate, therefore, was set to .025 for the two comparisons. All *p*-values were compared against .025. Consistent with my hypothesis, students reported significantly more threat during the last-minute effort episodes compared to the procrastination episodes, $d = .29$, $t(295) = 2.35$, $p = .02$, with almost a moderate effect size. However, contrary to my hypothesis, they also reported having significantly better mood overall when they attempted the academic task during the last-minute effort episodes compared when they attempted the task during the procrastination episodes, $d = .78$, $t(295) = 6.64$, $p < .001$ and revealed close to a large effect size (see Table 7-4 & Figure 7-2). Overall, my results showed that students do feel more threatened closer to

the deadlines compared to when they have more time to complete the task during the procrastination episodes. Despite feeling threatened, students experience an improved mood closer to the deadline when they start to work on the academic task compared to when they procrastinate.

It will be recalled that students who provided a score of 6 or higher on the "threat" scale during the procrastination episodes were asked to indicate whether they felt threatened for not completing the academic task during the procrastination episodes. They chose the reasons for feeling threatened from a pre-set list that was provided to them (e.g., fear of failing, having poor academic performance, withdrawal from the course, financial penalty of not completing the academic task or repeating the course, fear of negative evaluation by close others, or other explanations). Results showed that 196 students (66%) from the total sample of 296 students reported feeling threatened during the procrastination episodes and despite feeling threatened, they procrastinated on their academic tasks. The top two reasons students provided for feeling threatened during the procrastination episodes were having poor academic performance and fear of failing. Students were also asked to answer this same question during the last-minute efforts episodes when they started working on the academic tasks closer to the deadlines. Again, students who rated a threat level of 6 or higher were asked to answer this question. A total of 210 students of the total sample of 296 students reported feeling threatened and they noted that the same two reasons compelled them to start working on their academic task near the deadlines, that is, poor academic performance followed by fear of failing (see Table 7-5).

Table 7-5

Number of students endorsing different reasons for feeling threatened during the procrastination episode and the last-minute effort episodes

Reasons for feeling threatened	Threats endorsed during the procrastination episodes		Threats endorsed during the last-minute effort episodes	
	n	%	*n*	%
Having poor performance	100	33.8%	111	37.5%
Fear of failing	63	21.3%	75	25.3%
Fear of negative evaluation by parents or important others	19	6.4%	12	4.1%
Withdrawal from the course	3	1.0%	0	0.0%
Financial penalty of repeating the academic course	3	1.0%	3	1.0%
Financial penalty of not completing the academic task	2	0.7%	3	1.0%
Other reasons	6	2.0%	6	2.0%

Note. Among "other" option students included losing scholarship or co-op placements, and not graduating as their reasons for feeling threatened.

Another one-way repeated measures MANOVA was conducted to investigate whether cognitive appraisals of academic tasks differed between the procrastination episodes and the last-minute effort episodes, and within the procrastination episodes whether appraisal of academic tasks differed from that of alternate tasks. I expected that individuals who procrastinate would appraise their academic tasks to be less difficult and less challenging with better outcomes once they engage in the tasks compared to the procrastination episodes. However, their appraisal ratings of how important and value congruent the academic tasks are would not change between the procrastination episodes and the episodes of last-minute efforts. I also hypothesized that students would appraise their academic task as more important and value congruent but more difficult and challenging and having poor outcomes than the alternate task they engaged in during the procrastination episodes. Results of the MANOVA revealed significant differences among these appraisal dimensions, importance, difficulty, challenge, value congruency and outcome expectancy, across the two phases of the procrastination episodes (when engaging in academic tasks vs when engaging in alternate activities) and the last-minute effort episodes, $f = .82$, Wilks' $\lambda = .37$, $F(10, 285) = 76.37$, $p < .001$, partial $\eta^2 = .40$.

I carried out ten *a priori* pairwise comparisons to examine my specific hypotheses. To control familywise error rate at $\alpha = .05$, the per-comparison error rate was set at .005 for the ten comparisons using Bonferroni correction. The *p*-value of each comparison was compared to .005 to determine significance. When the dimensions challenge, difficulty and outcome of academic tasks were compared between the procrastination episodes and the last-minute effort episodes, contrary to my hypothesis, students did not appraise their academic tasks differently in terms of challenge, $d = .02$,

$t(294) = 1.68$, $p = .09$, difficulty, $d = .02$, $t(294) = 1.46$, $p = .15$, and outcomes of the academic task, $d = .16$, $t(294) = 1.33$, $p = .18$, between the two time segments. However, they reported that it was significantly more important to take action on the academic tasks near the deadlines compared to when they were procrastinating, $d = .28$, $t(294) = 2.99$, $p = .003$. The differences in mean value congruency between the two time segments did not reach significance, $t(294) = 2.68$, $p = .008$. See Table 7-6 for all means and standard deviations.

It is important to note that students perceived the dimension of importance differently which was discovered during the interview session. Although the original question asked was "How important is this academic task" which was asked once for the procrastination episodes and once for the last-minute effort episodes, students understood this question as how important it was to work on this academic task in those two time segments. Similarly, students may have misconstrued the question on value congruency as value of working on the task when they were procrastinating and near the deadlines instead of whether the academic task was consistent with the values that guided their life. Given this difference in interpretation I relied more on the answers provided during the interview session to understand the appraisal of academic tasks on importance and value congruency dimensions.

Next, the same five dimensions were examined using *a priori* pairwise comparisons within the procrastination episodes to understand whether academic tasks students procrastinated on and the alternate activities they carried out when they procrastinated were appraised differently. As hypothesized, students appraised their academic task to be more challenging, $d = 2.36$, $t(294) = 20.12$, $p < .001$, and difficult, d

= 2.50, $t(294) = 21.28$, $p < .001$, than the alternate activities they noted, but they think working on the academic task can result in more positive outcome than engaging in alternate activities which did not support my hypothesis, $d = .80$, $t(294) = 6.43$, $p < .001$. Whereas students appraised that it was more important to work on their academic task than their alternate activities, $d = 2.00$, $t(294) = 17.10$, $p < .001$, and students did not think that the academic task they procrastinated on to be more value congruent than their alternate activities, $d = .20$, $t(294) = 1.82$, $p < .001$ (see Table 7-6 & Figure 7-3).

Table 7-6
Means and Standard Deviations for the Cognitive Appraisal Dimensions during the Two Phases of Procrastination Episodes and the One Phase of Last-Minute Effort Episodes

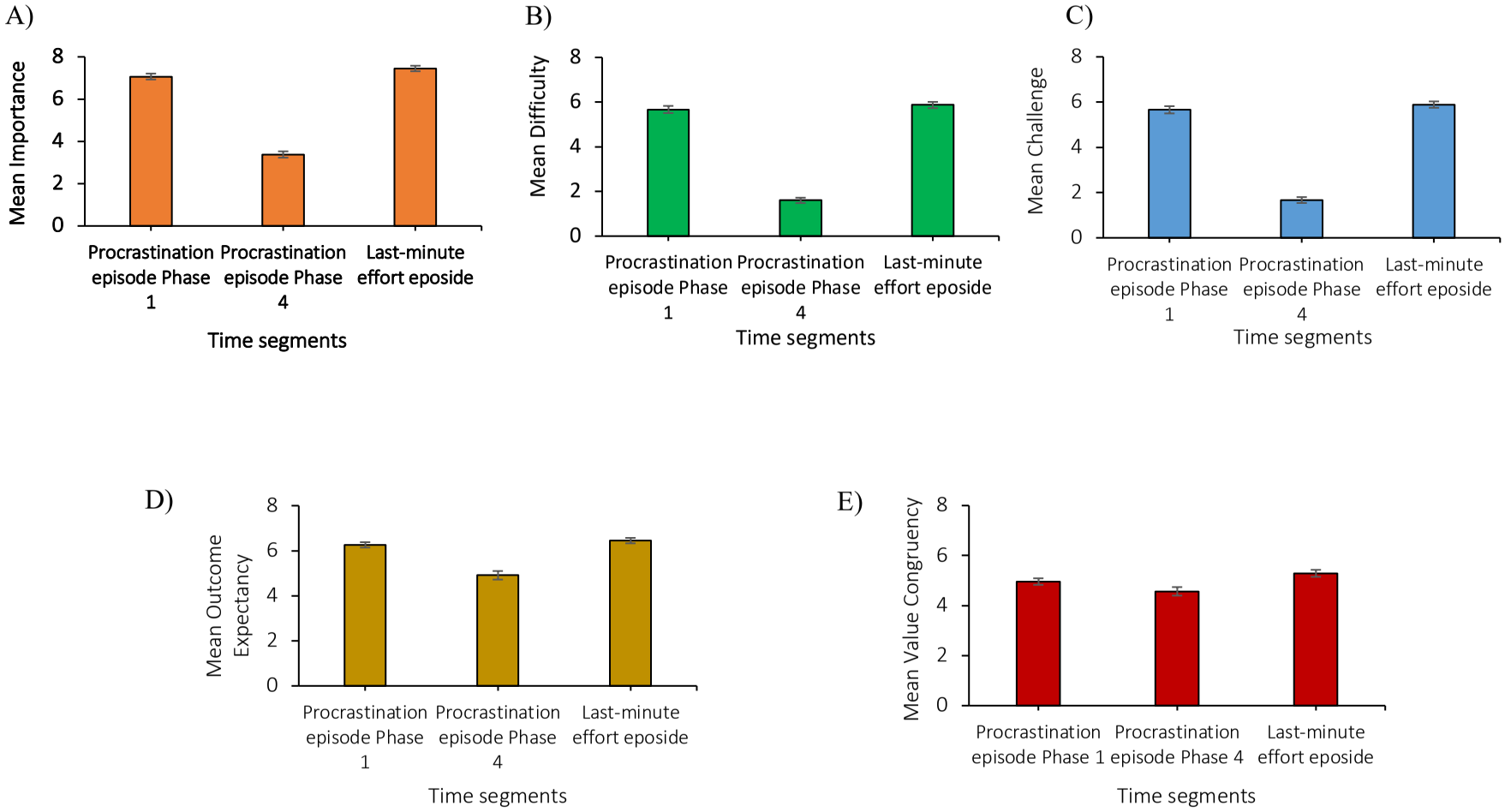
Time segments	Phases	Importance		Difficulty		Challenge		Outcome Expectancy		Value Congruency	
		M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Procrastination episodes	Attempted to work on the academic task (Phase 1)	7.07	2.39	5.67	2.66	5.66	2.77	6.26	2.12	4.96	2.24
	Engaged in alternate tasks (Phase 4)	3.38	2.60	1.60	2.07	1.67	2.15	4.91	3.18	4.57	2.83
Last Minute Effort Episodes	Completed the academic task near the deadlines	7.45	2.22	5.87	2.42	5.89	2.45	6.45	2.10	5.29	2.32

Table 7-7
Means and Standard Deviations for the Motivation Dimensions during the Two Phases of Procrastination Episodes and the One Phase of Last-Minute Effort Episodes

Time segments	Phases	Motivation		Autonomy		Competence		Control	
		M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Procrastination episodes	Attempted to work on the academic task (Phase 1)	3.51	2.33	5.34	2.58	6.03	2.42	5.45	2.36
	Engaged in alternate tasks (Phase 4)	6.04	2.85	6.83	2.97	6.50	3.00	6.49	2.84
Last Minute Effort Episodes	Completed the academic task near the deadlines	5.53	2.66	6.17	2.59	6.34	2.35	5.98	2.43

Figure 7-3

Mean (A) Importance, (B) Difficulty, (C) Challenge, D) Outcome Expectancy and E) Value Congruency during the Two Momentary Phases of the Procrastination Episodes and the Last-Minute Effort Episodes



Lastly, in a separate MANOVA, I examined whether students differ in their level of motivation, control, competence, and autonomy to carry out the academic task between the procrastination episodes and the last-minute effort episodes and within the procrastination episodes. I also examined whether appraisal of the academic tasks differ from that of alternate tasks they engaged in when they procrastinated. I expected that motivation to engage in academic tasks would be greater closer to the deadline compared to the procrastination episodes. I also expected that students would report less autonomy, competence and control over their academic projects during the procrastination episodes compared to the episodes of last-minute efforts. Additionally, they would report to have significantly less motivation, control, autonomy and competence to work on their academic task compared to the alternate activities they engaged in to repair their mood during the procrastination episodes. A significant difference in motivation, control, competence, and autonomy was found between the two phases of procrastination episodes and the last-minute effort episodes, $f = .40$, Wilks' $\lambda = .74$, $F(8, 292) = 23.38$, $p < .001$, partial $\eta^2 = .14$.

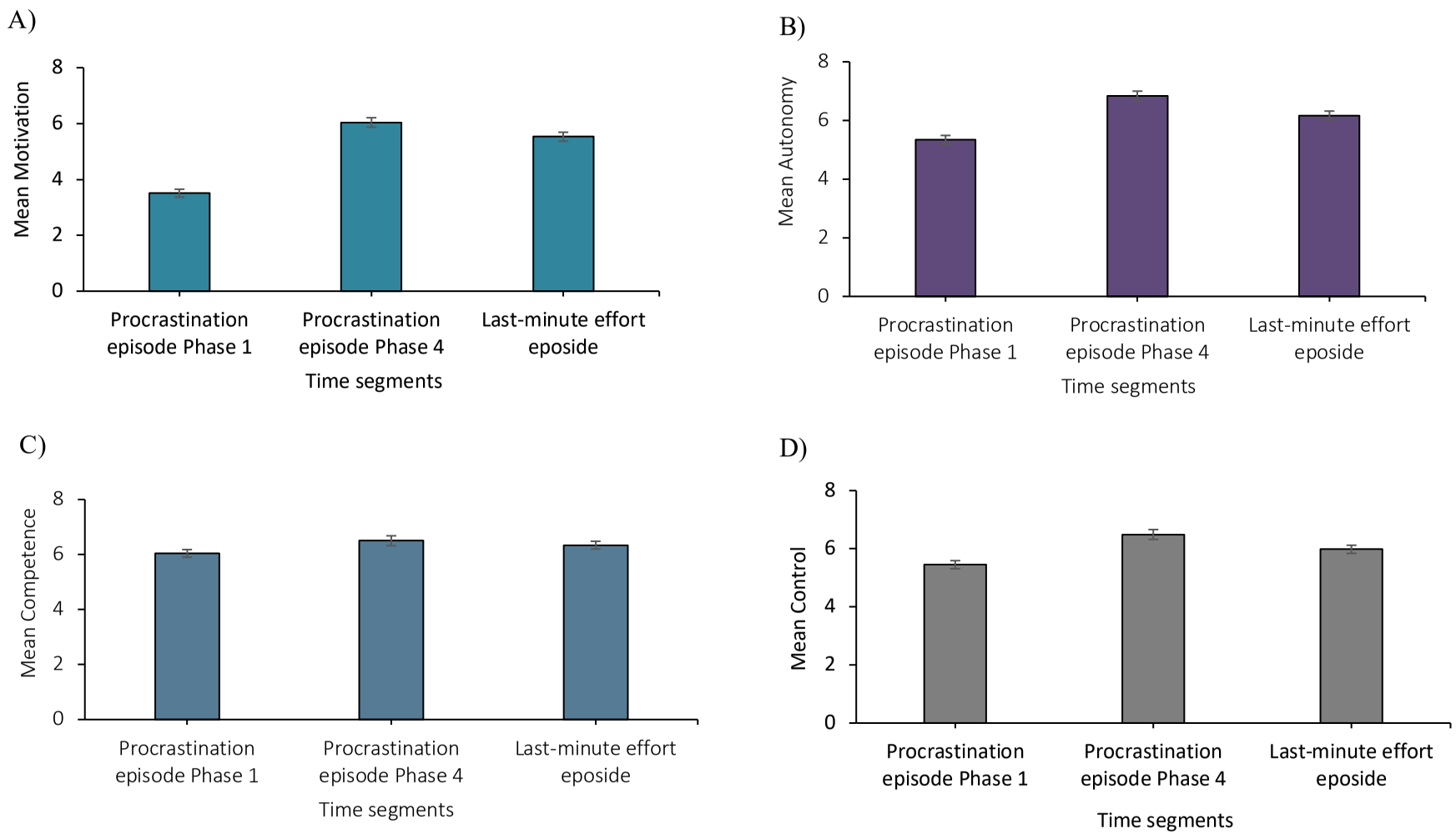
This finding was followed-up with eight *a priori* pairwise comparisons to examine my specific hypotheses. Again, the familywise error rate required to be $\alpha = .05$ which resulted in the per-comparison Type I error rate to be .006 for the eight comparisons using a Bonferroni correction. The *p*-values of all pairwise comparisons were compared against .006 per-comparison error rate to determine significance. Results revealed that students were more motivated to complete the academic task, $d = 1.38$, $t(294) = 11.69$, $p < .001$, felt more in control of their academic task, $d = .40$, $t(294) = 3.45$, $p = .001$, and experienced more autonomy to complete their academic task, $d = .62$,

$t(294) = 5.48$, $p < .001$, during the last-minute effort episodes compared to the procrastination episodes. However, their level of competence to do the academic task did not differ between these two time segments, $d = .22$, $t(294) = 2.00$, $p = .05$. Thus, my hypotheses were partially supported.

Within the two phases of procrastination episodes, attempting to do the academic task and engaging in alternate activities, students reported having significantly less motivation, $d = 1.34$, $t(294) = 11.50$, $p < .001$, less control, $d = .58$, $t(294) = 5.13$, $p < .001$, and less autonomy, $d = .80$, $t(294) = 6.85$, $p < .001$, to do the academic tasks compared to the alternate activities. Surprisingly, no significant difference in competence to carry out the academic task or alternate activities was found, $d = .28$, $t(294) = 2.44$, $p = .02$ (see Table 7-7 & Figure 7-4 presented above).

Figure 7-4

Mean (A) Motivation, (B) Autonomy, (C) Competence, and D) Control during the Two Momentary Phases of the Procrastination Episodes and the Last-Minute Effort Episodes



Gender Differences in Emotions, Cognitive Appraisals and Motivations

The effect of gender on the results were examined in this study. Again, a series of mixed ANOVAs were run instead of MANOVAs because of an unbalanced design (n_{men} = 68; n_{women} = 227). As explained in Study 2a, MANOVA is less powerful when the sample size is unequal between groups and therefore, ANOVA is preferred over MANOVA in such cases (Field, 2018; Tabchnick& Fidell, 2013). All assumptions of mixed ANOVA were checked prior to conducting the analyses. The assumption of normality was examined for all variables (positive and negative emotions, overall mood, perceived threat, cognitive appraisals of tasks, motivation dimensions) between the two segments of time (procrastination episodes and last-minute effort episodes) using Q-Q plots. Data for all variables showed a similar level of skew and kurtosis in the distributions for both genders and the level of skew and kurtosis were identical to the distributions of emotion, overall mood, perceived threat, cognitive appraisal, and motivations described in the assumptions section of this study. I also examined the normality of residuals for each gender. This was accomplished by plotting observed standardized residuals of each variable against their expected standardized residuals using Q-Q plot and the distributions of residuals did not deviate much from a normal distribution for these variables passing the normality assumptions. Also, the univariate and multivariate outliers detected were kept in the analyses as removing them did not change the results. Again, the test of sphericity did not pass for any of the two-way mixed ANOVAs and so I reported the Huynh-Feldt estimate. This is because the Greenhouse-Geisser estimates for each of these analyses were greater than .75 which would make the

results too conservative. Huynh-Feldt is a better alternative in this case. Lastly, Levene's test of homogeneity of variance passed for all variables.

I ran three separate 2 (gender) x 3 (two time-segments with three phases)[25] ANOVAs for each of the positive (positive affect during procrastination [PA-Proc]) and negative emotions (Frustration Intolerance [FI-Proc] and Fear of Failure [FoF-Proc]). Results showed significant main effects of time segments,[26] $f = 0.87$, $F(1.77, 517.68) = 217.17$, $p < .001$, partial $\eta^2 = .43$, and gender, $f = 0.10$, $F(1, 293) = 4.73$, $p = .03$, partial $\eta^2 = .01$, but no significant gender interactions for PA-Proc, $p > .05$. In the main effect of gender, men showed more positive affect than women. For the negative emotion factor, FI-Proc, the result showed a significant main effect of time segments, $f = 0.69$, $F(1.76, 515.75) = 141.01$, $p < .001$, partial $\eta^2 = .32$ and a significant gender x time segments interaction, $f = 0.10$, $F(1.76, 515.75) = 4.16$, $p = .02$, partial $\eta^2 = .01$, but no main effect of gender, $p > .05$. This interaction showed that women experienced more frustration intolerance than their men counterparts when they attempted the academic task during procrastination episodes, but they experienced less frustration intolerance compared to men when engaged in alternate activities during the procrastination episodes. However, when simple effects of gender on FI-Proc were run on each phase of the time segment, results indicated non-significance, $p > .05$. For FoF-Proc, results were similar to positive affect where there is a significant main effect of time segments, $f = 0.58$, $F(1.75, 513.87) = 99.22$, $p < .001$, partial $\eta^2 = .25$, and a main effect gender, $f = 0.20$, $F(1, 293) = 10.79$, p

[25] Two phases of procrastination episodes (when students attempted the academic tasks and when they engaged in alternate activities) and one phase of last-minute effort episodes (when they started working on academic task near the deadlines)

[26] The main effect of time segments for any of the variables were not interpreted here as they revealed the same results as demonstrated in the MANOVAs and *a priori* pairwise comparisons.

= .001, partial η^2 = .04, but no significant gender x time segments interaction, $p > .05$ (see Table 7-7 & Figure 7-5). In this case, women reported experiencing significantly more fear of failure than men. The significant main effects of gender for PA-Proc and FoF-Proc has to be interpreted with caution as the partial η^2 for these main effects are small ranging from .01 to .04 indicating small effect sizes. The large sample size may have resulted in a Type I error due to too much power. Thus, effect sizes have to be taken into consideration to interpret these results.

Table 7-8

Means and Standard Deviations for the Three Factors of Emotions, Overall Mood and Perceived Threat by Gender during the Two Phases of Procrastination Episodes and the One Phase of Last-Minute Effort Episodes

Time segments	Phases	Gender	FI-Proc		FoF-Proc		PA-Proc		Overall Mood		Perceived Threat	
			M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Procrastination episodes	Attempted to work on the academic task (Phase 1)	Men	4.95	2.58	5.16	2.67	3.02	2.10	4.57	2.08	5.62	2.87
		Women	5.59	2.39	6.49	2.61	2.20	2.06	3.88	2.08	6.32	2.94
Procrastination episodes	Engaged in alternate tasks (Phase 4)	Men	2.90	2.51	3.39	2.47	6.22	2.53	-	-	-	-
		Women	2.43	2.50	4.03	2.88	6.07	2.33	-	-	-	-
Last-minute effort episodes	Completed the academic task near the deadlines	Men	5.55	2.74	5.79	2.71	2.69	2.23	5.06	2.34	6.16	2.84
		Women	5.78	2.60	6.74	2.62	2.35	2.14	5.16	2.47	6.65	2.75

Figure 7-5

Mean (A) Positive Affect, (B) Frustration Intolerance and (C) Fear of Failure by Gender during the Two Momentary Phases of the Procrastination Episodes and the Last-Minute Effort Episodes

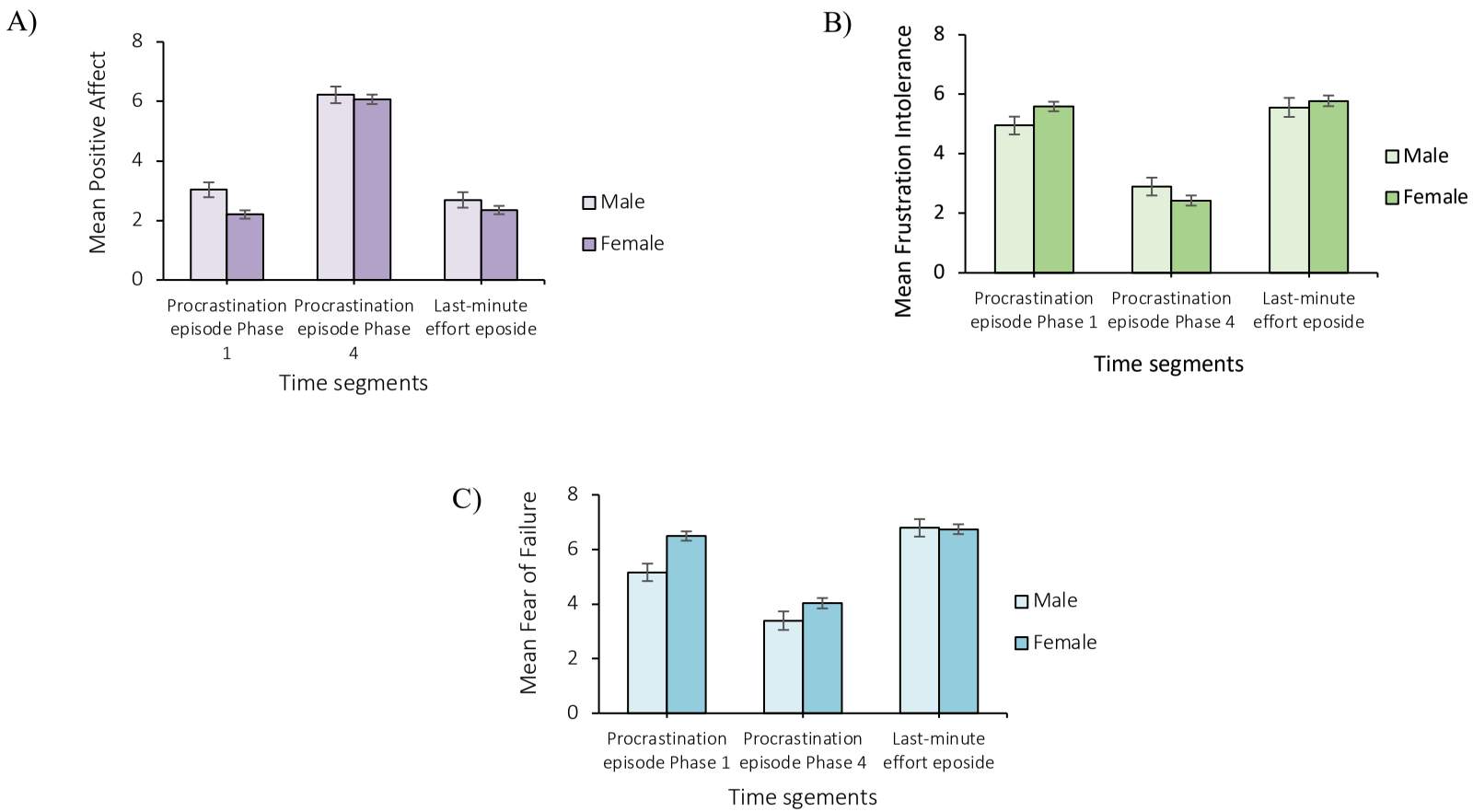
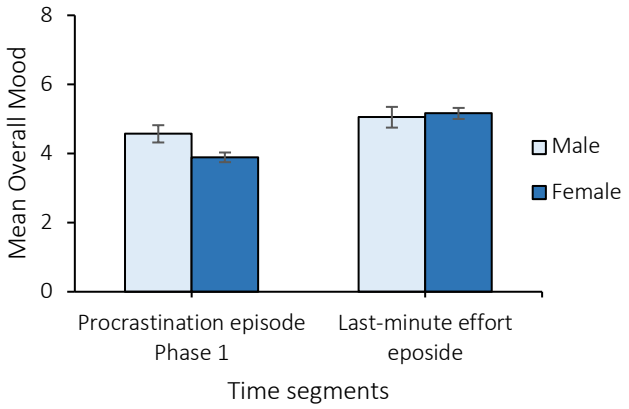


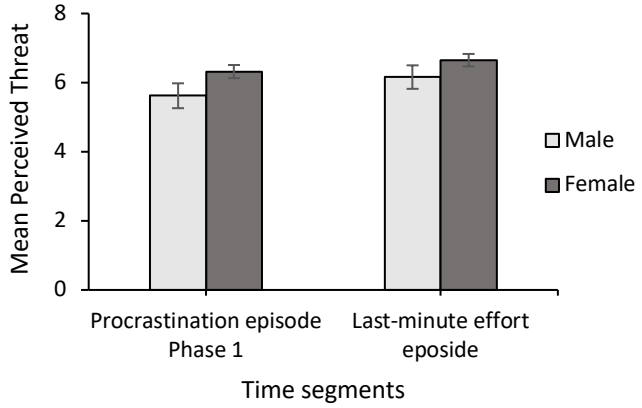
Figure 7-6

Mean (A) Overall Mood and (B) Perceived Threat by Gender during the Procrastination Episodes and the Last-Minute Effort Episodes

A)



B)



Next, a series of 2 (gender) x 2 (time segment[27]) mixed factorial ANOVAs were carried out for the overall mood and perceived threat dimensions. Results showed that there was a significant main effect of time segment, $f = 0.30$, $F(1, 293) = 20.51$, $p < .001$, partial $\eta^2 = .07$, and a significant gender x time segment interaction, $f = 0.10$, $F(1, 293) = 4.14$, $p = .04$, partial $\eta^2 = .01$, but no significant main effect of gender on overall mood, $p > .05$. Following up the interaction with a simple effect analysis revealed that men experienced greater overall mood than women during the procrastination episodes, $f = 0.10$, $F(1, 293) = 5.71$, $p = .02$, partial $\eta^2 = .01$, but this distinction was not apparent during the last-minute efforts episodes, $p > .05$ (see Table 7-9 & Figure 7-6). For perceived threat, results of the 2 (gender) x 2 (time segment) mixed factorial ANOVA showed no significant main effect of gender or gender x time segments, $p > .05$. Only the main effect of time segments was significant, consistent with the findings from the pairwise comparison reported in the previous section, $f = 0.14$, $F(1, 293) = 5.33$, $p = .02$, partial $\eta^2 = .02$, (see Table 7-9 & Figure 7-6).

Next, a series of 2 (gender) x 3 (time segment[28]) mixed ANOVAs were carried out for the cognitive appraisal of tasks dimensions (importance, challenge, difficulty, outcome expectancy and value congruency; see Table 7-10 & Figure 7-7) and the motivation dimensions (motivation, control, autonomy and competence; see Table 7-11 & Figure 7-8). All results showed only a significant main effect of time segments, $p < .05$ with magnitudes of effect size ranging between small to large but no significant main effect of gender or gender x time segment interaction for any of these variables, $p > .05$.

[27] Procrastination episodes and last-minute effort episodes
[28] Two phases of procrastination episodes (Phase 1 & Phase 4) and one phase of last-minute effort episodes.

The only exception was the dimension challenge where a significant gender x time segments interaction was detected but with a small effect, $f = 0.10$, $F(1.76, 514.78) = 3.89$, $p = .03$, partial $\eta^2 = .01$. However, when simple effects of gender for challenge dimension for the differences in time segments were investigated, none of these effects were significant.

Table 7-9

Means and Standard Deviations for the Cognitive Appraisal Dimensions by Gender during the Two Phases of Procrastination Episodes and the One Phase of Last-Minute Effort Episodes

Time segments	Phases	Gender	Importance		Difficulty		Challenging		Outcome Expectancy		Value Congruency	
			M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Procrastination episodes	Attempted to work on the academic task (Phase 1)	Men	6.51	2.71	5.37	2.76	5.35	2.70	6.35	2.35	4.69	2.40
		Women	7.23	2.27	5.76	2.63	5.76	2.79	6.22	2.06	5.05	2.17
Procrastination episodes	Engaged in alternate tasks (Phase 4)	Men	3.49	2.71	1.81	1.96	2.04	2.21	5.26	3.24	5.04	2.99
		Women	3.35	2.57	1.54	2.10	1.55	2.13	4.78	3.15	4.42	2.77
Last-minute effort episodes	Completed the academic task near the deadlines	Men	7.07	2.66	5.46	2.49	5.44	2.56	6.87	1.84	5.39	2.48
		Women	7.56	2.06	5.99	2.40	6.04	2.40	6.32	2.15	5.26	2.27

Table 7-10

Means and Standard Deviations for the Motivation Dimensions by Gender during the Two Phases of Procrastination Episodes and the One Phase of Last-Minute Effort Episodes

Time segments	Phases	Gender	Motivation		Autonomy		Competence		Control	
			M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Procrastination episodes	Attempted to work on the academic task (Phase 1)	Men	3.75	2.53	5.54	2.72	6.38	2.63	5.44	2.54
		Women	3.42	2.27	5.26	2.53	5.93	2.34	5.44	2.31
Procrastination episodes	Engaged in alternate tasks (Phase 4)	Men	6.43	2.52	6.88	2.87	6.81	2.86	6.60	2.76
		Women	5.93	2.94	6.80	3.01	6.40	3.06	6.45	2.88
Last-minute effort episodes	Completed the academic task near the deadlines	Men	5.46	2.68	6.12	2.77	6.59	2.29	6.18	2.59
		Women	5.55	2.66	6.18	2.54	6.26	2.37	5.91	2.39

Figure 7-7

Mean (A) Importance, (B) Difficulty, (C) Challenge, D) Outcome Expectancy and E) Value Congruency by Gender during the Two Momentary Phases of the Procrastination Episodes and the Last-Minute Effort Episodes

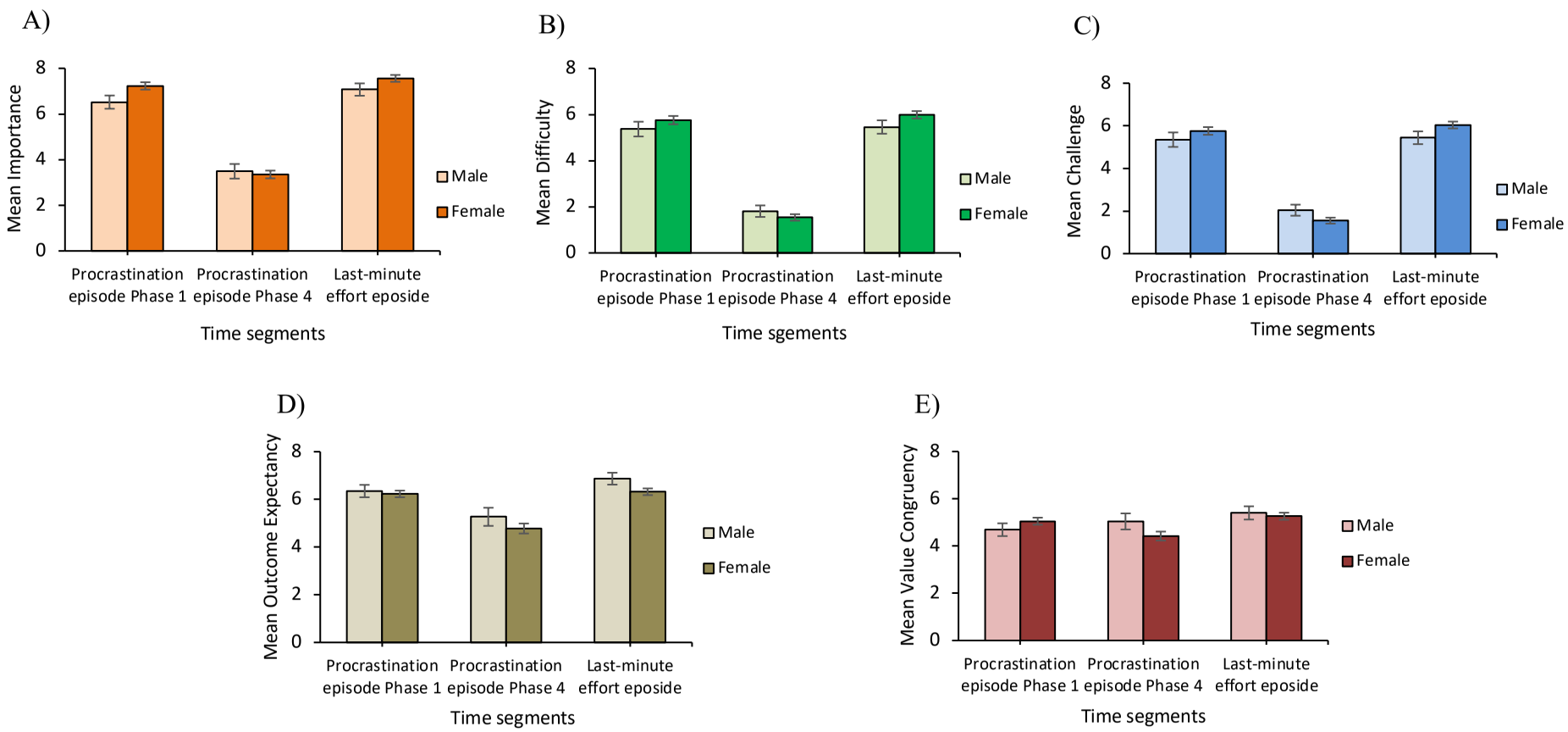
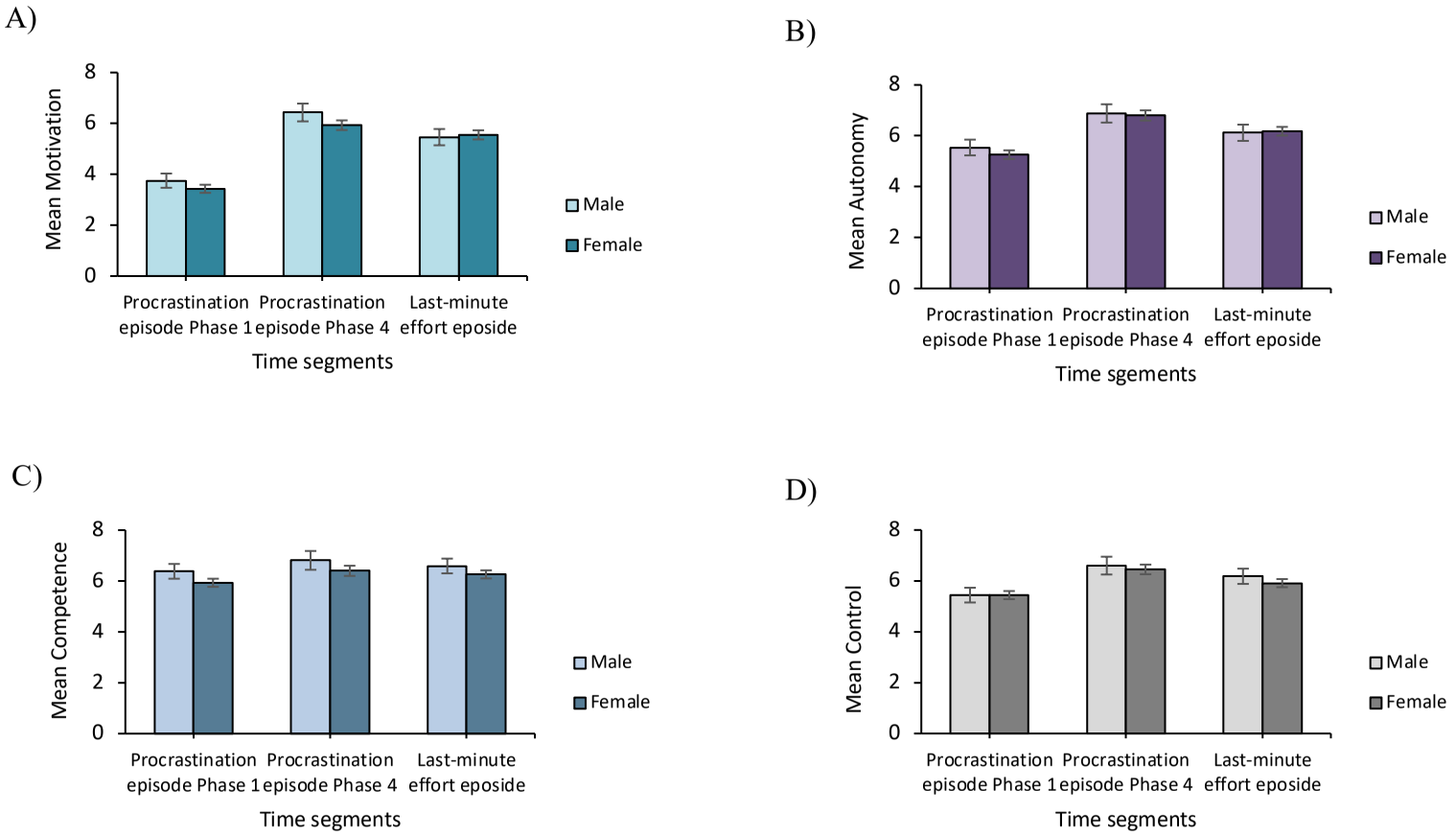


Figure 7-8

Mean (A) Motivation, (B) Autonomy, (C) Competence, and D) Control by Gender during the Two Momentary Phases of the Procrastination Episodes and the Last-Minute Effort Episodes



Study 3a: Summary

The main goal of this study was to examine preference reversal in procrastination, that is, why students decide to start working on their academic tasks closer to the deadline following a prolonged period of inactions during procrastination. In addition to replicating the mood-repair model, I investigated whether students perceive their academic deadlines as signalling a threat near the deadlines. As discussed previously, two time segments were included in this study – the procrastination episodes and the last-minute effort episodes. The procrastination episodes included two of the momentary phases from study 2a, that is, when students attempted to engage in the academic tasks they procrastinated on and when they engaged in alternate activities instead of working on their academic tasks. The last-minute effort episodes included only one phase, that is, when students started working on their academic tasks. The level of threat was assessed between the procrastination episodes and the last-minute effort episodes closer to the deadline and mood-repair was assessed within the two phases of the procrastination episodes.

Results showed that students perceive their academic deadlines as a threat closer to the deadlines. However, this level of threat was perceived at a lesser extent when they were avoiding the unpleasant academic task. The most prominent reasons reported for feeling threatened were that they were concerned about poor academic performance as well as they were fearful of failing. It seems students perceive the repercussions of not taking any actions as quite threatening which reinforces them to take actions near the deadlines. During procrastination episodes students can afford to avoid the academic task, but closer to the deadline they do not have the choice but to work on the academic

task as they feel heightened levels of threat by the looming deadline. The actions taken to complete the academic tasks are to avoid these negative consequences. A better understanding of why students who procrastinate perceive their academic deadlines as a threat can be obtained from students' narratives during the semi-structured interview which I discuss in the following section.

The assumptions of the temporal mood-repair model were examined by comparing two of the phases from Study 2a, Phase 1 and Phase 4, and findings of study 2a. The results replicate the previous study showing that students experienced elevated positive affect and reduced frustration intolerance and fear of failure when they engaged in alternate activities as opposed to when they attempted to do the academic task during the procrastination episodes. Students do experience a temporary relief when they avoid the aversive academic task and do something more pleasant. However, students' experience of positive and negative emotions did not differ between the procrastination episodes and the last-minute effort episodes as expected. This result is similar to the findings by Blunt and Pychyl (2000). That is, students continue to find their academic tasks as aversive across all stages of procrastination. Although students' positive and negative emotions did not change, students' overall mood was better closer to the deadline than when they attempted the task during the procrastination episodes. As we will see in the next section, students' explanations during the interview session provide a better insight into why their mood improved after beginning to work on their academic tasks near the deadlines.

When cognitive appraisals of the academic tasks were examined, students' appraisal of their academic tasks in terms of difficulty, challenge and outcome

expectancy (likelihood of success) did not differ when they thought of working on the academic task but procrastinated and when they actually worked on the academic task near the deadline. This result did not support my hypothesis as I had predicted based on previous study findings (e.g., Pychyl et al., 2000) that students would find their academic task less difficult and challenging and think that they are more likely to succeed in their academic tasks once they start working on the task in the last-minute effort episodes. It is possible that students continue to find their academic task difficult because they have increased time pressure or even insufficient time to do a good job.

Students' report of their value of working on the academic task did not change between the procrastination episodes and the last-minute effort episodes, but they reported that it was more important to work on the academic task when the deadline was very close compared to when they were procrastinating. Although students appraised their academic tasks as equally difficult and challenging during the episodes of procrastination and last-minute efforts, they reported experiencing more autonomy and control when they were working on the academic tasks near the deadline than when they thought of working on the academic tasks but chose to needlessly delay the task. These results are similar to findings by Pychyl and colleagues (2000), implying that even though students continue to find their academic tasks aversive, once they start working on the academic tasks, they feel more under control and feel that they can work on their academic task on their own volition. Despite the aversive feeling towards academic tasks, students' perception of their level of competence to work on the academic task remained the same when they attempted the academic task during the procrastination episodes and when they put effort to complete the academic task to meet the deadline. In fact, they also

reported having similar levels of competence to carry out the academic task and the alternate activities. Furthermore, between the academic tasks and the alternate activities, students reported experiencing less autonomy and low control to carry out the academic task compared to the alternate activities.

Most importantly, students reported that they were less motivated to work on the academic task compared to the alternate activities during the procrastination episodes but this motivation increased as the deadline approached. This higher level of motivation may have stemmed from the increased level of threat they reported experiencing near the deadline such as fear of failing, poor academic performance, financial penalty. I had speculated that to eliminate this perceived threat, students become more inclined to work on the academic task when the deadline is very close. While evidence from the quantitative approach support this prediction to an extent, the nuances and the details related to preference reversal in procrastination was uncovered during the interview sessions.

The results obtained from the nomothetic analyses provided some understanding of why students become more motivated to work on their academic task, but I relied on the idiographic approach again as this approach provided an advantage over nomothetic approach to gain further insights into why students perceive deadlines as a threat or why they appraise their academic tasks in the way they reported in this study. In the final section of this chapter, I discuss the qualitative analyses I conducted to understand the role of affect and cognition in preference reversal in procrastination.

Affective and Cognitive Appraisals during Preference Reversal in Procrastination using Qualitative Analysis

Study 3b: Method

Participants

A total of 10 students were selected from the quantitative study (Study 3a) who were interviewed in-person for the qualitative study. Similar to Study 2b, the same criterion of mean scores above 3.61 for task specific procrastination behaviour and severity of procrastination problem were used to select participants for the interview session (see Chapter 6 for rationale). First, participants who scored greater than 3.61 on task specific procrastination behaviour and on severity of procrastination problem in Study 3a were selected, and then from this group, I randomly selected 10 participants for the interview. This step was taken in this study because the purpose of this study was to examine preference reversal during procrastination and as such, it was important to determine that participants who were invited for an interview actually had experience in procrastination.

As discussed in Chapter 7, Guest and colleagues (2006) noted that approximately 12 participant interviews are sufficient to reach complete saturation, which has been also replicated in other studies (e.g., Ando et al., 2014). In the present study, saturation was reached after interviewing 8 students, that is, no new information was obtained in these interviews. Two additional participants were recruited to confirm saturation was reached.

Of the 10 participants, 7 participants were women (70%) and 3 were men (30%). The mean age of participants was 19.11 years (*SD* = 1.76) ranging from 18 to 23 years old. The ethnic background of these participants is as follows: four participants identified

themselves as Caucasian with a European descent, two participants African Canadian, two participants as Middle Eastern, one participant as South Asian, and one participant as East Asian.

Procedure

Participants were invited for the in-person interview sessions via email. In the email, they received an informed consent that outlined the purpose of the study (see Appendix R). Participants who agreed to take part in the interview session were asked to sign up for the study through the Experimental sign-up system of the Department of Psychology (SONA) at Carleton University.

For the interviews, participants were asked to come to the procrastination research meeting room located in Loeb Building at Carleton University. Before beginning the interview, each participant read and signed a consent form. Similar to Study 2a, in a semi-structured interview, each participant answered some open-ended questions where they described their experience of procrastination on the academic tasks they noted in the online study. They were asked to explain how they felt and thought about this academic task during the procrastination and last-minute effort episodes to understand preference reversal in procrastination. Each interview took approximately 60 minutes and were audiotaped. Participants received 1% grade-raising credit towards the final grades of PSYC 1001, PSYC 1002, PSYC 2001 or PSYC 2002, for their participation in the interviews.

Questionnaire for the Semi-Structured Interview.

Participants who took part in the semi-structured interview were asked to describe their experience of procrastination on the academic task they noted in the online study

(i.e., Study 3a). The PPA items of emotions, motivation and cognitions that participants rated in the online study were used as a guide to ask the open-ended questions during the interview. First, participants were asked to describe the specific requirements of the academic tasks they procrastinated on most recently and why they thought they were putting off this academic task. Participants then explained the positive and negative emotions they experienced when they attempted the academic task but then ended up postponing the task (i.e., during the procrastination episodes) and how they felt when they engaged in this academic task closer to the deadlines (i.e., during the last-minute effort episodes). More specifically, they were asked to elaborate on the emotions they noted in the online study (Study 3a) including the level of threat they experienced during the procrastination episodes and the last-minute effort episodes.

Participants also explained how they appraised their academic task in terms of importance, difficulty, challenge, value congruency and outcome (likelihood of success) during the procrastination episodes and the last-minute effort episodes. Furthermore, they were asked to describe their experience of motivation, autonomy, control and competence to work on this academic task during the procrastination episodes and the last-minute efforts episodes. Additionally, participants were also asked to describe the alternate activities they engaged in when they procrastinated on this academic task during the procrastination episodes and were asked to elaborate on the emotions they experienced when they participated in the alternate activities. The questions are presented in Appendix S.

Study 3b: Result of Qualitative Approach

Similar to Study 2b, the interviews conducted in Study 3b were also transcribed verbatim following which the accuracy of the transcription was checked. Using the NVivo software program, thematic analysis was conducted on the interview transcripts of students to replicate results of mood-repair in procrastination and investigate whether perceiving deadlines as a threat motivated preference reversal closer to the task deadline. Additionally, students' cognitive appraisals of the academic task during the procrastination episodes and the last-minute effort episodes were assessed using thematic analysis.

Again, theory-driven codebooks were created to identify themes of temporal mood-repair model of procrastination, preference reversal, motivation and cognitive appraisals. The first codebook was used to examine: 1) mood-repair by assessing up-regulation of positive emotions and down-regulation of negative emotions from attempting the academic task (Phase 1) to when students gave in to alternate activities (Phase 4) during the procrastination episodes; 2) no change in emotions between the procrastination episodes and the last-minute effort episodes when students attempt the academic tasks; and 3) change in perceived threat as signalling a threat during the last-minute effort episodes but not during the procrastination episodes (see Table 7-11). The second codebook was developed to investigate the motivational aspects (i.e., motivation, autonomy, control, competence) of procrastination and cognitive appraisals (i.e., importance, difficulty, challenge, value congruency and outcome) of the academic task during the procrastination episodes and the last-minute effort episodes (see Table 7-12).

The process of how the codebooks were used to analyze themes within the interview transcripts was consistent to that of Study 2b. The first and the second codebooks developed were applied to the first five interview transcripts and a thorough investigation of new themes in these transcripts was completed.[29] A theme that emerged in Study 2b was also included in this study, that is, "lingering thoughts about the academic task" as students reported having lingering thoughts about the pending academic tasks when they engaged in alternate activities in Phase 4 of the procrastination episodes. Moreover, a theme called "change in emotions within the last-minute effort episodes" was included as students' explanations reflected change in the trend of positive and negative emotions when they attempted the academic task near the deadline, and when they made progress and finally completed the academic task near the deadline. No other themes emerged in these interviews beyond these themes.

[29] The rationale for this process is described in Study 2b.

Table 7-11

Codebook Developed to Analyze the Mood-Repair Model of Procrastination using Qualitative Interview Data in Study 3b. The Codes and the Corresponding Descriptions were Created to Analyze Positive and Negative Emotions, and Perceived Threat during the Procrastination Episodes and the Last-Minute Effort Episodes

Code	Description
1. Types of positive and negative emotions experienced during the procrastination episodes and the last-minute effort episodes included in the PPA	Students' account of the types of positive and negative emotions during the procrastination episodes (when they thought of engaging in their academic tasks [Phase 1] and when engaged in alternate activities [Phase 4]), and the last-minute effort episodes closer to the deadline. The positive emotions coded were happy/pleased, enjoyment, fun, excited, enthusiastic, content, relaxed, and relief. The negative emotions coded were boredom, frustration, resentment, anxious, stressed, afraid of failure, distressed, upset, angry, irritated and nervous. Additionally, perceived threat were assessed during the procrastination episodes and the last-minute effort episodes.
2. Other positive and negative emotions experienced during the procrastination episodes and the last-minute effort episodes not included in the PPA	Additional positive and negative emotions that students referred to when describing their experience of academic procrastination. These emotions were coded separately during the procrastination episodes and the last-minute effort episodes.
3. Positive and negative emotions experienced during the procrastination episodes and the last-minute effort episodes	Students' description of reduced positive emotions and elevated negative emotions in Phase 1 and increased positive emotions and reduced negative emotions in Phase 4 during the procrastination episodes were coded. Absence of mood-repair in the last-minute effort episodes compared to the procrastination episodes were coded.
4. Preference reversal from procrastination episodes to the last-minute effort episodes due to perceived threat	Students' description of increased perception of threat during the last-minute effort episodes compared to the procrastination episodes were coded.

Table 7-11 continues

Code	Description
5. Reasons for perceiving deadlines as signalling a threat	Students' explanation that they perceived the following reasons as signalling threat (or even punishment): • Fear of failing • Having poor academic performance • Withdrawal from the course • Financial penalty of not completing this course • Financial penalty of repeating this academic course • Fear of negative evaluation from parents or important others • Other reasons

Table 7-12

Codebook Developed to Analyze the Cognitive Appraisals of Academic and Alternate Tasks and Motivational Aspects during Procrastination using Qualitative Interview Data in Study 3b. The Codes and the Corresponding Descriptions were Created to Analyze Changes in Cognitions and Motivation during the Procrastination Episodes and the Last-Minute Effort Episodes.

Code	Description
Change in perception of academic tasks and alternate activities on motivational aspects during the procrastination episodes and the last-minute effort episodes	Students' descriptions of whether they perceived their academic tasks differently on PPA items such as motivation, competence, autonomy and control during the procrastination episodes and the last-minute efforts were coded. Ratings from PPA were reviewed together with their interview transcripts.
Change in academic tasks and alternate activities on cognitive aspects during the procrastination episodes and the last-minute effort episodes	Students' appraisals of their academic tasks based on cognitive items, that is, importance, difficulty, challenge, outcome (likelihood of success) and value congruency during the procrastination episodes and the last-minute efforts were coded. Ratings from PPA were reviewed together with their interview transcripts.

Table 7-13

An Additional Codebook with the Corresponding Descriptions Analyzed in Study 3b

Code	Description
Lingering thoughts about the academic task students procrastinating on the most	Students' account of the lingering thought about the academic task when they engaged in alternate activities (Phase 4).
Change in emotions within the last-minute effort episodes	Students' descriptions of positive and negative emotions within the last-minute effort episodes were coded to understand their experience of positive and negative emotions when they first attempted the academic task near the deadline and how their emotions changed as they made progress in the academic task.

Individual Differences in Emotions, Cognitions and Motivation Reported during the Procrastination Episodes and the Last-Minute Effort Episodes

In this study, students retrospectively reported on a recent experience of procrastination. The names of the academic tasks these students reported to have procrastinated on are presented in Table 7-14. Similar to Study 2b, students' understanding of procrastination was assessed by asking them "*What makes you think you are procrastinating?"* To this question, the students in this study answered that they had the intention to complete the academic task early but they postponed the task closer to the deadline due to the aversive quality of the task (i.e., the task was perceived as boring or stressful). They also noted that they had ample time to complete the academic task they procrastinated on and yet they did not start early. Students' responses to this question are presented in Table 7-15 of Appendix A.

Table 7-14

Academic Tasks that Students Reported to have Procrastinated on the Most

Students' Anonymous ID	Name of the academic task
S1	Assigned reading
S2	Studying for psychology exam
S3	Law assignment
S4	Human rights essay
S5	Religion paper
S6	Assignment
S7	Psychology textbook reading
S8	Studying for midterm on Earth science course about dinosaurs
S9	Computer Science assignment
S10	Reading a book

The types of emotions that students reported experiencing when they attempted to engage in the academic task they eventually procrastinated on (Phase 1) and when they engaged in alternate activities instead of the academic task (Phase 4) during the procrastination episodes were consistent to that of the results in Study 2b. Other emotions that students described experiencing when they procrastinated (i.e., emotions that were not included in the PPA questionnaire) were feeling overwhelmed, annoyed, disappointed, worried and mad. Similar to Study 2b, individual differences in the ratings of positive and negative emotions were observed between the procrastination episodes and the last-minute effort episodes. The trends of ratings were plotted and analyzed at the person level (see Figure 7-9 & 7-10). The trend of ratings for positive and negative emotions varied in the procrastination episodes and the last-minute effort episodes. Most of the students' ratings demonstrated downward trends for the majority of the negative

emotions (i.e., boredom, frustration, resentment, anxious, stressed, distressed, upset, irritated) within the procrastination episodes from Phase 1 (when academic task was attempted) to Phase 4 (when students engaged in the alternate activities). Conversely, most students, via their ratings, indicated upward trends from Phase 1 to Phase 4 of the procrastination episodes for all the positive emotions (i.e., happy, enjoyment, fun, excitement, enthusiastic, content, relaxed, relieved). The average ratings of positive and negative emotions calculated separately for each student also revealed downward trends for negative emotions and upward trends for positive emotions within the procrastination episodes from Phase1 to Phase 4 (see Figure 7-11). These results replicated the Study 2b results where down-regulation of negative emotions and up-regulation of positive emotions were evident from Phase 1 to Phase 4 when students procrastinated on their academic tasks. The positive and negative emotions that were originally included in the PPA questionnaires were all included in the interview.

When the rating trends were compared between Phase 1 of procrastination episodes and the last-minute effort episodes at the person level, minimal differences in ratings were found for the majority of the negative and positive emotions (see Figure 7-9 & 7-10). This was also evident when average scores of the positive and negative emotions were calculated separately for each emotion item with the exception of the emotion *relief* which indicated students felt more relief in the last-minute effort episodes (see Figure 7-11). The ratings for perceiving the deadline as a threat during preference reversal were also plotted and analyzed. Most students' rating indicated that they experienced a threat much closer to the deadline whereas the others perceived their task deadline as not threatening (see Figure 7-9). Overall, students' ratings indicated mood-

repair within the procrastination episodes but not between the procrastination episodes and the last-minute-effort episodes. Students seemed to have perceived deadlines as a threat when they had insufficient time to complete their task which triggered their urgency to start working on their academic task. A better insight into these results can be obtained from the narratives of these students.

Figure 7-9

PPA Ratings of Negative Emotions for Each Student

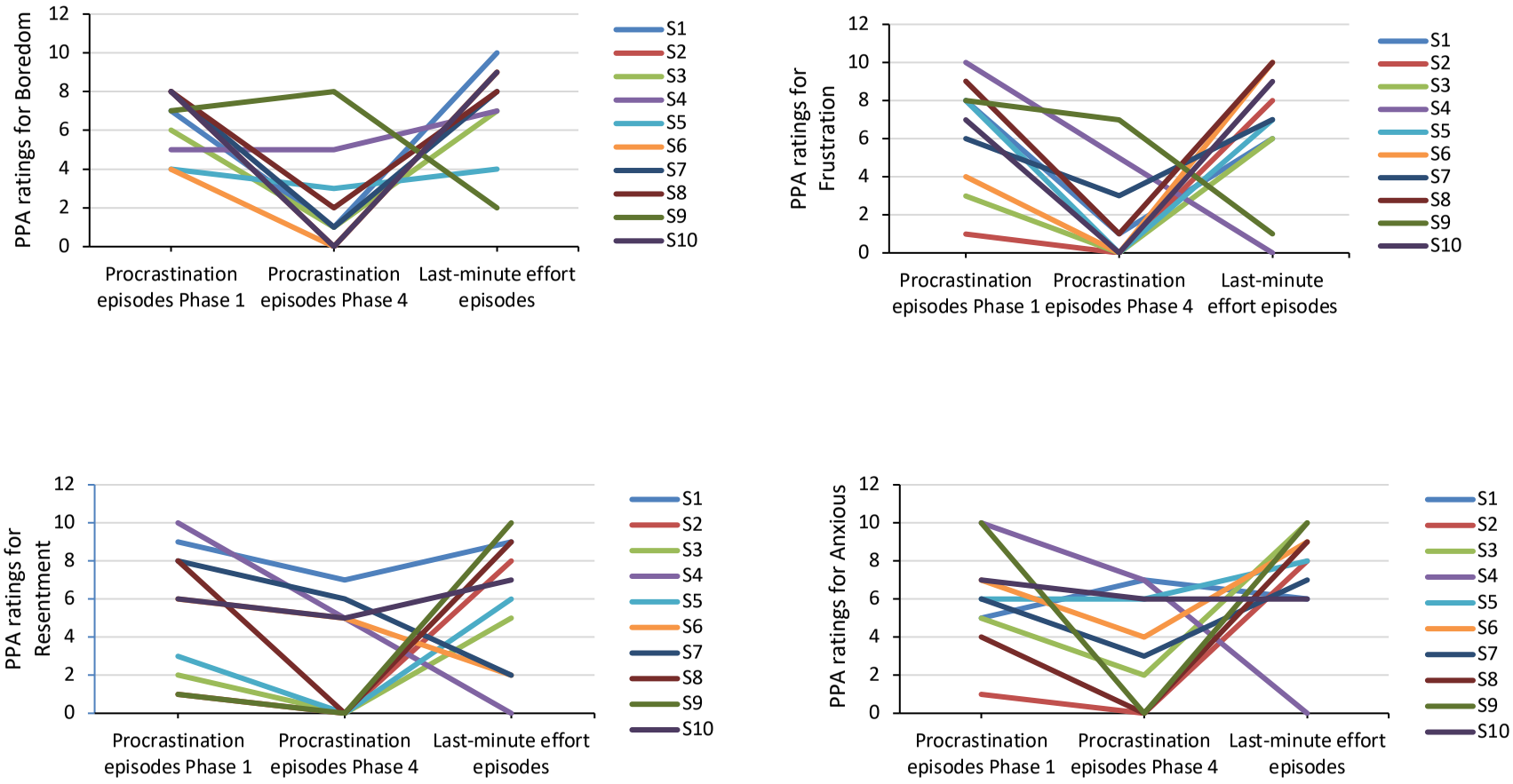


Figure 7-9 continues

PPA Ratings of Negative Emotions for Each Student

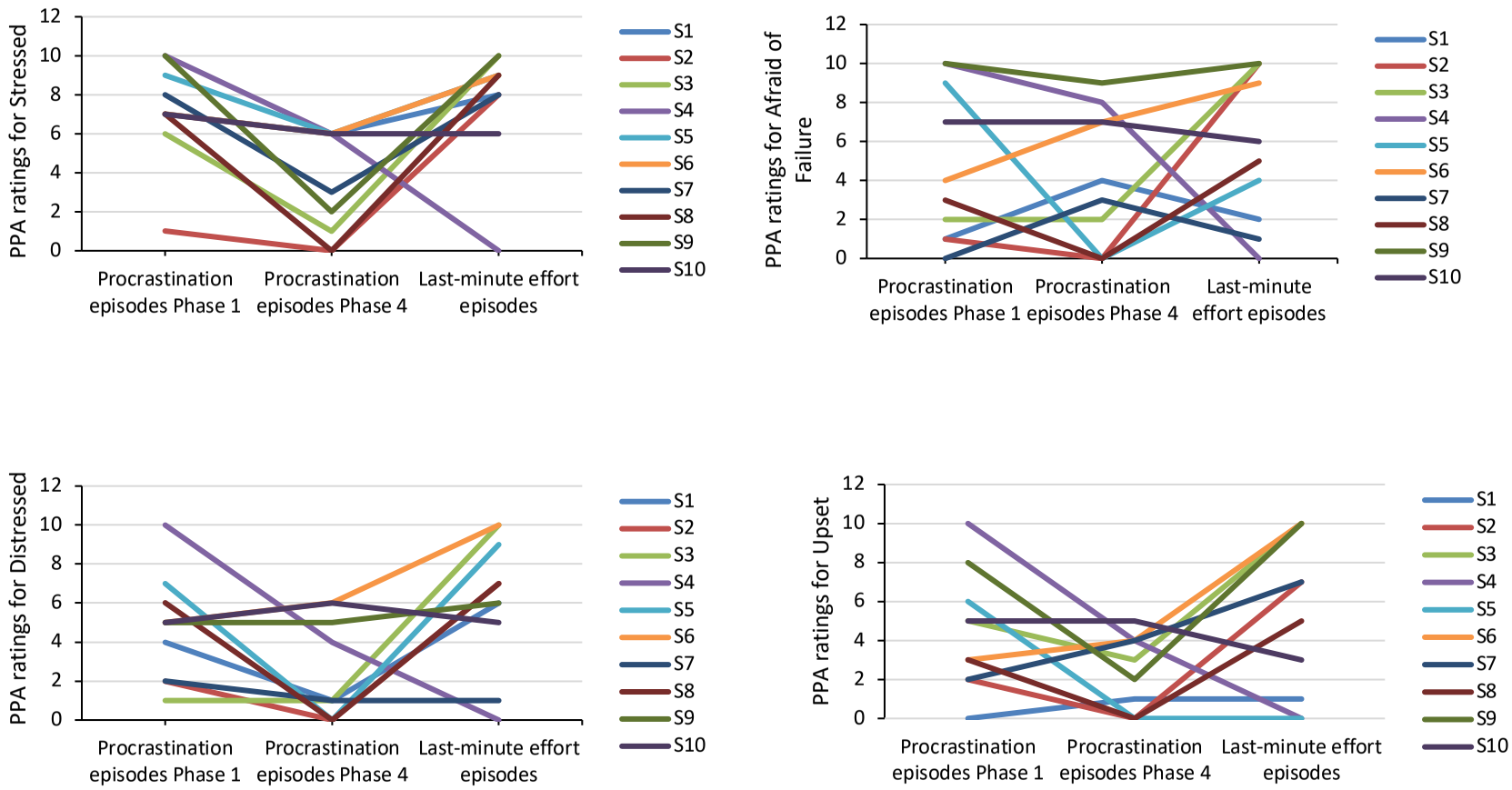
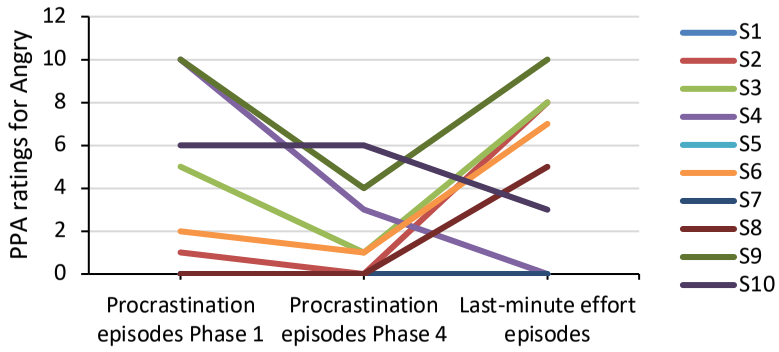
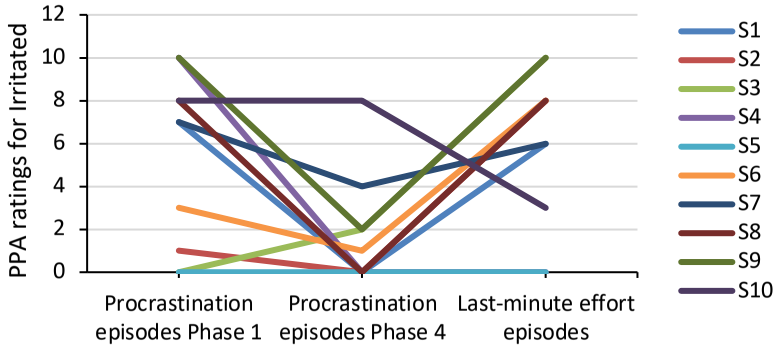
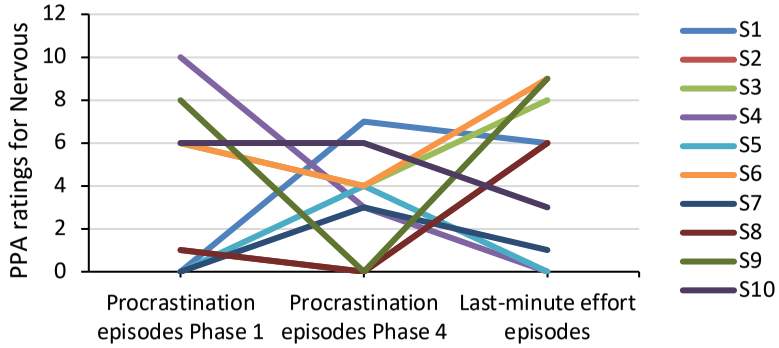


Figure 7-9 continues

PPA Ratings of Negative Emotions and Threat for Each Student







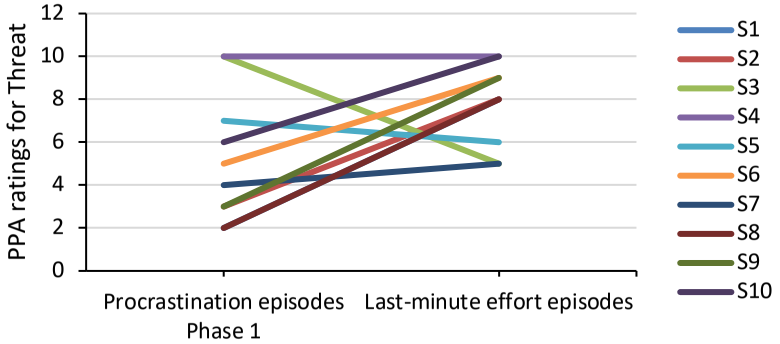


Figure 7-10

PPA Ratings of Positive Emotions for Each Student

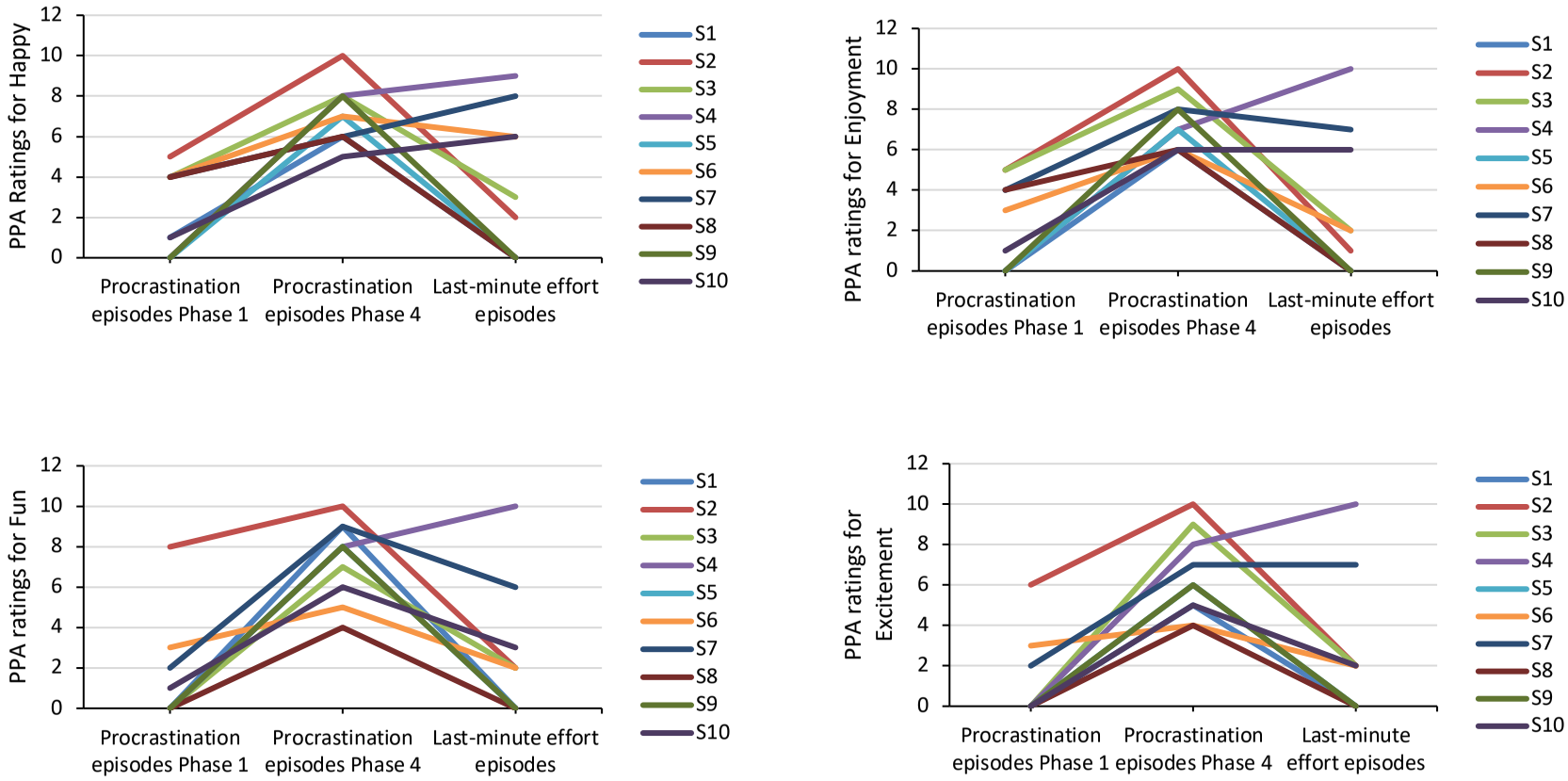


Figure 7-10 continues

PA Ratings of Positive Emotions for Each Student

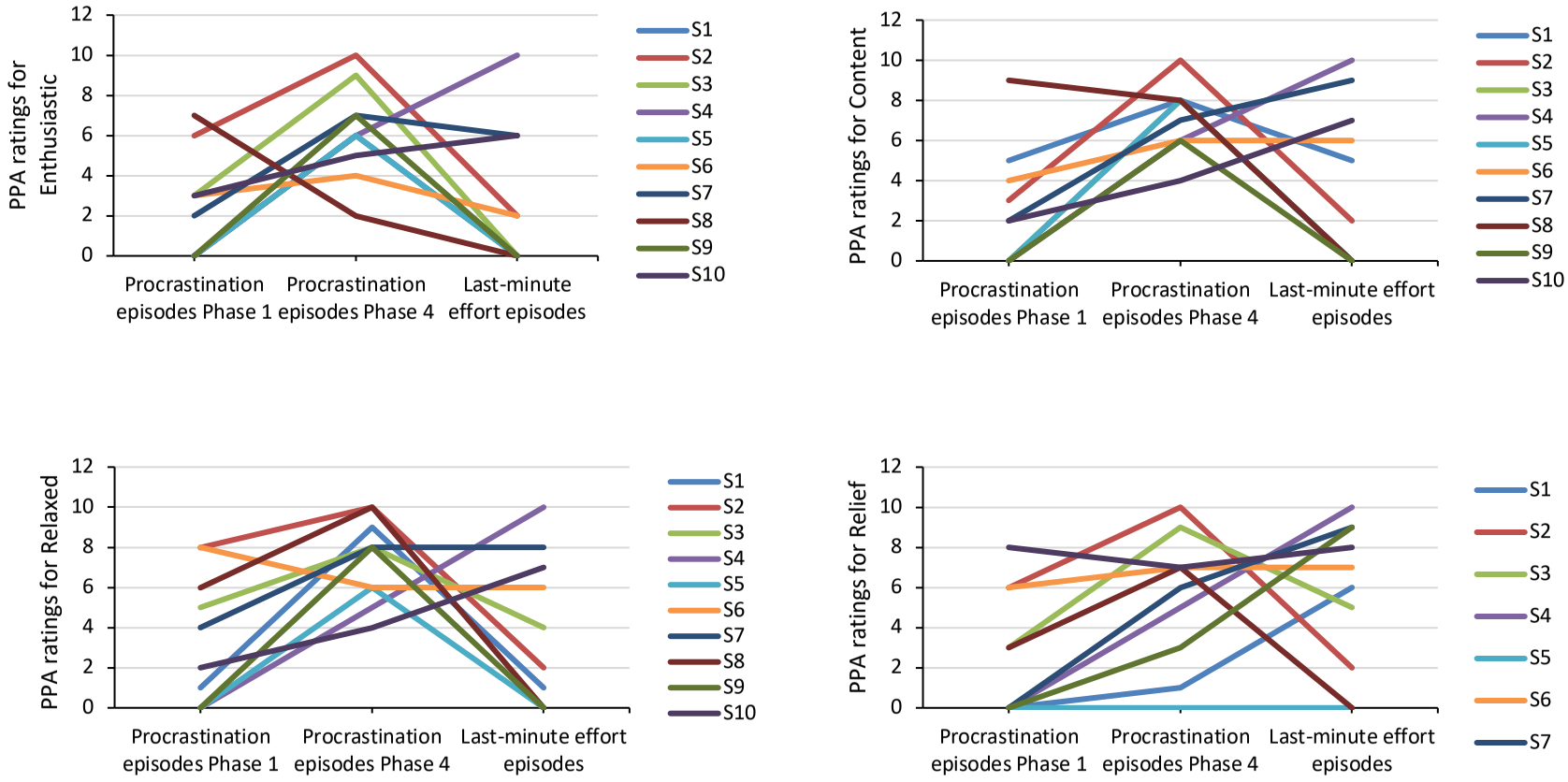
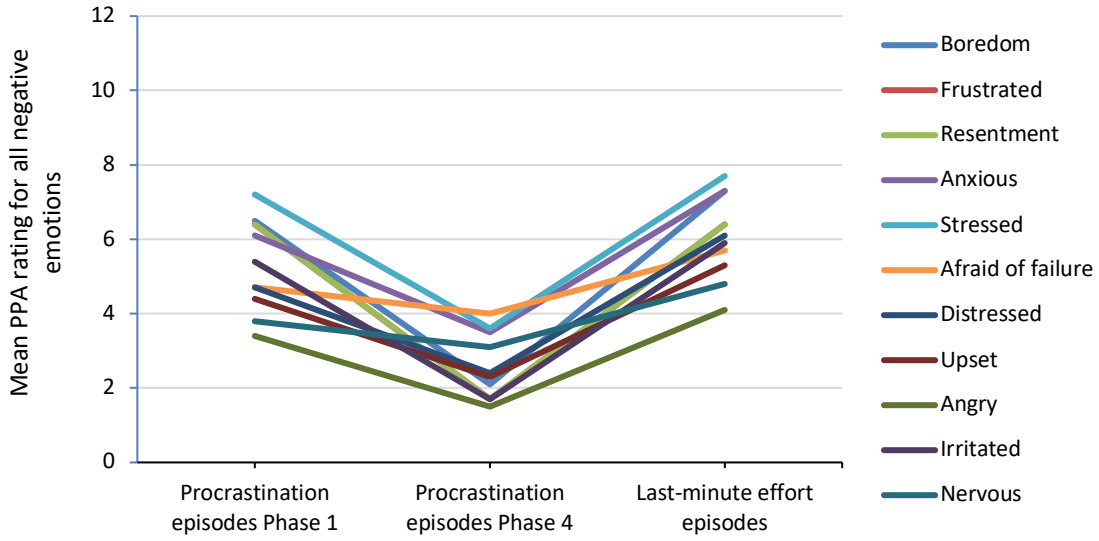
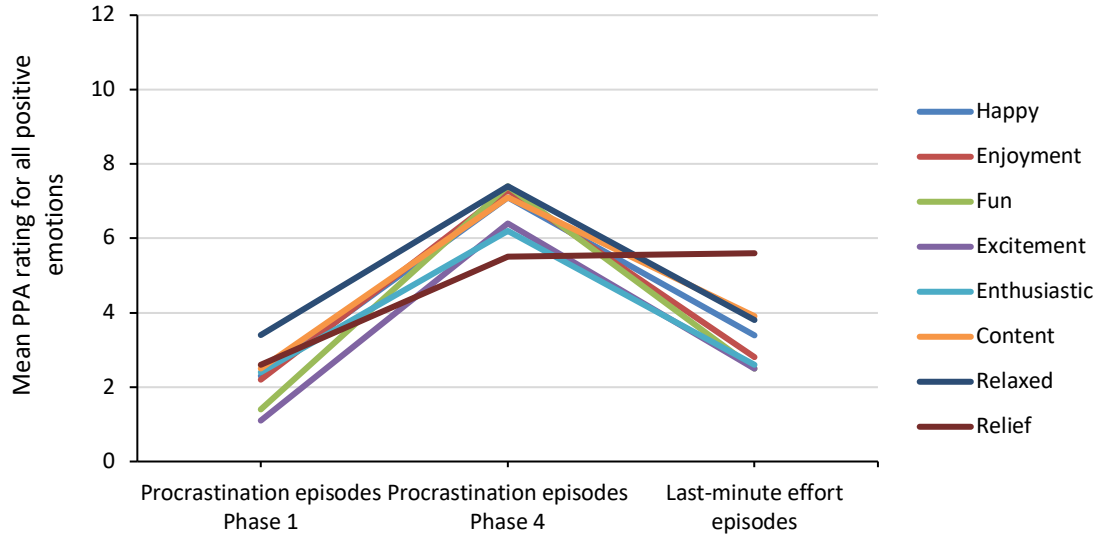


Figure 7-11

Mean PPA Ratings of Each Negative and Positive Emotion for 10 Students

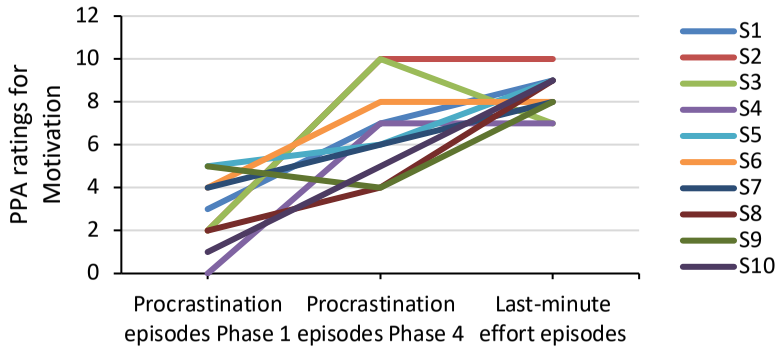


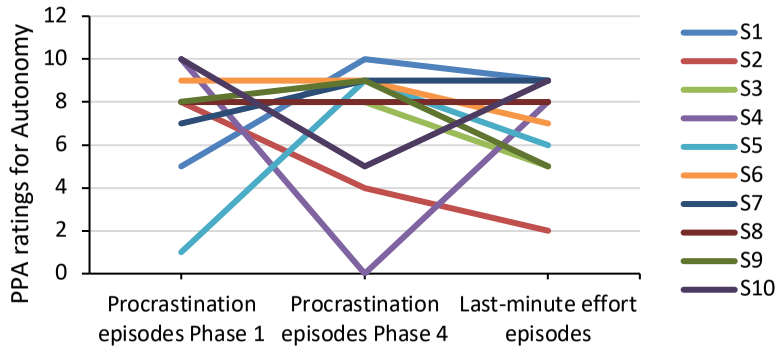


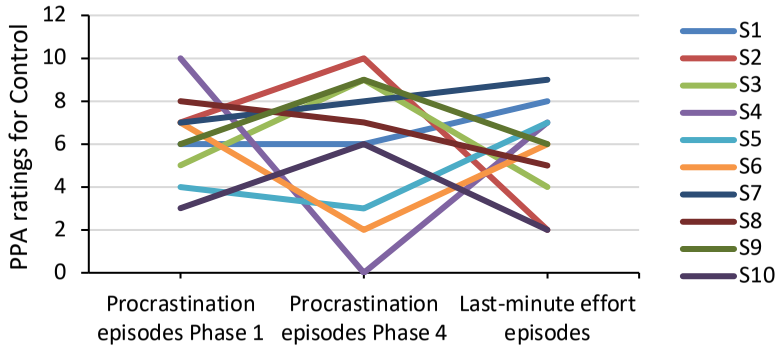
Among the PPA items of motivation (see Figure 7-12), most students reported having more motivation during the last-minute effort episodes to work on their academic task compared to the procrastination episodes. The average of their ratings on motivation also demonstrated the same pattern (see Figure 7-13). However, they perceived that their competence did not change between the procrastination episodes and the last-minute effort episodes. Students' ratings of control on their academic task and their autonomy yielded mixed results where some students reported having more control and autonomy in the procrastination episodes whereas others reported more control and autonomy in the last-minute effort episodes. The average of the students' ratings (those who were interviewed) showed minimal changes between the procrastination episodes and the last minute-effort episodes.

Figure 7-12

PPA Ratings of Motivational Items for Each Student







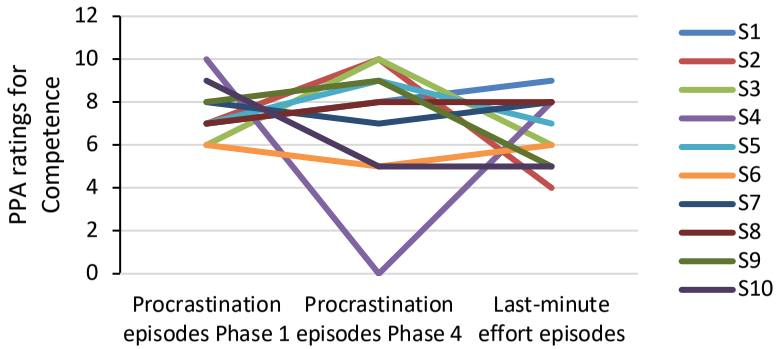
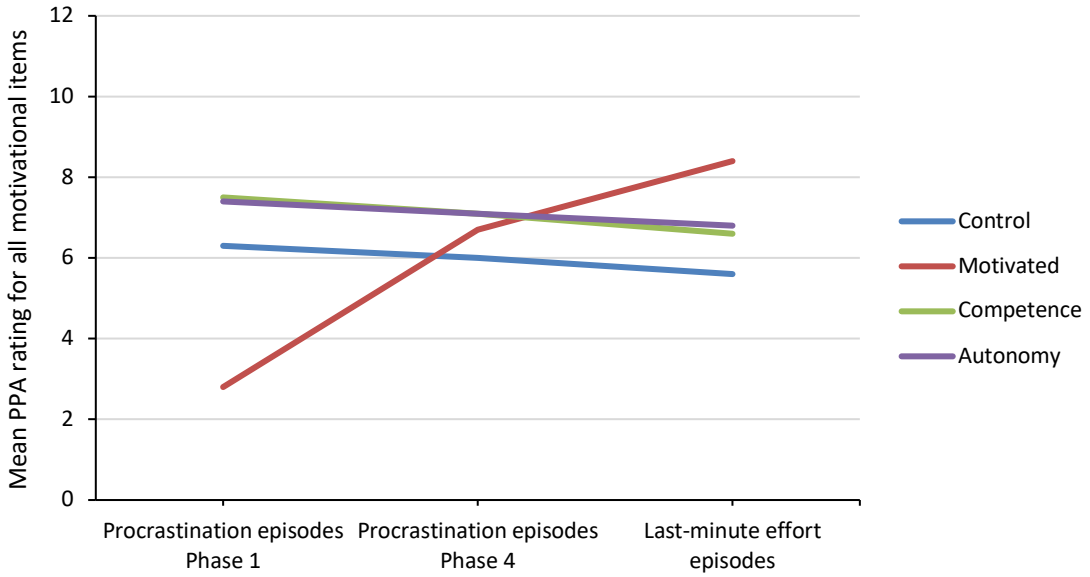


Figure 7-13

Mean PPA Ratings of Each Motivational Items for 10 Students



The examination of the trends of ratings of the cognitive items showed that importance, difficulty, challenge and value congruency of the academic tasks that students procrastinated on did not change between the procrastination episodes and the last-minute episodes for most of the students (see Figure 7-14). The average of the ratings provided by these students for these four cognitive items showed similar patterns (see Figure 7-15). Students varied in their perception of the outcome (i.e., likelihood of success) of the academic task where some expected no change in outcomes, some expected better outcomes and others expected poorer outcomes in the last-minute-effort episodes compared to the procrastinating episodes (see Figure 7-14). However, the average of the students' outcome ratings revealed they perceived no change in outcome between the procrastination episodes and the last-minute effort episodes (see Figure 7-15). Next, I present the results of the narrative inquiry which explains the individual differences in PPA ratings of the emotions, cognitions and motivation in the pattern described above.

Figure 7-14

PPA Ratings of Cognitive Items for Each Student

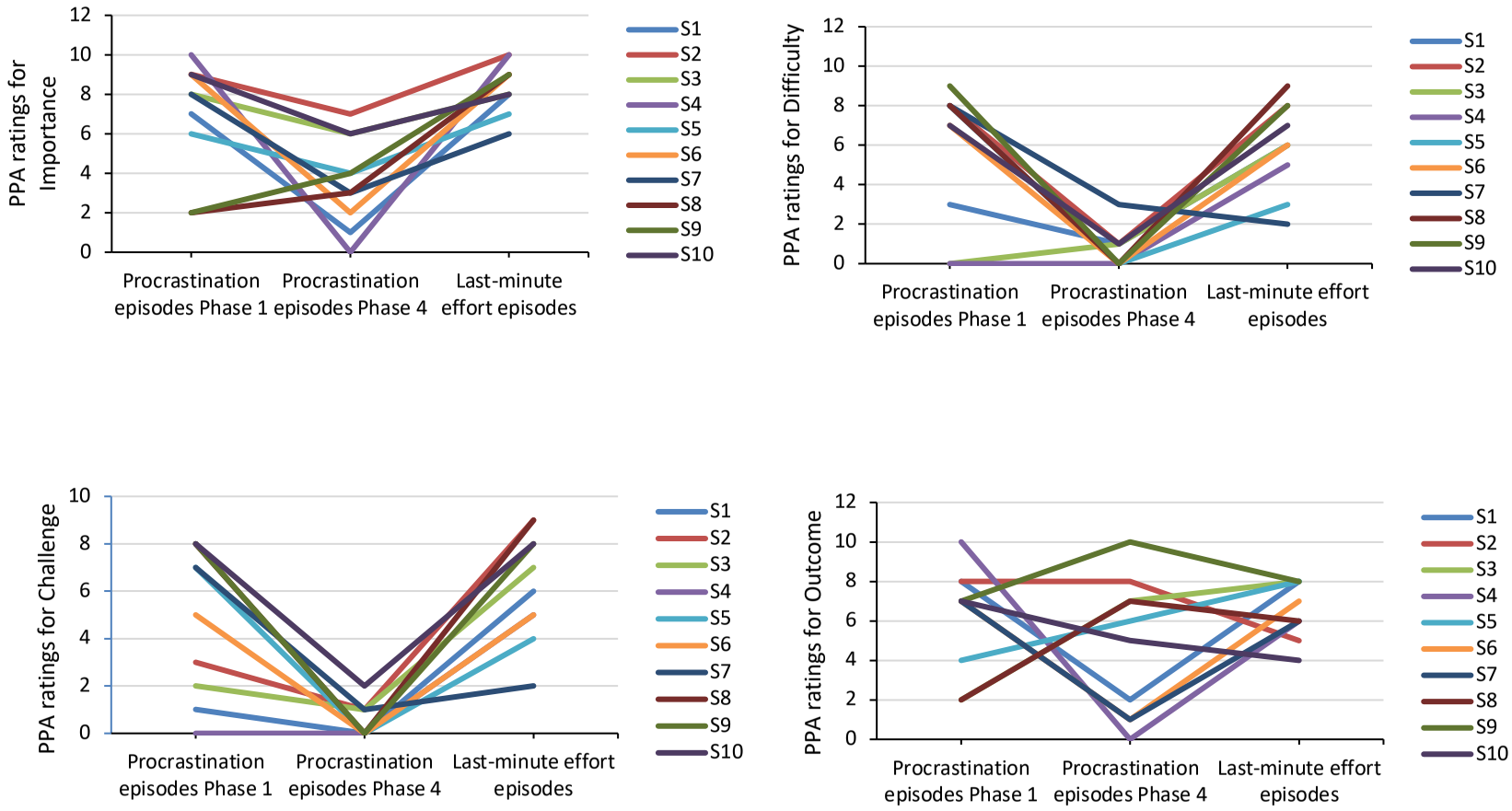


Figure 7-14 continues

PPA Ratings of Cognitive Items for Each Student

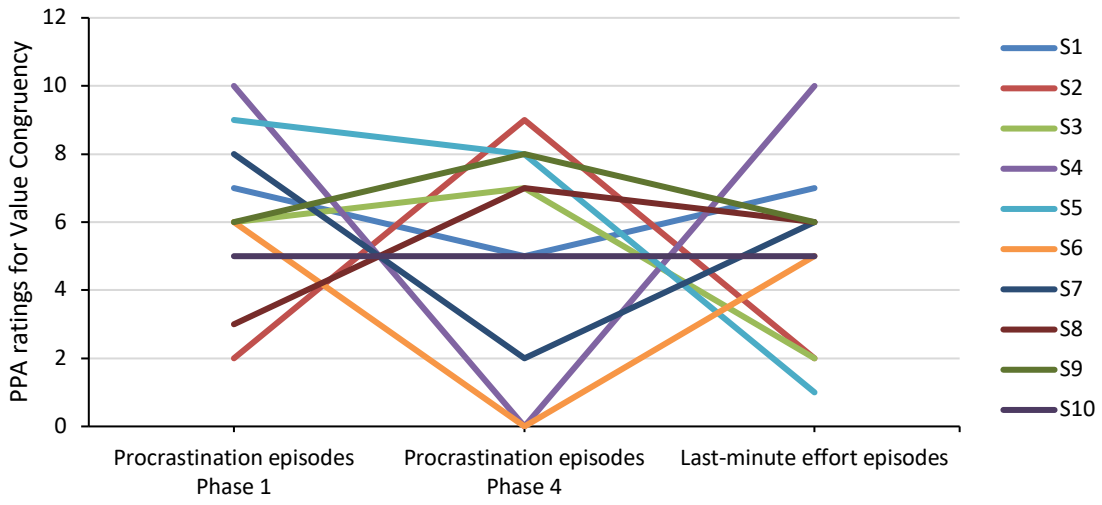
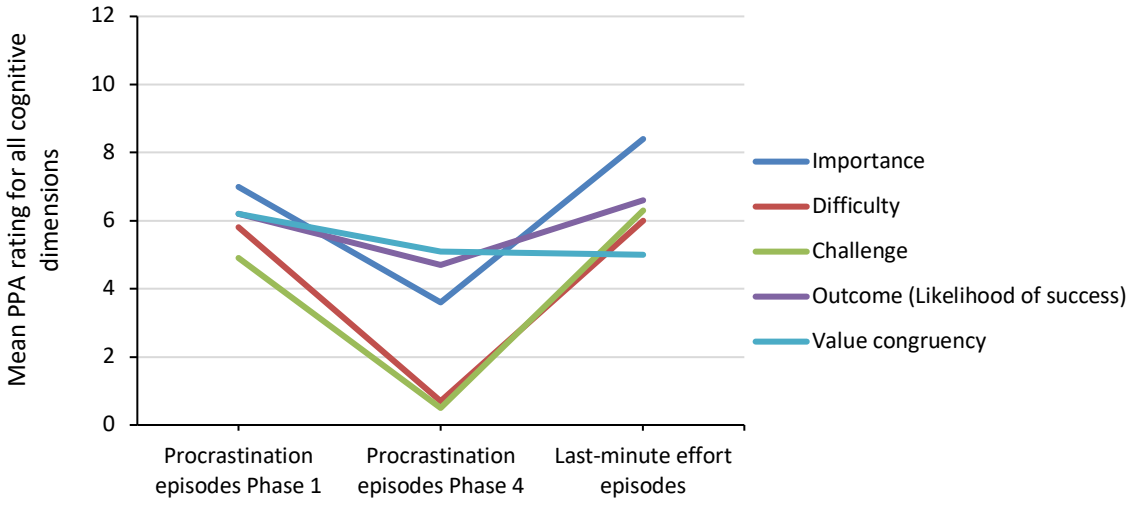


Figure 7-15

Mean PPA Ratings of Each Cognitive Items for 10 Students



Narrative Inquiry of Mood-Repair Process, Preference Reversal and Perception of Tasks during Procrastination

The purpose of using the narrative inquiry approach was to replicate part of the results of the mood-repair process in procrastination from Study 2b and have a better understanding of the quantitative results pertaining to preference reversal near the deadlines during procrastination. Students reported on their experience of positive and negative emotions during Phase 1 (i.e., when students attempted the academic task they procrastinated on) and Phase 4 (i.e., when they engaged in alternate tasks while procrastinating) of the procrastination episodes and during the last-minute effort episodes (i.e., when they finally started working on the academic task). Students also provided narratives of how they appraised their academic tasks and alternate tasks on different cognitive and motivational dimensions during the procrastination episodes (Phase 1 and Phase 4) and the last-minute effort episodes.

Similar to Study 2b, students answered specific questions about how they felt (e.g., frustration, anxious, happy, content) during the two momentary phases of the procrastination episodes (Phase 1 and Phase 4). Additionally, they answered questions on how they felt during the last-minute effort episodes. It will be recalled that a new emotion dimension called *threat* was introduced in this study to understand preference reversal in procrastination. Specifically, I investigated whether students felt threatened near the deadlines which reinforced their decision to complete the academic task closer to the deadline. Furthermore, students provided narratives of how they appraised their academic tasks on dimensions such as motivation, autonomy, importance, difficulty, value congruency and whether these appraisals changed during the procrastination episodes and

the last-minute effort episodes. In the following sections, students' explanation of how they felt and their perception of their academic and alternate tasks during the procrastination and last-minute effort episodes are discussed.

Narrative Inquiry of the Mood-Repair Process during Procrastination

Experience of Emotions in Phase 1 of the Procrastination Episodes. Like Study 2b, students reflected on how they felt when they tried to engage in the academic task they procrastinated on. Students explained that they experienced mainly negative emotions when they tried to work on the academic task and experienced less of the positive emotions. Beyond the emotions from the PPA, students noted feeling annoyed and overwhelmed. Students discussed their emotions together with their thought process which indicates how emotions and thoughts are intertwined in procrastination. Some of the responses from students are provided below:[30]

> "Well, usually I'm just annoyed at myself because then it's like, *Great! Now it's another thing that you have to sit there and dread until you do it.* Like, you [referring to herself] have to keep thinking, *oh, I need to do it* until you [referring to herself] actually do it." (Student #1)

> "Bad obviously, like, I knew I should be doing my assignment but I'd always find like other things to work on. And like, I'd like, justified by telling myself like, *Oh, I'll start tomorrow morning for sure*. Like, I'll work on it all day, but obviously I wouldn't work on it again. And like it just made me feel like annoyed and like angry that I wasn't working on like the one thing I should have been working on." (Student #4)

> "A bit uneasy. Like, I'm always like, I know that I should start working [on] it [academic task] when I do have time because when I am thinking that, that's when I have time to write, I'm doing something else. Um, but I think in the end, I know I'll pull through it just might not be the best quality and that like, I usually try and like, do the best that I can. So, like turning in something that I'm not exactly proud of, is not like something I like doing but it ends up happening quite often with

[30] Although all explanations students provided for all questions in the interviews have been transcribed verbatim, students' explanations for every emotion were not included in the result section of the dissertation to keep the result section concise. Students' responses that were relevant and comprehensive have been included in the dissertation.

> papers…. That I was kind of just like, going back into a routine of like doing something that like I know, doesn't always work out for me, but still, like not wanting to work on it at the time. Just like frustrated kind of with myself, I guess more so. And I don't know, for that paper, in particular, like the it was very broad, like the kind of like the topic like we can kind of take it in different ways. And that's nice but it's frustrating too, because I'm like, I don't know what you want. Um, that was probably like some of the frustration for that too, as well." (Student #5)

> "I felt stressed. I knew I was supposed to be doing it [work on the academic task], but I kind of put off so I felt stressed. I felt kind of just disengaged in the whole kind of process like okay, thinking about how much I have to do, I have to go through, [and] read the text. I have to like highlight it. I have to make sure I understand it. Maybe make notes for the test coming up like, it was just a lot. So, I feel stressed, overwhelmed even more, even less willing to do it [work on the academic task] because the stress made me think okay, like, I don't want to get started or else it's going to make more stress. It's kind of like a cycle." (Student # 7)

> "A little bit, but it was kind of like, I feel like it was more anxious and stressed like more than being bored…. I honestly, yeah, because I did fail the midterm. But it kind of backfired, like the feeling of failure kind of backfired. Because at that point, I was like, *okay, you know, I don't have a chance I'm going to fail anyways.* Okay, you know, like at the beginning, I did have fear of failure. But then as time passed by, I was like, kind of used to it, like I was okay with failing the course…. Honestly yeah, like the whole time like I'm kind of upset at myself mostly because of this bad habit. Like I think I, I want to say I was upset about like, you know starting to work on or anything I was more about why am I like this like why am I doing this to myself, you know." (Student #8)

> "I think mostly just felt kind of overwhelmed. Especially, you know, you open it up and you look at the rubric and everything and you see how much you have to do. You're like, *Oh wow! This is like, this is stressful. This is overwhelming, like, I'm just going to, I'm just going to not do it.* So, you're [referring to himself] just trying to, like, get that relief of just do something else get your mind off of it. So probably just pretty, like, pretty overwhelmed and anxious about it." (Student #9)

A few students reported that they did not experience negative emotions too strongly when they attempted to work on the academic task but then decided to delay the task for the following reasons:

> "Yeah, I just felt like I had enough time. The first week it was okay. I didn't really need to start. So like, I just postponed. It wasn't really a pressure. I wasn't worried." (Student # 6)

> "I didn't really think much of it. I wasn't really worried. And all I said to myself, you know, I've been good thinking that I have it under control. So yeah, I didn't really think much of it. Um, you know, I thought I was good to go. And I thought that, you know, I could probably do it, you know, in one night, whatever…. Yeah, well, I thought it would be boring, obviously. And I'd be, you know, frustrated and upset because you know how long that would take. And, um, yeah, and I just didn't want to think about that." (Student #10)

Some students talked about how they had lingering thoughts when they were procrastinating on their academic task they intended to work on. Not only the aversive quality of the academic task made them feel bad but they also experienced negative emotions (e.g., stress) that stemmed from the thoughts that they still have the pending task that they are supposed to work on and yet they are not working on it.

> "Well, I feel like procrastination just usually leads to stress because then you, you know, you have to keep thinking about it. And then you think about it and it stresses you and you're like, let's push it off and pretend it's going to not stress me out right now." (Student # 1)

> "Well, I mean, like, when I postpone things in general, like it's still weighing on me like it's there, and I can't get rid of it holds done. So, it just kind of lingers and I can't like it's always they're bothering." (Student # 5)

Students were also asked to reflect on their thought processes separately to get a better understanding of what they were thinking when they tried to engage in the academic during the procrastination episodes. Often students referred to having more time as their justification to not do the aversive academic task right now or they simply said they will work on it later or that they needed to experience the pressure or feel inspired to start the task. The rationales presented in this study were similar to the thought processes that were described by the students in Study 2b. Some excerpts of their thought processes are presented below:

> "Yeah, that I don't want to do it right now. Usually by telling myself, I have more time to do it, like, you can do them before the class, you can do them after the class. They just want you to do it so that you have the information for the tests or whatever. But yeah, I pretty much just tell myself Oh, there's time later. I'll do it later. Maybe tomorrow, or maybe next week." (Student #1)

> "I guess I don't know why, but I need to feel pressure to, like, feel motivated to do it. Because if it's not like due tomorrow, then I'm like, I have time. Like, I just put it off. I have time, but like, it really was like my friend made me realize, like, you know, it's like due tomorrow. And I had to do it." (Student #3)

> "So, it's just because, like this assignment, so easy, like in my mind *Oh my God, this won't take me long,* like *I could just work on it tomorrow*, and then tomorrow and then tomorrow until like, it's due the next day, and then I have no choice but to work on it. And like, I was just thinking that, you know, I could just work on it later. And then every time I would try to work on it, I just wouldn't still." (Student #4)

> "I'm like not feeling inspired right now. Like, I don't have like enough ideas, like, even start at this point. And most the time when I do write papers, like I'll start out with just like, vomiting words and then kind of editing after but usually I'm sort of, I surprise myself after like, how concise or just like how it kind of flows nicely. When it comes to like, thinking about starting it, I'm like, No, it's not there. I'm not ready." (Student #5)

Experience of Emotions in Phase 4 of the Procrastination Episodes. In this study, students were also asked to reflect on the alternate activities they participated in when they procrastinated on their academic task. It will be recalled that Phase 2 (decision to delay the academic task) and Phase 3 (forming a renewed intention to work on the academic task later) were not included in this study to avoid fatigue among participants during the interview sessions. Only Phase 4 questions were included to replicate the evidence for mood-repair. Students reported a maximum of five alternate activities which are provided in Table 7-16. The alternate activities reported were categorized to determine their frequency. In the present sample, three of the most common activities students noted (at least six times) were browsing social media or the internet, engaging in

productive tasks (e.g., cleaning, working on an easier academic task, working out at the gym) and watching Netflix. Other activities that were reported five or less times were socializing with friends, going on the phone (e.g., texting, FaceTime), sleeping, playing video games, eating, and other tasks such as shopping (see Figure 7-16).

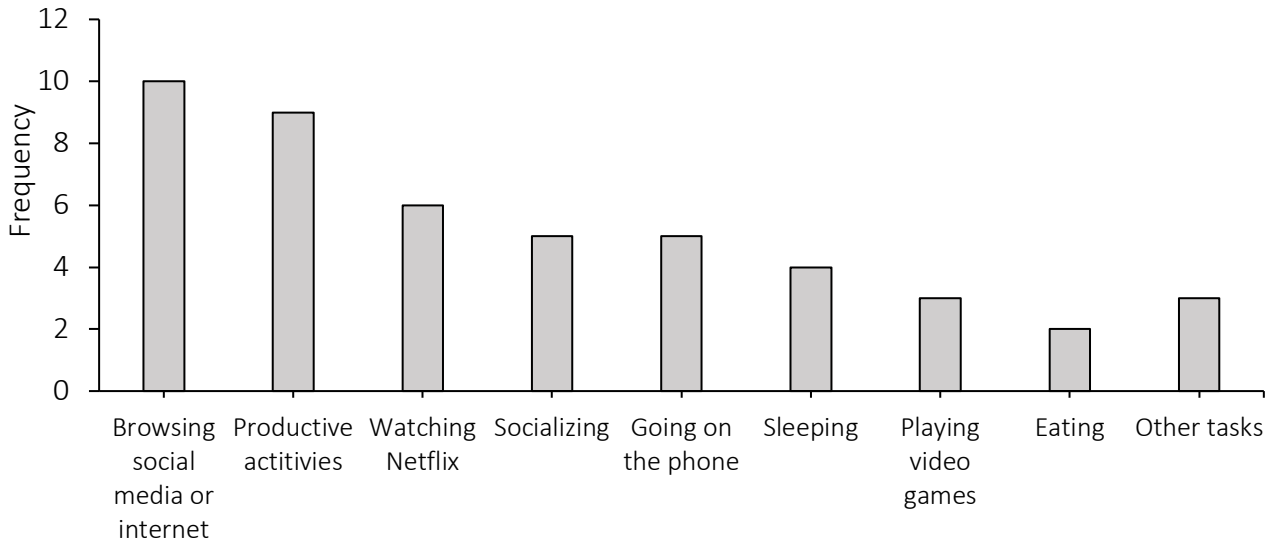
Table 7-16

Alternate Activities or Tasks that Students Engaged in When They Procrastinated on the Academic Task

Students' ID	Alternate Task 1	Alternate Task 2	Alternate Task 3	Alternate Task 4	Alternate Task 5
S1	Doing small productive things (e.g., organizing desk)	Watching Netflix	Browsing social media	Socializing with friends or family	
S2	Browsing social media	Playing video games	Socializing with friends or family	Doing something on laptop	Browse the internet
S3	FaceTime with friends	Calling Parents	Watching Netflix	Swimming	Browsing social media
S4	Watching Netflix	Cleaning to get relieve from stress	Shopping	Sleeping	Doing other smaller assignments that are not urgent
S5	Browsing social media	Doing productive tasks (e.g., shovelling driveway, cooking)	Calling friends		
S6	Watching Netflix	Sleeping	Browsing social media	Calling friends	Playing video games
S7	Browsing social media	Watching Netflix	Sleeping	Socializing with friends	
S8	Browsing social media or internet	Sleeping	Socializing with friends	Eating	Doing other small assignments that are not urgent
S9	Texting on cell phone	Watching Netflix	Socializing with friends	Doing small productive things (e.g., cooking)	Browsing social media
S10	Browsing social media	Playing video games	Doing small productive things (e.g., organizing desk)	Doing other smaller school assignments that are not urgent	Eating

Figure 7-16

Frequency of Alternate Activities or Tasks Students Reported in Phase 4



During the interview session, students were asked to provide their rationale for choosing these activities. They were asked to answer why they specifically chose these activities instead of working on their academic tasks and what quality of these alternate activities attracted them. Although students reported having a pleasant time when they engaged in the alternate activities, their experience varied depending on the activities they engaged in. Similar to the students in Study 2b, students in this study also noted that watching Netflix requires less effort which is why they chose this activity. Some students noted that they regretted engaging in certain activities than others. A few students noted that they deal with the stress of procrastination by doing some other tasks that they deem to be productive. Some descriptions of why students engaged in these activities are noted below:

> "So, like with cleaning, I try to justify it by like, I can't do work until I'm in a clean environment. So, I have to clean the bathroom and the sink and tidy up all my stuff, [and] make my bed. I just find myself like I can't do anything until it's clean. So, I just like, I enjoy cleaning. I stress clean. And then like, things like Netflix and like hanging out with friends. Like, it requires little to no brain effort. Like there's no hard thinking there's no like philosophical thoughts or anything. It's just having fun and not having to do anything really." (Student #1)

> "Because if I'm like on my phone and looking at Twitter and looking at Instagram or Snapchat, that I feel like I'm wasting my time. But then if I'm watching YouTube, I'm like, this is a video that just came out and I want to finish. I want to watch it and then like, I'm happy. But like, I'm not the type of person to stay on my phone. Like, I don't like [being on] my phone. So, like, okay, unless I'm like, facetiming someone or something, I feel like I'm wasting my time on my phone. So, I would have more regret when it comes to certain aspects of how I procrastinate. So, if it's like YouTube, I'm more like, *Oh, this is better than if I'm like on my phone* and then I'm angry at myself like I'm more angry that I procrastinated." (Student #3)

> **"**It makes me feel like anxious and stuff. So, for example, like the cleaning, like, that's like my way of dealing with stress and like procrastinating just makes me even more stressed. So, it's like, if I know I'm going to start my studying, I'll be like, *Okay, before I start, I need to clean like as a way to deal with my stress.* And it's like weird and then like, the whole cleaning thing when I know I can do that later. Like, just makes me procrastinate further into not doing my assignment. So, it's like, it's the procrastination just keeps going on." (Student #4)

After asking students about the alternate activities, students were specifically asked to describe how they felt when they took part in the alternate activities. Similar to Study 2b, students in this study described that they preferred participating in some alternate activities more than others and the extent to which they experienced positive and negative emotions for these activities were different. Although the level of emotions and how students perceived the different alternate activities varied, they still reported being in a better mood compared to when they tried to engage in the academic task they perceived as unpleasant. During the discussion on alternate activities, students reflected

on their emotions as well as their thought processes even though they were only asked to describe how they felt about the alternate activities.

> "There's this thing that I started to do, like I swim every day. So that didn't happen when I was doing your questionnaire first and then I figured out that we have pool here. So, then I started swimming every day and that is completely worth it to me. For me, I procrastinated on academic task to go swimming. I've done it before. I had an exam the next day and I still went swimming. My good mood is actually heightened [when swimming]. So, if I were like on my phone on social media, like that's a waste of time to me sometimes. But other times if I'm like Snapchatting with someone, it's good. But if I like spend an hour on social media scrolling, I regret it that I didn't do my schoolwork. It's weird. It's so weird the way it works." (Student #3)

> "…. And when I'm at home, I can't get as much work done anyways, because I'm like, I'm with family. So, if I'm like spending a lot of time with family, and I guess in that way, I kind of procrastinated from doing my assignment like, that doesn't make me feel as bad because I'm like, like, it's a good reason. Like I was seeing family after a long time. So, it wasn't me just like watching Netflix or like going out with friends. It was me spending time with family. So, I don't feel as like anxious or stressed or bad about like having procrastinated. Like the feeling of spending time with family part made me feel like happy and like I was like, I didn't feel as bad for making the choice to, like not do my assignment. But still, like I felt upset that I wasn't doing my assignment." (Student #4)

> "It [when the deadline was far away] almost made me feel better thinking I'm going to do the stuff [academic task] that I know I can get done that made me feel good thinking *oh, I'm getting stuff done,* but then not really working on the psychology project that I should be working on…. Not so much [anxious or stressed]. It [alternate activities] kind of masked what I was kind of trying not to do [work on the academic task]. So, it masked the feelings of kind of motivation and stress of having to do the psychology [reading]. It kind of masks and kind of switch gears and made me think, *okay, well, I'm doing something that I like* and it made me kind of feel happier. And then that made be more unmotivated to go to the psychology [reading]. I still had the psychology [reading] in the back of my mind. But then I was doing like kind of like dopamine releasing events. So, I was like, I was really happy. And then like, the whole like brain reward center, I kept doing it again and again. It became like a learned kind of event, thinking, *okay, if I want to be happy, and I want to not be stressed about the psychology, I'm going to do these things that kind of, I feel rewarded for I feel happy about* and then it became learned, I kept doing it and kept doing it. Fear of failure kind of started fading away because I was distracting myself. So not as much I still felt a bit stressed but the fear of failure, kind of started going away." (Student #7)

> "I felt relieved, I would say, I guess yeah. Because its kind of in a way was me telling myself like, *Okay, look, you're doing something else so you're busy*. *So, it's fine. You don't have to work on it now*. You know, like, let's say I'd be cooking. I'm like, *okay, you're busy cooking*. So, it's like the relief of like, *Okay, I'm busy right now*. So that's okay. That's an excuse to not actually work on studying for my exam." (Student #8)

> "I would say yeah, all five of them [referring to the alternate activities] would be different because it's almost like I have them on a scale of like how much I've given up. So, if I've totally given up that's like, I'll be playing video games like get into something totally forget. And then you know, each level below that is me pretending I haven't quite given up. So you know, if I just like watching YouTube videos, there's something I'm going to be telling myself. *You know, I'm still going to, I'll do it like, I'll do it sometime tonight*. And then, you know, if I'm like, I, like, I'll just eat instead. I'll go to do something and I'm like, No, I'm hungry. And then I'll use a reason to procrastinate. But again, with that one, I'll tell myself, *no, like, I'm just going to eat quick. And then I'll and then I'll get started*. Same with, you know, sort of social media. And then I also feel like I use doing other tasks like, you know, organizing stuff or doing little things like responding to an email, as well as working on like a smaller school assignment and just sort of trying to feel good about myself, like, *oh, no, look, I'm doing something productive*. So yeah, definitely. Those are all like sort of five different options for me in terms of like, how much do I want to give up or how much do I want to like lie to myself and believe that I'm still going to be productive tonight." (Student #9)

> "Yeah, I mean, definitely hanging out with friends and in all that stuff, and, you know, maybe playing video games or whatever. I definitely did enjoy those two more than the other ones [other alternate tasks he mentioned in the online study]. I wouldn't say I really enjoyed them. But it's more like these days, maybe and addiction if you want to call. I just go to them because you know, my mind has become fixated on them. And then like, just, you know, do whatever. So, it's not really enjoyment per se." (Student #10)

Some students described that they still had lingering thoughts about the academic tasks when they were taking part in the alternate activities. The persisting thoughts of the pending academic tasks were stronger specifically when they took part in activities that they enjoyed less (e.g., Watching Netflix, YouTube videos). These students reported that they felt guilty to some extent because they still have an unfinished academic task that they are needlessly delaying. They acknowledged that they should have worked on their

academic task, but they acted against their better judgement and chose the gratifying activities instead.

> "Like, the alternate activities. I'm kind of doing them to try to relieve the stress. And really, it's [lingering thoughts of academic task] in the back of my head like it's still there. It doesn't erase the problem that I need to do the readings. It's just trying to distract myself but it doesn't work very well. Yeah so, I still feel all those like negative feelings around. [But] I'm not thinking like if I can completely forget about the other tasks [referring to academic task]. I'm just [also] happy. Just doing what I want to do [referring to alternate activities]. Like sure I made the choice to do those [alternate] activities. I'm happy about it. More content, calm. Well, like cleaning, for example is like a huge stress release. Like it's, it's a physical kind of activity where you're actually like moving around, and it makes your environment better. It makes your environment more pleasant to be in. So, it's definitely a stress reliever. At least for me. I know some people hate cleaning, but I'm kind of a neat freak and unlike the other tasks." (Student #1)

> "Because it was at the back of my mind. Like, I'm like, I know I'm going to have to do that. That's something I can't just like not do. But just like, like doing any of those things [referring to alternate activities] like it's [thoughts of academic tasks] still there. Cooking less so because I'm able to just like, shut everything off. But shoveling like I'm thinking about it [academic task] the whole time and then like YouTube videos like every time I start a new video, I'm like, you should not do that but I keep watching…. Um, cooking is probably higher (feel much better), like, if I am putting stuff off…. But YouTube videos, I'm not feeling good at all." (Student #5)

> "So, it [referring to alternate activities] took my mind off task [academic task], and I felt happier. [However,] I do feel a bit of the negative emotions. In the back of my mind, it [thoughts of the pending academic task] was still at the back [of my mind]." (Student #6)

> "I feel pretty, what's the word. Um, I feel like it's kind of hanging over me. Like, I know that I'm supposed to do another task [academic task]. I feel kind of guilty. Especially because I'm thinking I know what I should be doing. And I have, like, a little motivation to do it [work on the academic task] but I still feel like I should be doing it. And it's just kind of like in my head." (Student #7)

> "Oh, yeah, some of the negative emotions would like come and go. But it still didn't make me want to like work on it, you know. Let's say while I'm on social media, *okay, I don't have anything to do,* you know. I could study but I just didn't." (Student #8)

> "I felt all right. I felt okay. I felt content. I felt relaxed. So yeah, I felt like I was happy…. I was in a good mood that I don't have to deal with the reading and I can do something that I enjoy." (Student #10)

Also, some students noted that they experienced better mood (up-regulation of positive emotions) from doing those alternate activities when they had ample time to complete the tasks but the extent of mood repair diminished as they had less and less time to complete the academic task. One such example is:

> "So again, it varies based on how close the assignments are due. When it comes to playing video games or watching a show or a movie or something, very far off like the assignments not due for two, three weeks, and I definitely don't really feel stressed or any intimidation or anything because again, it's so far away. It doesn't really matter. But much closer, I actually, like say, okay, the day before the psychology test, so um, of course, on that day, I did not play any games, at least from, actually I might have, I actually I don't even remember. But when I'm doing that stuff [referring to alternate activities] closer on, it's definitely something maybe hanging in the back of my mind, but then again, when you're watching something that you really like, or when you're playing something, you tend to get immersed, so you're not even really thinking about the outside world. So, there's definitely that element in terms of social media and stuff." (Student #2)

Experience of Emotions during the Last-Minute Effort Episodes. Students were also asked to report on their experience of emotions during the last-minute effort episodes, that is, when they started working on their academic task very close to the task deadline. Most students noted that the good mood or positive emotions they experienced when they were participating in the other activities subsided near the deadline and they started experiencing the negative emotions again as they had no choice but to work on the unpleasant academic task they were avoiding. They knew that the avoidance coping strategy they used helped them to feel good temporarily. They explained that they started experiencing the academic task induced negative emotions again when they had to work on

the academic task under tremendous time pressure. Some examples of students' experience are presented below:

> "Well, I only really felt anxiety and stress while I was attempting to study and I kind of saw the magnitude of the material. That's when I started feeling anxious and stressed because I was kind of looking at it. I was definitely saying to myself, I don't know if I'm going to be able to study all of this stuff on time. You know, there are definitely times where I thought of, you know, just kind of like maybe, you know, no matter what I do today, the next day, I'm probably not going to do good no matter what. So those thoughts are definitely running through my mind. But I kept going through it and, you know, so I guess that was the time where I felt anxious and stress." [Student #2]

> "I feel irritated because I don't like, feeling like there's something that I need to do. It sounds so stupid, but I don't like being controlled. And it's like, I feel like having that deadline is like controlling in a sense and I can't do anything else except do it [academic task]. I feel so frustrated and angry that I have to do it…. Because you, you get frustrated that you have to do it. Like, it's frustrating that I like don't have more time. And then again, I had like a month. It's just like, I feel like I get frustrated within myself, because I'm like, I had so much time to do this. And now I feel so much pressure. And then I also feel frustrated because I feel like there's this thing that I can't avoid anymore. I have to do it." (Student #3)

> "When I started working on my assignment, I was really stressed, anxious and nervous. All those negative emotions were like increasing including fear of failure…. I was happy that I started the task but I was not enjoying doing the task. Whether I felt relaxed, that's a hard question. Because you're doing it and you have like, almost halfway done and you feel relaxed about that part. But then you also have to do it." [Student #6]

> **"**Initially, I go through kinds of things, I feel stress is, *oh my gosh, like there's a lot more than I thought to do and there's a lot* and then I feel motivated like a rush of like motivation comes right in. I'm thinking, *okay, I can do this, I can do this, I get on to it* [academic task]. Because I'm thinking this is all I have, like, I have to do this. The times coming up, like I have no choice. So, then I get extreme motivation. And then I feel like really happy and excited something can get done. Like I'm pulling it off and everything. Then I get it done." (Student #7)

Some students described that they feel the negative emotions more strongly when they start working on the academic task near the deadline but as they made some progress, they started to feel a little better and experienced more positive emotions and less negative emotions.

> "[Near the deadline as this student made progress] I felt like I felt good. Like, relieved. So that was one of the things like now it's like not anxious and yeah, so going towards more like okay, now I'm getting it, calming down with just not being as worried about I was worried." (Student #4)

> **"**I felt horrible. I was I was really stressed. I was really, really mad at myself for putting it off. Because, like, I also had other exams at the time, like final exams. So, I was really mad at myself. I was upset, you know, stressing and thinking, *why did I put it off?* You know, I have other stuff to do [other academic tasks]. Like there's really horrible feelings…. I felt some positive emotions because again, I was actually not going to study at all. Like, I was just not worried about like failing. But then when I started, I was like, *no, you know, I have to do this. I have to at least try.* So. there was, you know, some positive feelings but it was more negative. Oh, I would say probably, like, I wouldn't say really happy but I would say kind of relieved." (Student #8)

> "It felt good to finally get started. But it was also sort of like, *okay, like, here we go. I have to do all the stuff I didn't want to do*. So, you know, it's a little bit like, this kind of sucks, but also feels pretty good to finally get into it, especially when you start making some progress. As soon as I get started those decrease. So, you know, like, right at the moment that I start doing stuff, right before that all those are high. I'm sort of anxious, but the assignment whatnot and just opening up the document again, started immediately sort of relieved those things. Because, you know, thinking, *okay, like, here we go, like, I'm going to do well on it now that I'm making progress* and all that kind of stuff. So, it's a pretty quick change, I guess, to feeling better about working [on the academic task]. Even right as soon as I just do anything, or even as soon as I okay, I think to myself, *okay, I'm going to get started*. Like as soon as I've actually like committed, you already start to feel a bit better about it." (Student #9)

> **"**I felt a little panicked. I was stressed and I was frustrated. But I knew I needed to get it done. I was quite nervous. So, I was like, okay, I have to do this now because you know, if I don't do it, then I'm not going to do good on the quiz.…When I started making progress, I was like, you know what, maybe I could get this done in one night. So, you know, maybe, you know, it's not such a big deal. So, my stress kind of like went lower a little bit." (Student #10)

One student noted that she actually felt much better when she started working on the academic task near the deadline. She realized that the academic task was rather simple and easy to complete. She expressed regret for not starting early and complete this task ahead of time.

> "That's when like, I started feeling better, like, I would feel good and I'd like start thinking like, *Oh, this was like, so easy. I should have just done this before*. I don't know why I was putting it off for so long. Because like, this assignment in particular, it's like pretty easy. Like, you can finish it within a day in like a couple of hours. So, it was just like, it made me like happy that I was finally working on it. But then it also like made me angry that I spent so much time doing other things when I could have just done it before. It was a relief of stress. Like I was actually working on it. And I knew like once I started working on it, like I'll be done before the deadline like it'll be fine. I felt like I felt good. Like, relieved. So that was one of the things like now it's like not anxious and yeah, so going towards more like okay, now I'm getting it, calming down with just not being as worried about I was worried." (Student #4)

Although this student mentioned that she felt better when she started working on the academic task, she also noted that the task was in fact boring. Her explanation reflects that she did not fully like the task despite the task being an easy one and that she was able to meet the deadline under pressure.

> "…. It can get boring because you know exactly what you want to write. And like, since this assignment, it's like a full year course. So, I've had to do like five of them before. So, I guess it's pretty repetitive. Like you're just right, like it's the same layout, and it'll get boring and it'll make me want to like stop working on that again. But like, the button will make me like push through it." (Student #4)

Narrative Inquiry of Preference Reversal during Procrastination

It will be recalled that the role of negative emotions was also investigated to understand preference reversal in this study. In particular, the role of perceived threat was investigated to understand why procrastinating students choose to engage in the academic task near the deadline. Thus, besides the negative emotions from Study 2b, students were also asked to elaborate on their ratings on whether they perceived the academic task deadline as a threat when they were procrastinating and when they started working on their academic task near the deadline. If they did find the deadline as threatening, they were further asked to

explain why they felt threatened by the task deadline, to get an explicit idiographic account of preference reversal.

Level of Threat during the Procrastination Episodes. First, students reflected on whether they felt threatened when they were procrastinating but had sufficient time to complete the academic task. A few students noted that they felt some level of threat when they were procrastinating whereas others noted that they did not feel as threatened that made them think that they ought to do the academic task when the deadline was far away.

> "Like all those like negative emotions. Probably like, a little bit anxious, a little bit nervous a little bit threatened because of the whole, like, you know, the voice in your head was like, *what if you don't do well. If you don't do this, then you're going to fail,* you know, like all the like little insecurities and irrational fears." (Student #1)

> "I did. That's what stressed me out. I kept on thinking okay, like if I don't get a good mark on this quiz, but it's not going to do and that's going to affect my other quizzes. Um, and I really love psychology I love it. So, I'm thinking like, I want to read the text like I really was interested in it, but I know how slow I am, and I know how long it's going to take me. So, yeah." (Student #7)

> "I didn't because when I was procrastinating, Well, I can't speak for everybody but to me there's like this confidence to when you procrastinate because if you feel like you don't need to do an assignment that means you feel that when you can work on it like you'll do well and that you'll be able to do it on time. So, there was definitely an element of confidence when I'm, when I'm procrastinating on anything like yeah, where it's just like, I know that when I get to work, I'm able to do this somebody will do it on time and I'm able to do it well so, there was yeah, there was definitely that." (Student #2)

> "I wasn't like worried about completing it as much because I thought that I would have time." (Student #4)

> "Probably just for like, a short period of time. Not like, most of the time. Yeah, because again, like I just kind of, you know, I just kind of put in the back of my head like, I wasn't really thinking about it. And even if I did think about it, I accepted the fact that I was going to fail. So, I don't know I really did kind of, didn't matter at that point." (Student #8)

> "Yeah. As soon as you put it off, you start to think about, you know, what might happen if I keep putting it off. And certainly, you know, the mark is the worry there about, you know, am I going to be able to get this done if I, if I put it off, or,

> you know, am I going to do a bad job of it or whatever. So, the threat of getting lower marks, nothing like drastic. I'll always pull something off. You feel, you know, a little threatened by like, you know, the difficulty of the course as a whole and that it's like, well, you know, maybe I'm not so like, on top of this." (Student #9)

Interestingly, a few students clearly described how their perception of the academic task deadline as a threat changed when they had ample time to work on their academic task but they procrastinated, and near the deadline when there was insufficient time. As the deadline approached, these students noted feeling more stressed which culminated in perceiving the deadline more like a threat.

> "It's a lot less. It's a lot less [perceiving deadline as a threat]. Yeah. Because like at the beginning of the week, obviously like, I'm like, I have time. And it's not like as bad but there's, there's still this pressure. And that's why it's out of five [she is providing a rating to the level of threat she experienced]. But then if you go and it's like, a day before that, it's like at a 10 [perceived level of threat closer to the deadline] because it's like, *okay, now you can't like postpone anymore.* But if it's like the week before, I like still feel that I'm like, *Oh, I only have a week to do this.* And I like see it in my head. I'm like, you have Monday, Tuesday, Wednesday, Thursday, right before it's due on Friday. And it's like, I know, there's some days that I can't like fully work on it like Wednesday I can't. And so, I tell myself, I only have like three days left. And then I'm like, I don't do anything on the Mondays then I think *oh, I have two days left.* And then that's how like my stress kind of accumulates even though it's like a week before." (Student #3)

> "Yeah, it wasn't as obvious when I was procrastinating but it was gradually more and more [felt threatened] near the deadline." (Student #5)

Level of Threat during the Last-Minute Effort Episodes. Students were also asked to reflect on whether they perceived the academic task deadline as a threat when the deadline was quite close and they had limited time to work on their pending academic task. To this question, students reported that they did feel threatened near the deadline because they were concerned about the repercussions of not completing their academic task. These students said that they were mainly worried about the consequences of poor academic performance and

fear of failing the course. A few students explained that they were fearful of negative evaluation from parents for failing in academia. Some descriptions of how students interpreted the level of threat associated with academic task deadline are provided below:

> **"**Yeah, I think definitely when you miss something that's like mandatory attendance, you definitely feel guilty. It's like you lose 2% every time you don't show up. And like, it doesn't seem like a lot, but it adds up if you were to miss a lot of the discussions or tutorials or whatever. So, I'm like, yeah, guilty, a little bit threatened. Especially when you like look at the clock and you think like, *oh, right now I would be in this* [referring to the tutorial] *and you're not, you're doing whatever else*." (Student #1)
>
> **"**I can't really think of anything else. I think it's really poor performance. That's what was running through my mind for the psychology. Because, you know, it was a test, 36% of our marks [grades]. So, if you fail it, it's going to be a horrific uphill battle for the rest of the semester. So, I guess that's what, that's what I was thinking. That's why that was my main driving motivation [to start and complete the academic task near the deadline], yeah." (Student #2)
>
> **"**I feel like fear of performance was it was one. And then also, there's the fact of like, the parents because it's like, I have an assignment due in a week. And that's like the day of and I'm like talking to my parents, and I'm like, on the phone with them on FaceTime. And I'm like, this assignment is due right now and I'm so stressed. And then they ask like, "how much time did you have to do it?" And I'm like, *like a week*, and they would just be like, "Well, you had a week to do it!" So, then there's like that pressure of like, *okay, this is a thing that I should have done* and then there's like this fear of failure because you had so much time and you have like people telling you that you had so much time and it's like, yeah, I guess fear of failure and the parents' thing [fear of negative evaluation from parents] is a good combination." (Student #3)
>
> "Felt like a threat [referring to academic task deadline as a threat]. It may impact, my GPA, my grades." (Student #4)
>
> "Okay, so when I first started, I realized how actually important this was. And also reminding myself that no, I actually don't want to fail. That's when the fear of failure like came back to me because I like I didn't want to not get the credit and have to replace it. And then, you know, like, I didn't want any of that. So, I just, that's what kind of motivated me to actually start studying." (Student #8)
>
> "Um, yeah, I think so. Because I think it's the threat sort of increasing that causes me to actually start working. So, yeah, when I, if I make the decision to put it off, it's because the sort of desire to not have to deal with it and, you know, trying to get that relief of putting it off outweighs, you know, I'm totally screwed. The threat of getting low marks and then you know, as it sort of those sorts of flip flop

> and then the threat is way bigger than, you know, the relief you're going to get. That's when I like, *okay, I'm going to work on this stuff*." (Student #9)

One student noted that even though she perceived the deadline as threatening and stressful, her motivation to work on the academic task near the deadline increased as she made progress on the academic task. She perceived the deadline as relatively less threatening as she was determined to finish the pending academic task she procrastinated on.

> "I realized how much work it is. So, the feeling like, yeah, being feeling threatened a little bit came with like, the stress and the anxiety of it. And the amount of difficulty I felt I kind of had at the beginning…. It [perceiving academic deadline as a threat] was there but wasn't very prominent, but it was there. Because my motivation got really high all of a sudden, so I thought, okay, I know I'm a motivated person. When I start something, I do get it done, especially if it's near the deadline. And when my motivation goes up, and my stress level goes up, that just motivates me even further to do and so, I knew I'd get it done and I knew I'd understand it." (Student #7)

Another student noted that he perceived the deadline as a threat because he is a perfectionist and he wanted to get a perfect grade. The deadline motivated him to attempt the academic task (i.e., reading a 250-page long book on the last day to complete a short quiz) as he was fearful that he might get a poor mark on the quiz if he had not started at that point.

> "Maybe because, you know, I'd say that I'm a perfectionist. So, even though this book will likely just speed three multiple choice questions, this entire book will literally just have three multiple choice questions because I was like, *okay, I have to get perfect marks on the quiz in order to, you know, get like an A+*. So, I was like, okay, if I don't read the book, then I'm probably going to do bad. So, I was like, okay, I better get this done, because I might not get it perfect mark on the quiz." (Student #10)

Narrative Inquiry of Motivational Dimensions during the Procrastination Episodes and the Last-Minute Effort Episodes.

Appraisal of Academic Task on Motivation. Next, students were asked about their level of motivation to work on the academic task during the *procrastination episodes* and they all noted that their motivation was very low. Most students' typical responses, as noted in the earlier sections, were that the negative emotions they experienced when attempting the academic tasks refrained them from doing the task. They also explained that their justifications contributed to their low motivation when they had plenty of time to work on the academic task such as *I have more time*, *I need to feel the time pressure to do it*, or simply, *I will do it later* (see previous sections on narrative inquiry of emotions). These responses were not included here to avoid redundancy. Additionally, students reflected on how their perceived task difficulty when attempting the academic task motivated their procrastination, which are presented later in the cognitive appraisal section.

> "While procrastinating that's [motivation] definitely low because, yeah especially when it's so far out." (Student #2)
>
> "Yeah, I would say I [was] less motivated to do it." (Student #3)
>
> "I was not motivated at all to work on the task." (Student #4)
>
> "I was procrastinating and so, my motivation to work on the academic task was like really low. It was really low." (Student #5)
>
> "Not very motivated to work on the academic task." (Student #7)
>
> "Probably not very motivated. I think that sort of contributes to the whole thing…. because, you know, there's the pressure of doing the task. And I'm like, you know, it'd be really great to get this done. So, I am motivated in that sense, but because of all the reasons, you know, the justifications I've given myself for why I can put it off, you know, you lose motivation in that sense." (Student #9)

> "Yeah, my motivation to do the task [academic task] was low at that point [during the procrastination phase]" (Student #10)

However, all students reported that they were very motivated to engage in relatively more pleasant activities when they were procrastinating. The alternate activities served as an escape from the unpleasant feelings associated with the academic task. One example excerpt reflecting motivation towards alternate activities is:

> "I'm seeing kind of the, I guess the relative motivation makes sense to kind of discuss like where you're less motivated to do the reading, and you're more motivated in the other task, and it's because of the negative experience I was having with the task [talking about aversive nature of the academic task]." (Student #1)

All students reported that they were very motivated to complete the academic task as the deadline approached (i.e., *the last-minute effort episodes*). As described in the previous section, many students perceived the deadline as a threat which persuaded them to complete the academic task much closer to the deadline. They wanted to avoid the consequence of not meeting the deadline (e.g., poor academic performance, failing the course). A few of these students also noted that they wanted to get over with the aversive academic task so that they can have some free, fun time afterwards. Others noted that they were motivated to get a high mark and so, they started to work on the task even though it was clearly a last-minute effort. These students did not want to lose the opportunity to earn good grades despite the fact that they procrastinated. Only one student described that he was motivated to work on the academic task near the deadline because he wanted to meet his internal standard of getting a good grade. It seemed from his explanation that he did not want to miss the opportunity to earn a good grade because of not completing the academic task.

> "Definitely, like pretty motivated, because I want to be finished. I want to be done with it. I want to put that stress away for a little bit so that I can go do something fun and go do something that I think is more interesting." (Student #1)

> "When I started the reading, I'd say like a good motivation. It's gets pretty high…. Just thinking about how like, I have to finish it. I know I can finish it. The deadline is coming soon. I really do care about my mark. I want to get a high mark. Yeah, just thinking about the mark in my mind. So, I always have marks in mind thinking *okay, I need to get high mark on this. I want to get high mark in this.*" (Student #7)

> "I was motivated to do the task [academic task] near the deadline." (Student #8)

> "Yeah, like really high [motivation], which is the only reason I'm doing it anyways, is because I'm now like, super motivated to get them done. Fear of failure sort of that's what causes the motivation. So, they go up together." (Student #9)

> "No, I was pretty motivated to do it. I would say like an eight out of 10 [provided a rating to explain his motivation], you know. I need to get this done to match it with my internal standard [getting a good grade], my own values of being a perfectionist." (Student #10)

One student explained that his motivation to work on the academic task, when he was procrastinating, was very low but when the deadline approached and he started working on the academic task, he was more motivated to do the task, However, he noted that while he attempted the task, his level of motivation was changing in a cycle where in one moment he felt motivated and then in the next moment he felt less motivated, doubting whether he will be able to complete the academic task. Following the low motivation, he then experienced a burst of motivation again. His explanation is as follows:

> "Well, when I was not working on it, I definitely never really feel a lot of motivation. Like obviously, I wanted to do other things than psychology. I wasn't really a fan of it. But while I was doing it, my motivation was definitely beginning to waver because I would have bursts of motivation. Motivation where I would be studying really hard and memorizing as much as I could but there would also be times where you know the due dates coming so close it was

> literally the next day you know, where I'd kind of just kind of lose motivation for a little bit and I just sit back and be like, *I don't know if I could do this is way too much. What if I fail!* So, that's um, so that was kind of my motivation was definitely wavering while I was studying to kind of waver for about half an hour. Wow, just kind of be looking at my stuff kind of depressed, but then the burst comes back, I would memorize more and more look at more and more for about maybe two, three hours, and then I'll just kind of lose motivation again. So just got it was like a cycle." (Student #2)

Appraisal of Academic Task on Autonomy and Control. The majority of the students noted that they did feel that they had control and that they had autonomy to decide on whether to work on the academic task or not during the procrastination episodes. The explanation of autonomy and control are discussed together in this section because students often discussed these concepts together. Although students shared the same perception that they had control, their rationale for control during procrastination did vary. One student described that she had free will to simply get started with the academic task, but she also explained that she worked against her better judgement and made a choice to not work on the academic task. Another student explained that he definitely felt having full control because he had planned when he would work on the academic task which gave him confidence to execute the plan and yet he did not act on his plan, not until he had little time left. Yet another student explained that she had control which is why she was able to postpone the academic task, however, as she was postponing the task, she felt she was also losing control over the task.

> "So like, in the sense that, obviously, I have the free will to go and do the thing that I have to do, or the readings. I have that but then there's like other parts that are holding me back, right? Like, I'm like, it's still myself holding me back. Like, it's, I do have the autonomy, it's probably higher than I rated it. And then like, you know, like the anxieties of all the other things, like I just feel like, life is always busy. But there's sometimes where it's definitely more busy than other times. And then you're like, yeah, I have a choice here. But do I actually, because this paper is due tomorrow in this reading, if I never do it, no one will know…. Like I have

> full capacity to do it. I'm making that choice. Like, no one's forcing me to do anything because it's assigned reading like I'm supposed to, but there's no one there to be like, sit down, do it now. It's just my choices that I make that you're making." (Student #1)

> "I had full autonomy to get started with the academic task." (Student #6)

> "Yeah, I did. I had autonomy. I knew I could change it and turn it around and work on it. I knew but I still procrastinated on it." (Student #7)

> "Yeah, I had full autonomy to decide when I want to work on the academic task." (Student #8)

> "Okay. I feel like I did have control in this [academic task]….it was just when I was thinking, I was like, *oh, this is not going to be a big deal*. I know I'm going to be able to do this in this much time, this much time and this much time. Like that's what I was thinking about before. So, if that's what you mean by control, then I definitely felt confident just like you know what, this is going to take three hours on Sunday, this is going to take three hours to study and all, by the time the days up. So, I definitely felt like I had control." (Student #2)

> "When I'm procrastinating, like, I have control because like, I am deciding to postpone doing it. And I have this gut feeling that I can, like, postpone it. So, I feel like I'm in control. I would say five [provided rating out of 10], because then there's, like, obviously, you're in control of the fact that you're like, pushing it back. But there's also like that loss of control in the back of my mind that's like, *you have to do this. you have to do this.*" (Student #3)

Another student described that he perceived that he had control over the situation when he was procrastinating but it was most likely a false sense of control. He explained that the control he experienced only provided a misconception that he can figure out how to do the academic task. The perceived control helped him to postpone the academic task.

> "I would say I felt like I had control. I probably didn't. You know, whenever you make a decision like that about, *oh, you know, I'm going to figure it out later.* You're like, *Nah, I know what I'm doing. Once I need to do it*, *I'll decide to do it. I'm fine. I'm in control.* I don't think I had control. I don't think I really was [in control]." (Student #9)

Only one student reported that she did not experience any control because she did not work on the assignment at all when she was procrastinating. She explained that she would have experienced control over the academic task only if she had worked on it to some extent.

> "Like, no control. I don't know like, once I like, at least if I had written down ideas or something [for the assignment], I'll be like okay, but yeah, I know if I completely like push it off like the assignment like, I don't feel like I have control at all." (Student #5)

When students were asked about control and autonomy during the last-minute effort episodes, some students felt that they had the autonomy to choose to work on the academic task and control over the academic task depending on the task they needed to complete.

> "I still have like that autonomy or that control to do it. It's just like forcing yourself to finish what you started." (Student #1)

> "I would say pretty high, like an eight [provided a rating out of 10] because I was starting, I'm like, *Okay, I know what can do it. I've actually started it.* I felt like a bit more motivated now. So, I felt more in control of the situation [working on the academic task]." (Student #7)

> "I definitely thought I had full control. Yeah, um, I just thought I could get it done. Yeah, I did feel like I has autonomy too, to decide when to do it. I feel like I still had a lot of control, to be honest, because I felt like a coin to myself. I maybe could still get it done in a tie. So, I still felt a good degree of autonomy. Maybe in reality that was not the case. But at least that's how I felt." (Student #10)

One student explicitly discussed that she thought she had less control on the academic tasks when she was procrastinating but as she worked on the academic task near the deadline, she found that she actually had more control over the academic task than she had initially thought.

> "I had more control near the deadline. Yeah, I would say, just because like I was doing something about it, you know, versus like just when I push something off, I'm like*, I didn't know exactly what I'm going to do*. It's just me in the future before the deadline. So that like, I felt a bit of the loss of control there. But I'm like, *okay, this is what I'm working on. It's right now*, like, that's when I'm like, okay, *I've control*." (Student #5)

Other students reported they did not perceive any control and autonomy as they did not have enough time to complete the academic task closer to the deadline. They felt rushed to meet the task deadline. Only one student explained that she had the autonomy to engage in the academic task on her own volition, but she did not perceive having full control over the academic task.

> "Um, I would say in that moment, I don't think I had a lot of control. We did have a study guide. So, I did know where to go like what to look at, but he wanted us to look at textbooks, like chapters of a textbook and his PowerPoint [slides], and anything in those sections could have been in it. But of course, I didn't have time to look at anything. So, I definitely didn't feel like I had as much control or autonomy." (Student #2)

> "Yeah. Um, no, I would say like, less control" (Student #3)

> "Obviously, I don't have as much time. I just had to, like, get it done. So, I didn't have like full control over what I could do. But like, I had enough, like, I had control that I could, like you know, finish what the criteria was to do the assignment…. That's I guess, autonomy still high because I could still manage the, like assignment by myself." (Student #4)

Appraisal of Academic Task on Competence. When students were asked to reflect on their competence, most of the students noted that they perceived themselves to be competent to complete the academic task when they were procrastinating. Students explained that their self-perception of high competence made them think that they needed only a day or two to complete the academic task, which led to their decision to needlessly delay working on the task.

> "So yeah, I'm fully competent to do the readings. Like I can do them. I will do them eventually. But like, even if there's nothing else in the way, I still don't want to do it. Like it's not something that's fun….But like no one knows there's not really any there's not really any repercussions from not doing what I'm supposed to do. Because I'm especially with like, psychology readings, I'm going to learn that intellectually. Somebody else is going to teach it to me later. *Do I have to sit here and teach it to myself?* There are no repercussions." (Student #1)

> "I feel like I have confidence in myself to do it [academic task]. So, because like, I have this feeling of like, you can postpone this, I guess it's a good feeling. So, it's like, I go with my gut feeling and if I feel like, I'm going to be competent and like be able to do it [complete the academic task]….Yeah, it definitely does trigger the procrastination. Yeah." (Student #3)

> "Yeah, that's like, literally why I would procrastinate and have the reason why like I knew I would be able to do it [academic task]. I think I am competent to do it. But then I thought I would just put it off for so long that there wouldn't be enough time to do it properly." (Student #4)

> "Usually, I think, like, I wouldn't need the full two weeks, I think two days or so is good enough to complete the task. I'm competent to get it done." (Student #6)

> "I felt pretty competent. I knew I could get it done. I knew it would take longer. That's why I procrastinate but I knew, I felt pretty competent, probably like an eight [provided a rating out of 10]. I knew I could get it done eventually and then I would. And that I could handle it even though it's a lot of reading, it's going to take time. It's a lot of notetakings. I knew that but I felt pretty competent." (Student #7)

> "Yeah, absolutely I was competent to do the task. I mean, it's just reading a book. I felt like I have the skills necessary to get it done." (Student #10)

When the question about competence was asked, one student reported that she measured her competence relative to other students in the class and she perceived being less competent compared to other students when she was procrastinating on her religion assignment.

> "I think I was like able to come up with something. I just didn't think it'd be like, the best thing. Because it was so broad (referring to the assignment) and because like with that class I'm very like, I don't know, I find like, I don't really fit in. Like the way they (referring to other students in the class) theorize and just like the way their minds think (about the course religion material), I'm like, that's really

> interesting, but I never thought about it that way. And so that like, was in the back of my mind too. When I was like, pushing it off. I'm like, *they're going to have better papers than you and you are just going to be like not getting to the depths of things. You'll be at the very surface level.*" (Student #5)

Some of the students who perceived that they were competent to finish the academic task in a short amount of time when they were procrastinating, they reflected that their perception had changed near the deadline. These students found themselves to be less competent to finish the task in such a short amount of time during the last-minute effort episodes.

> "For the psychology tests, in terms of competence, I would say it was low because again, it was the day of. There's so much material and there was only so much I could cover." (Student #2)

> "I was like, I knew I was competent to do it and I had to get done. Like what I was doing. That's still high. Yeah, it's just like, the timing." (Student #4)

> "Well, I was kind of worried in terms of competency whether I would get it done in one night. And that was something that was worrying me. So, I felt like no, maybe my competency in terms of getting it done on time maybe not so great." (Student #10)

A couple of students, who had reported that they perceived themselves as competent to do the academic task when they were procrastinating, still perceived that they were competent to do the academic task near the deadline. Their level competence did not change from the procrastination episodes to the last-minute effort episodes.

> "I guess I felt competent to do the academic task." (Student #6)

> "I did, I did feel competent to get the work done." (Student #7)

Another student explained that when she started working on the academic task very close to the deadline, she perceived herself to be less competent to work on the

academic task. However, as she made progress on the task, she found herself to be competent to continue working on the task.

> "Like, I think the more I worked on it, like I gained more confidence in my abilities. Like, when I first started, I'm like*, okay, just go, like start writing whatever it is*. And then like the more I started typing, I'm like, *hey! that's actually like a decent idea. I can expand on it.*" (Student #5)

Narrative Inquiry of Cognitive Appraisals of Academic and Alternate Tasks during Procrastination

Appraisals of Academic Task on Importance. The discussion on task importance during the interviews clarified the results of the quantitative analyses. It was discovered during the interviews that students had misinterpreted the question pertaining to task importance in the quantitative study. The original question asked whether students found the academic task they were procrastinating on to be important (i.e., generally important). When answering the online questionnaires, students had misconstrued the question on general importance as whether it was important to do the academic task. As such, their answers to the task importance question were further clarified during the interview by asking two distinct questions: how important it was to work on the academic task during the procrastination episodes and the last-minute effort episodes, and in general, how important they thought this academic task was to them. Thematic analysis showed that the importance of working on the academic task changed as the deadline approached for these students. That is, when they had plenty of time to complete the academic task, they did not find it important to commence the task; whereas the importance of working on the academic task became a priority when the deadline was very close. However, students' explanation indicated no change in their overall perceived importance of the academic task between the procrastination episodes and when they finally attempted the task in the last-minute effort episodes.

"In terms of importance, yeah, when I'm procrastinating, the meaning of it is yet diminished, because it's just, it's so far away. It doesn't feel important…. Um, yeah, definitely come back on it. In general, it was definitely important. 36% of your mark is really important to me. I would say nine to ten [provided a high rating] because, yeah, that was like, one of our that was like, we had online quizzes that we had to do. But that was our first major like, assessment. So, it was definitely really important." (Student #2)

"It was a very important assignment, but I didn't realize it until I was doing it. So, obviously, I was because it was my first case summary, which is where you read a case, and then we'll put it into four pages or three. And so, I've never done that before. It's my first semester here. So I was, it's like, you realize the importance of it while you're doing it. Because obviously, if it's like an assignment that doesn't like matter in real life situation, then I would put less weight on it. But then if it's like, I'm looking at it, and it's like, this is how the judicial system works. And then like, it's interesting things and I realized that this is like stuff for my everyday life that's really useful to me…. I would think it would remain the same or remain the same. Like, I'm like, I like I really appreciate school. That assignment was important to me. So, like, obviously, if it was like a sociology quiz or something, I wouldn't see it as important because it's like, general knowledge. But then if it's like really specific law things, it's like really interesting to me. So, it's like to me that's important is the more interested you are, the more important it gets." (Student #3).

"I still think my human rights essay was still important [referring to the perceived general importance]." (Student #4)

"I'd say the general importance of the academic tasks was about the same…. Um, but if it is the importance of doing the academic task [near the deadline], I think it went up a bit in terms of doing it because I'm realizing how important it is to do it and how much work it takes and how much it counts towards my grade. I say it goes up a bit goes up a bit." (Student #7)

"I felt it was important until like, after, like when I actually started reading, that's when I felt it felt that it was important. During the procrastination, I didn't find it important because I wasn't thinking about it…. I think it wasn't important to me in general…. yeah, because even when I took action, I was still like telling myself like, *okay, even if you feel like this now, you're going to study well. Even if you fail, it's fine.* You know, it's not the end of the world. So, I don't think I really took it as being that important in general, I guess." (Student #8)

"Yeah, I definitely put it a bit higher [rating of general importance]. Because, you know, computer science is one of the courses I'm doing pretty well and I use it as sort of a source of like, continuing to get good marks to sort of help out some other marks and other courses. So, I really do care about the box in that and the assignments are worth quite a bit. So, in terms of just the whole scale at any point,

> whatever, it's like an eight or nine in terms of importance…. I would say it stays the same. My attitude towards the important of doing the task changes throughout, but I would say all the way through I'm pretty clear on how crucial it is to get it done [importance of academic task generally did not change] and do a good job of it. So I'd say stays the same." (Student #9)

Thematic analysis also revealed that the students who regarded their academic task as being important, provided different reasons for why they thought the task was important. One student explained that since the academic task she was procrastinating on was emphasized by her professor and so, it must be important to learn. Another student explained that because she was allowed to choose her own topic to write the assignment, she chose a topic that she thought was important to her, even though she procrastinated on writing the assignment. Students also assessed the importance of the academic tasks based on how much the task counted towards the final grade.

> "It's high in terms of importance solely because my professor likes to put textbook questions in the midterms and the final, because she wants us to read them. And it's probably best if you read them, it probably does reinforce your learning. But, again, I don't want to do it." (Student # 1)

> "Like it's, I guess it's pretty important like because I, I like the assignment because I guess we get to choose our own topics too. And we got to talk about stuff that we feel like, like is important to us. So, I guess that's why it's important. Like, it's, like valuable to me." (Student #4)

> "I knew it was important from the beginning." (Student #6)

> "I felt that was pretty important because the quiz kind of counts for the rest of the marks. It was like 24% for all the quizzes." (Student #7)

Some students did not think the academic tasks they were procrastinating on were actually important to them. Students perceived these academic tasks were of low importance for a number of reasons: the academic task they were procrastinating on was part of a course not importance for the degree, they simply found the course to be

unimportant and thus, the assignment, the content of the assignment was less relatable to what they wanted to do, the concepts they had to study were abstract, or the percentage of the academic task did not count much towards the final grade. Again, their overall perception of importance did not change between the procrastination and the last-minute effort episodes.

> "In terms of the grand scheme of everything, probably not especially, I'm not really enjoying the course. So, I don't know if I'm even going to take it again next year. So, in terms of personally, it's not really that important to me. And my degree is a law. So, it's not really important for that either." (Student #2)

> "No, like the topic wasn't something that I thought was important. It's like religion courses. I'm taking it as it is a requirement for the grad school I want to go to. It's St. Paul's University. So, I have to take like some religion courses. So, I honestly like don't really care about that class in particular like, a lot of it is very I don't know, like philosophical like it's more abstract concepts versus like, having something concrete." (Student #5)

> "I did not really find it important because as I said, it doesn't really count for much in the course. And so given that I have a lot of time left, I was like, you know what, this is not priority for me. So, I can just put it off. Yeah, even when I had free time, I didn't work on it." (Student #10)

During the procrastination episodes, when students were asked to discuss the importance of the alternate activities they participated in when they were procrastinating, they explained that it is important to have free time to do other activities (e.g., watching Netflix, spending time with friends and family) because these activities can help them relax and they are important for well-being. However, they also acknowledged that they were not important to be carried out when they had a pending academic task; the academic tasks were perceived as more important compared to the pleasurable activities. Students further explained that they engaged in these unimportant activities simply to avoid the aversive academic task.

> "Well, I mean, like the cleaning, hanging out with friends like it is important for your well-being, but like watching Netflix like you don't really need to do that, but like it is, it is nice to like relax, like, you also do need that for your well-being. Like they're not as important as the academic task. Since I value hard work and like good grades and stuff, they're not as important as the academic tasks that I'm supposed to be doing. But in like a broader sense, they're important to take care of yourself." (Student #1)

> "So, like, of course, the assignment is important because you know, you're in university you're paying for us here, grades have to be good. You know, some of us have scholarship where if you keep maintaining good average, you'll get money off your tuition. So of course, that's important. But you know, you also want to enjoy your free time, you also want to have fun and you know, not always focus on work. So, in terms of, for my free time, and just enjoying myself and enjoying life, like those alternate things have, like a lot of importance to me, but of course, that assignment is what's really important. You know, that's kind of what you realize, I don't know if I should get into this, but, um, you know, you kind of realize all the mistakes you make after everything's done. You know, and it's almost like the cycle where every assignment like you almost fall into the same trap thing where you just, you know, you end up procrastinating, but then you know, you do the thing and then after a sudden you're like, man, I shouldn't have procrastinate, next time. I will procrastinate and then You know, kind of happens again." (Student #2)

> "Like they weren't important at all. I was just doing them because I didn't want to do the assignment." (Student #4)

> "Definitely not….I feel they're not as important, not as important." (Student #7)

A few students noted that the importance of alternate tasks depended on which task they were participating on. For instance, one student noted that some of the alternate activities she engaged in were important to be carried out such as cooking or hanging out with friends. However, she explained that social media or texting were unimportant tasks especially when she had an academic task due. Another student explained that he engaged in other easy academic tasks to procrastinate on the aversive academic task. He explained that he perceived the other easier academic tasks were important to do but he

did not perceive browsing social media or watching Netflix as being important compared to the academic task he was procrastinating on.

> "It depends on us. Because again, like cooking, it's kind of a responsibility because I'm cooking like for my family. Hanging out with friends, I also feel like it's kind of responsible because like you, you know, you're hosting everything, because your friends are over, so you're kind of the host, so it's kind of a responsibility. But also, the other stuff not really not important, like social media. Also, same with texting. It's like pretty low on like importance." (Student #8)

> "I would say the only one that feels important is when you're doing you know, other school tasks or something. That's part of why you know, that's something I do is because they're always sort of important like they're also on my to-do list and whatnot. So, they feel somewhat important to get done. You know, stuff like browsing social media and stuff doesn't feel important at all." (Student #9)

Appraisals of Academic Task on Difficulty and Challenge. Some of the students reported that they found the academic task they were procrastinating on to be difficult and challenging. The most common reasons they provided about the level of difficulty of the task was that there was too much information to focus on or the content of the academic task was too difficult or hard to understand. Some students explained that the challenging and difficult aspects of the academic task triggered negative emotions like stress and frustration and less of the positive emotions when they attempted the academic task.

> "I felt like it was pretty difficult, especially coming in my first semester thinking, *okay, well, it's a lot of information*. And it won't necessarily be easy to read as much as I'm slow. It's going to be hard and I need to really let it sink in and make sure that I understand it for the quiz. So, I'd say it was pretty difficult…. it was pretty much the same, like, pretty big challenge because, yeah, coming back from high school kind of thing. Like I thought, *Okay, this is a challenge, and it's going to be a lot of work. It's going to be maybe a bit overwhelming*. So yeah, I felt like it was quite a bit of a challenge." (Student #7)

> "I will call it difficult because it takes a lot of time to read, you know, a really big novel [250 pages long book]. And whenever I read books, you know, I can, especially if I have to read it for an academic setting, you know, I do feel stressed, I do feel a little bit of frustration because I'm not really reading it out for my own

> enjoyment. I'm just reading it because I need to get the marks on the quiz." (Student #10)

> "I thought it was really difficult because I honestly didn't understand any of the content. So yeah, I feel like it was like, I knew it was going to be difficult…. I thought it was really difficult because I honestly didn't understand any of the content. So yeah, I feel like it was like, I knew it was going to be difficult…. I just I didn't understand and I was like, *oh, I'll do it later. I'll do it later,* until it kind of piled up." (Student #8)
> "Yeah, very challenging difficult [during the procrastination episodes] because, as I said, when you're reading, reading the requirements, I'm perceiving it to be, *oh, wow, this is like, you know, this is really hard*….But it looks really hard at face value especially. And that's, that's the thing that'll happen sometimes for me that I'll get started and then as soon as I'll run into sort of a roadblock, I'll like, I'll give up and then, you know, press it for another 24 hours. So yeah, it's that running into the difficulty early on. I think that sort of influences the procrastination." (Student #9)

Other students reported that they did not find the academic task difficult or challenging when they were procrastinating. Students explained that they knew what the academic task entailed and all they needed to do was complete the task. The justifications these students provided to themselves to avoid the academic task were that they were feeling lazy to start working or that the task was too easy.

> "Oh, so yeah, it like it's not hard to do. You just have to sit there and read like there's not really any, unless you want, like I highlight. I used to take notes on the textbook and I stopped because I got lazy, but like there's not really any. Like other tests that have to do, I'm not quizzed on it [referring to textbook readings], like some courses, you might have quizzes on the readings or whatever, I'm not quizzed on it. I just have to sit there and read it. It's not difficult. So, then that brings the question then *why don't you just do it*?" (Student #1)

> "No. Like, that's another reason I procrastinate on it a lot. Because it's like, in my head, I'm like, *Oh, I know my topic*. Like, I know exactly what I want to say. I just have to like, you know, type it out. It's only two pages. And so, like I procrastinate because I know it's not difficult for me. But that's another thing about the assignment like, it can only be two pages and then making it concise and I don't give myself enough time to do that while on it." (Student #4)

> "Just that it wasn't really difficult to get it done. So, I just thought, if I set a specific time and stuff, I'd get it done." (Student #6)

Interestingly, some of the students who reported that they did not find the academic task to be difficult or challenging when they were procrastinating, found the task difficult as well as challenging near the deadline. They explained that they experienced tremendous time pressure to complete the academic task in a very short time. Additionally, a number of students explained their perception of academic tasks in terms of difficulty and challenge during the procrastination episodes and the last-minute effort episodes together in the same question. These descriptions more clearly articulated how students' perception of task difficulty changed over time.

> "Probably just like the difficulty or like the challenge is probably coming from like having to physically sit there and read like, I'm not very good at sitting still. I don't have a long attention span. Like I'm usually like, doing something like always. And like even when I am reading, sometimes I'm multitasking like I'm reading it but like today I was reading about, I think like schizophrenia at the same time I was watching a Dr. Phil segment about schizophrenia. I was like, *it's kind of the same thing*. But like reading, but then paying attention, but then reading and then it's like, it's back and forth shift of like, I just don't have a long enough attention span to just solely focus on that. (Student #1)"

> "No, not like, not really. No, it's just like, I'm sick, realizing that I don't have as much time and I'm like, oh, maybe I had another "next day". I could have researched more like but since I didn't have as much time, like I couldn't have, I just had to do what I could get done within that time left but it wasn't like challenging nor difficult." (Student #4)

> "So, definitely difficult and challenging while procrastinating, I didn't really find it challenging until I actually sat down. I saw the amount that we had to learn and what exactly we had to learn. So yeah, it was definitely challenging. It was challenging while I was doing it, but I didn't see it as challenging was procrastinating." (Student #2)

> "I didn't think it was like going to be hard. So like, I didn't think it would be hard. So, I just put it off because I was like, I have time to do all this stuff. And then it wasn't until after that, my friend said it was like 50 pages that I had to read that I was like, *oh my god!* Yeah, but if I had known that it was like 50 pages or

> whatever, I think I would still procrastinate. I would still put it off because I don't like it. I feel like the less time you have, the more important it gets." (Student #3)

> "In the action phase, it kind of hit me like *okay, this is actually difficult this is actually challenging.* Then I think, *why did I put this off?* Um, and then as I go through it kind of lessens, like overall like the negative emotions like start right off and then they lessen. Like the stress the feeling of how important like everything like that in the positive emotions increase. So, the difficulty and also the challenge went down." (Student #7)

In contrast, other students who had described their academic tasks as difficult and challenging when they were procrastinating, reported that they found the tasks to be difficult and challenging when they started working on them near the deadline. However, as they made progress on the tasks, the perceived task difficult lessened.

> "I think like when I was postponing it, like, I thought it was more difficult but like, in the moment [when worked on the academic close to deadline], I'm like I can do this, you know. Even like when I finished it, that was even easier you know than like when I was working on it and when I was pushing it off as well….Um, well I think my confidence in my capabilities, maybe went a bit being like, *you know what, this task isn't as hard as I maybe originally thought* or like, literally, *all I have to do is start typing and then like, something will come up*." (Student #5)

> "You definitely run into that same level of difficulty. When you get started. You know, you just force yourself through it now, but that same thing that you read into when you press it the first time, but like, *okay, this is really challenging*. You hit that again, when you get started. But this time, you just push through it and it doesn't, you know, you don't stop because of it. And then as you go on and make more and more progress, as I said, this sort of perceived difficulty sometimes goes down. Sometimes you'll you know, specifically in computer science, because it's sort of a requirement list. Sometimes like the fifth and seventh will be really hard. So, it sort of fluctuates. But definitely is, you know, as you get a handle on things and see that you're getting stuff done. It feels less difficult." (Student #9)

Only one student explained that he perceived the academic task as even more difficult and challenging when he started working on it near the deadline than he had originally anticipated when he was procrastinating.

> "Yeah, I didn't like it. It was very long and I still felt negative emotions and frustrated and stressed and yeah, I didn't like it. I would say the difficulty and challenge maybe trended up because I have underestimated how much time it will take me to do it." (Student #10)

Appraisals of Academic Task on Outcome (Likelihood of Success). In terms of outcome expectancy, some students explained that they thought they would experience positive outcomes which essentially helped them to justify their procrastination. Among these students, only one student mentioned that he had some moments during the procrastination episodes where he had doubts that he may not be successful.

> "I would, because the only way I can let myself procrastinate is if I think I'm going to do well." (Student #3)

> "When I was procrastinating, I was thinking I'm going to do well anyway, because I will get it done maybe just not as like much earlier as I should. But I felt, yeah, I felt like I was going to do pretty well…. I thought, I felt like it would work out and I'd definitely get it done." (Student #7)

> "Yeah, I did think I would succeed. Eventually I can get it done. I can read all the pages and like, I would be fine." (Student #10)

> "It's sort of fluctuating like I think. It's part of the stress of it. Because you're like, *No, I'm good. I'm going to be successful*. Well, maybe I'm not going to be, you know, oh, but no, *I'm good*. So, you know, it seems like these difficult phases to go through where you're sort of uncertain about the whole thing." (Student #9)

Another student expressed that the more time she wasted procrastinating, the less was her chance to succeed on the academic task. By procrastinating, she was diminishing her chance to succeed but she still procrastinated.

> "Like I knew the more time I was like letting go by, I wasn't going to be as successful. Like for like my mark on it and stuff. So, I knew that I shouldn't, like have been procrastinating." (Student #4)

When the same question about outcome, in other words likelihood of success, was asked during the last-minute effort episodes, some students thought that they could have been

more successful or could have a better outcome only if they had started early or if they had a few more days. Conversely, other students perceived that they were capable of doing well as they kept on working on the academic task near the deadline.

> "Yeah, because there was so much that could have been on that test. And of course, there wasn't enough time to cover it all…. with a test, and especially since the study guide, gave us some pointers, and gave us some key terms, but it didn't exactly go into as much detail, every single thing you needed to learn, especially since the textbook had so much text and the PowerPoints had so many different scenarios and stuff. So there is definitely you know, that element of the type of work and the type of assignment that I was, so I definitely felt less confident because if the stuff that I didn't look at wasn't on the test, you know, it's not like in that last day, I had the deepest understanding of the entire of all four units I had to memorize I kind of had surface level maybe a little deeper, but I had like, just kind of surface level understanding of everything. So if None of that stuff was on the test or he asked us to go deeper than you know, that's how I really felt like I wouldn't succeed." (Student #2)

> "It felt like I still got it done. But I wouldn't be as successful. If I started before and didn't procrastinate, I would have succeeded." (Student #4)

> "Yeah, yeah, the more like I was writing, I thought I can succeed on the task. I ended up doing really well. I got like an A on it." (Student #5)

> "Like, I still feel like I could get it down. But I was kind of frustrated because I'm like, *Oh, this is a lot stressful.*" (Student #7)

Appraisals of Academic Task on Value Congruency. Students reported that the inherent value of the academic task did not change between the procrastination episodes and the last-minute effort episodes. They found the academic task they were procrastinating on as either more value congruent or less value congruent and this perception did not change during their procrastination.

> "Yeah, I'd say so. Like, I'm, like I want to do well in school. I value, I value good grades. I value like hard work, and so like, it being work that I have to do that contributes to my value working hard. And like, I think the information is important, especially like it's my major, so I should probably pay attention to it a bit more. It's important." (Student #1)

> "Well, yeah, not really like psychology, when it comes to classes that I'm not really a fan of, of course, that element of value isn't really there because you know, it's something that you're not really a fan of doing. So, you're not going to value it. Yeah, it's not really something that, you know, that passion that I have passion or value for, at least at this point in times. Well, the value changed in the sense that I need to know this stuff because I need to do good on that test tomorrow. But if you're looking at it in terms of like if I genuinely value the material on that would probably still be low. I only valued it because I needed it for the grade. So probably is probably the same probably a two. In terms of like personal value versus, like, you know what I need to value." (Student #2)

> "I feel like it was because I really value kind of learning stuff about psychology and that's a big value to me like that's my minor and I might change it to my major. So, I really value that. And it's pretty valued in the course because it's weighted pretty highly. So, I felt like it aligned pretty well. I guess. I had to read it. It was worth a lot. And I wanted to…. I did, I felt pretty much the same way about the value of the academic task. It didn't change. Pretty much they didn't change." (Student #7)

> "Not really. It wasn't really something that aligned with my value. Like, it wasn't something I really cared about, you know, it was kind of one of the like, it was important kind of, but not really. I don't know how to put it, but it was kind of one of the last things that I was really worrying about." (Student #8)

> "Ah, no, I didn't really like the task at all. I valued it less than my other tasks." (Student #10)

Only one student noted that she valued the law assignment even though she was procrastinating on this task. In fact, she valued the task even more as she was working on the task near the deadline.

> "Because it's like, the more you read a law case, the more you're involved, and the more you want to argue about it. So, it's like, I don't know, you value it even more. Yeah, Because I'm into it now." (Student #3)

Study 3b: Summary

The purpose of this qualitative study is threefold (Study 3a): to replicate the Study 2 results of the temporal mood-repair process during procrastination episodes; to understand why academic deadlines are perceived as a threat which triggers task initiation near the deadlines; and to understand the change in appraisals of academic tasks on different cognitive and motivational aspects from the procrastination to the last-minute effort episodes. The qualitative results obtained via thematic analysis in the present study corroborated many of the results from the quantitative study with some exceptions. Nonetheless, these results helped establish a comprehensive understanding of the affective, cognitive, and motivational processes involved in procrastination.

Replication of Mood-Repair Process Results during Procrastination Episodes

Unlike Study 2, the temporal mood-repair model was assessed using only two of the momentary phases of procrastination: 1) when students attempted to do the academic task (Phase 1) and 2) when students engaged in alternate tasks instead of their academic task (Phase 4). Further support for the temporal mood-repair model of procrastination was found as students explained that their mood improved when they engaged in alternate activities as opposed to when they were trying to attempt their academic task. Students' explanations indicated up-regulation of positive emotions (e.g., happy, excited, relaxed) and down-regulation of negative emotions (e.g., boredom, frustrated, anxious) from when they attempted the academic task to when they took part in alternate activities. They perceived the academic task they were procrastinating on to be aversive, often appraised them as overwhelming and annoying, whereas they described the alternate activities as relatively more pleasant. Again, the most popular activities were watching

Netflix, browsing social media and productive activities like cleaning. Similar to the explanation students provided in Study 2b, students in the present study also explained that the extent of good feelings associated with the alternate activities varied depending on the type of activities they engaged in. Students labelled activities like cleaning, exercising, preparing meals as productive and, as such, these activities induced better mood compared to activities like watching Netflix which was again labelled to be mind-numbing. Alternate activities that students found more pleasant to take part in also helped them to forget about the academic task they need to complete. In contrast, relatively less engaging and less stimulating tasks like watching Netflix were unsuccessful in helping students forget about the pending academic task.

Although irrational beliefs were not examined in this study and students were not asked about their thought processes at the time they were procrastinating, they still referred to the irrational justifications they used to rationalize their delay when they were describing their emotions during procrastination (e.g., *I am not inspired right now, I have more time, I need to be in a clean environment to study*). The irrational thought processes naturally accompanied the mood-repair process students inadvertently engaged in. Thus, the results pertaining to the interplay of mood-repair and irrational beliefs during procrastination were also replicated in this study. It is worth noting that the student sample in this study also reported having lingering thoughts about the pending academic task when they were participating in certain alternate activities (e.g., watching Netflix) and these descriptions of persisting thoughts of the academic tasks are in line with the descriptions students provided in Study 2b. Students held themselves culpable for their inactions on the academic task and acknowledged that the delay they engaged in is indeed

irrational.

Not surprisingly, the extent to which engaging in alternate activities improved their mood progressively lessened as the deadline of the academic task approached. In fact, most students noted that when they began working on the academic task during the last-minute effort episodes, they experienced more negative emotions and less positive emotions. Some students explained that the unpleasant feeling waned as they made progress on the academic task during the last-minute effort episodes whereas other continued to find the academic task unpleasant and aversive.

Preference Reversal from the Procrastination Episodes to the Last-Minute Effort Episodes

Students' idiographic account of how they perceived deadlines and their role in preference reversal from inactions when procrastinating to taking actions on academic tasks near the deadlines were analyzed. When the deadline was far away, most of the students mentioned not feeling threatened by the academic deadline. However, when the academic deadline was very close, students reflected that they felt threatened by the fast-approaching deadline which ultimately led them to begin working on the academic task. During the interview sessions, students clarified that the repercussions of not completing the academic task by the deadline worried them. While there were individual differences in which repercussions were perceived to be stressful and worrisome, students more commonly shared negative consequences like performing poorly on the academic task and the possibility that they may fail the course if they delay their work any further. These repercussions were hinging on the looming deadline and, thereby, they perceived the deadline to be threatening.

Appraisals of Motivation and Cognitive Features during the Procrastination and Last-Minute Effort Episodes

When appraising their level of motivation, students described having very low motivation to begin working on the academic task during the procrastination episodes. They explained that the low positive emotions and high negative emotions associated with the academic task reduced their motivation to getting started. All students stated that they were certainly more motivated to do something else to suppress the unpleasant feeling associated with the academic task during the procrastination episodes. However, the level of motivation to start working on the academic task increased near the deadline. The consequences associated with not meeting the deadline and perceiving the deadline as a threat contributed to greater motivation to take actions during the last-minute effort episodes. However, individual differences in motivation need to be considered as the level of motivation may not be consistently high but can fluctuate when rushing to complete the academic task last-minute as students explained.

Unlike the nomothetic results, most students who were interviewed reported having some level of control on the academic task during the procrastination episodes compared to the last-minute effort episodes. Most of the students shared that they had some level of both control and autonomy to get started with their academic task, but they were reluctant to get started. In some cases, creating plans to work on the academic task provided a false sense of control but the task was not attempted as planned. These students also noted that as they were delaying the task, they were slowly losing control over the academic task. Individual differences in the level of control and autonomy were notable during the last-minute effort episodes. Some students perceived that they had

more control and autonomy to work now that they have started working on the academic task whereas others said they felt pressured by the deadline and as such, experienced less control and autonomy once they started.

When discussing their level of competence, variation in explanation was noted as well. Some students did not think that their level of competence changed from the procrastination episodes to the last-minute effort episodes. These students thought they were capable of getting the task done. In some cases, perceiving the self to be competent to finish the academic task in a day or two promoted procrastination. This perception changed near the deadline when students realized they overestimated their level of competence and that they needed to start sooner. Perceived competence can change within the last-minute effort episodes as well. As students made progress on the academic task near the deadline, they perceived themselves to be more competent to finish the task, although not necessarily with ease given the time pressure.

Task importance was assessed in two different ways: how important it was to work on the academic task during the procrastination episodes and the last-minute effort episodes, and in general, how important they thought this academic task was to them. While students found working on the academic task to be less important during the procrastination episodes and more important during the last-minute effort episodes, their overall appraisal of task importance (i.e., the academic task being important or unimportant overall) did not change between the two time segments. Some tasks were perceived to be generally important because students were given the opportunity to choose a topic of personal interest in the task or the professor successfully explained the significance of accomplishing the task. Conversely, other academic tasks were perceived

as unimportant for a number of reasons such as students not understanding the content of the task, the task was not important for the degree program they were in, or the task did not worth much of the final grade. The alternate activities, in contrast, were considered to be important in general as they help students to relax and reduce stress. However, the pending academic task was deemed to be more important to be completed than to participate in the alternate activities during procrastination. Again, students acknowledged that they engaged in the alternate activities against their better judgment during procrastination. Like task importance, students either perceived the academic task to be congruent or incongruent with their value overall. The extent of value congruency remained the same during procrastination time segment and the last-minute time segment.

Individual differences were apparent for the difficulty and challenge items where some students perceived their academic tasks to be more difficult and challenging during the procrastination episodes than during the last-minute effort episodes, whereas other students reported the opposite. Sometimes it was not even the academic task itself that was difficult or challenging, but rather not allowing enough time to complete the academic task near the deadline made the task seem difficult and challenging than it actually was (e.g., researching articles to write an essay). In other cases, some students explained that the academic task they were procrastinating on was difficult in both time segments but making progress during the last-minute effort episodes alleviated task difficulty.

Students' narratives of how they perceived outcome expectancy (likelihood of success) revealed that students knew they were inaccurate judges of the outcome expectancy during the procrastination episodes. They inaccurately predicted that they

could do the task last-minute and can yield positive outcomes. This pattern of thinking contributed to their procrastination just like how their misconception about their level of competence to finish the task near the deadline. There were also the people who knew they were less likely to succeed if they continued procrastinating and, yet, they kept postponing their academic task, knowingly sabotaging their chance to succeed. During the last-minute effort episodes, some students recognized that if they had started earlier, they could have performed much better. In contrast, others communicated that they still thought they could succeed on the academic task and reap the positive outcomes. Overall, the juxtaposition of idiographic and nomothetic results helped unravel which emotions and cognitions contribute to needless delay and preference reversal in procrastination and the mechanism through which the interrelated factors are working to facilitate procrastination.

CHAPTER 8

GENERAL DISCUSSION

Over the past four or so decades of research, we have learned a lot about the cognitive (i.e., irrational beliefs), and motivational aspects of procrastination (e.g., Harrington, 2005; McCown et al., 2012; Silver & Sabini, 1981), however the emotional aspects of procrastination have received relatively little attention until recently (e.g., Pychyl & Sirois, 2016; Sirois & Pychyl, 2013; Tice & Bratslavsky, 2000; Tice, Bratslavsky, & Baumeister, 2000). Simply investigating the cognitive aspects of decision making related to volitional failure is not enough to understand why people delay their intended tasks when they know that they should not. This is because people are not simply "homo economicus." In fact, the Nobel prize winner in Economics for 2017, Richard Thaler, has noted that people are a lot more like Homer Simpson than homo economicus. We are, as the behavioural economists argue, predictably irrational (Ariely, 2010), and I argue that this apparent irrationality or Homer-Simpson aspect of our decision making has everything to do with the interaction of our emotions with our cognitions in volitionally-related decision making.

In my dissertation, I examined two segments of procrastination – the procrastination episodes (i.e., episodes when they needlessly delayed their academic task) and the last-minute effort episodes (i.e., episodes when they started working on their academic task). In the procrastination episodes, I took a dual-process perspective to examine the interplay of emotions and cognitions in procrastination. More specifically, I investigated the temporal mood-repair together with irrational beliefs that influence students' decision-making during procrastination using both nomothetic and idiographic

approaches. To examine the temporal mood-repair model, several positive and negative emotion items selected from previous studies were factor analyzed to reduce them to three factors – frustration intolerance (i.e., frustration, resentment, angry and irritated), fear of failure (i.e., distressed, anxious, stressed, afraid of failure and nervous) and positive affect (i.e., happy, fun, excited, content, relaxed and relief; Study 1a & 1b).

Using these three factors of emotions, I found strong support for the temporal mood-repair model of procrastination (across four phases) in Studies 2a and 2b. Results of the quantitative study (Study 2a) revealed that students experience more negative emotions and less positive emotions as well as poor overall mood when they attempted their academic tasks (Phase 1) indicating that they perceived their academic task to be aversive. However, in the subsequent momentary phases, when they avoided the academic task (Phase 2), intended to do the task later (Phase 3) and engaged in pleasant alternate activities (Phase 4) instead, they experienced less negative emotions and more positive emotions and they also reported having a better overall mood. Qualitative results (Study 2b) further explained the quantitative results. While individual differences in students experience of positive and negative emotions were evident, students reported mood-repair when they discussed their ongoing procrastination experience. Students described that they prioritized improving their mood over attempting their important academic tasks that evoked aversive emotions. Students confirmed that they made momentary choices like avoiding the onerous academic task, forming intention updates to complete the task later and participating in alternate, rewarding activities to downregulate the academic task-induced negative emotions (frustration intolerance and fear of failure) and upregulate positive emotions. Both quantitative and qualitative results also revealed

that mood-repair alone did not motivate procrastination. Students also irrationally justified the needless delay of their academic task so that they can avoid negative emotions that accompany the academic task and provide temporary relief from the negative mood suggesting that both emotions and cognitions play an important role in procrastination.

In Studies 3a and 3b, I also investigated why students move from not taking actions on their academic task during the procrastination episodes to taking actions near the deadlines, through the lens of emotions. Again, both nomothetic and idiographic approaches were taken to understand the implication of emotions in preference reversal, in other words, prolonged inactions to last-minute actions in procrastination. I found evidence that students perceive their academic deadlines as signalling a threat when there is insufficient time left to complete the academic task. The repercussions of not completing the academic task (e.g., fear of failing) poses as a threat when the deadline is looming. To avoid the negative consequences, students chose to complete the academic tasks near the deadline. Additionally, change in motivational and cognitive appraisals of academic tasks from procrastination episodes to last-minute effort episodes were examined. Results at the group level showed that students were less motivated to complete the academic task during the procrastination episodes but more motivated to work on them during the last-minute effort episodes. Person-level results confirmed the increased motivation near the deadlines was due the threat they perceived for not completing the academic task. At the group level, students experienced more autonomy and control during the procrastination episodes compared to the last-minute effort episodes, but results were mixed at the person level indicating individual differences in

perceived autonomy and control. While perceived differences in competence, academic task difficulty, challenge, outcome expectancy (i.e., likelihood of success) of the task were not evident at the group level, students' narratives revealed mixed results indicating individual differences in task aversiveness and outcomes during the procrastination episodes and the last-minute effort episodes. In the quantitative study, students perceived importance of working on the academic task to be greater near the deadlines as opposed to during the procrastination episodes, students clarified that they perceived their academic task to be important regardless of their procrastination. Students' report on the value of working on the academic task did not change from the procrastination episodes to the last-minute effort episodes both at the group or the person level.

In the following sections, I will first discuss how individuals who procrastinate adopt a hedonic emotion-regulation strategy, in other words emotion misregulation, during procrastination. Second, I will explain the duality of temporal mood-repair and irrational beliefs in the decision to needlessly delay during procrastination. This section is followed by a discussion of lingering thoughts of the pending academic tasks, affective forecasting during intention update and differential role of alternate activities during procrastination episodes. Third, I will describe and interpret the results pertaining to the change in students' motivation to work on the academic tasks and cognitive appraisals of the academic tasks from procrastination episodes to last-minute effort episodes. Fourth, I will elucidate the results on how academic deadlines were perceived as signalling a threat near the deadlines contributing to preference reversal, that is, not taking any actions during the procrastination episodes to taking actions during the last-minute effort episodes. Lastly, the implications and limitations of the present research and future

directions are discussed.

Emotion Misregulation during Procrastination Episodes

One of the goals of this study was to examine procrastination episodes through the lens of the temporal mood-repair model. At the heart of this model are the emotional determinants of procrastination. As previously discussed, the temporal mood-repair model of procrastination operates on the assumption that individuals who procrastinate prioritize having a better mood by avoiding aversive academic tasks over taking instrumental action to complete that task (e.g., Pychyl & Sirois, 2016; Sirois & Pychyl, 2013; Tice & Bratslavsky, 2000). Basically, individuals who procrastinate hold a mistaken belief that they can feel better by needlessly delaying the unpleasant academic task (e.g., Pychyl & Sirois, 2016). The proponents of temporal mood-repair model described procrastination as an instance of emotion misregulation because procrastinating individuals adopts an emotion-focused coping strategy that works against their better judgement. These individuals make the choice to procrastinate in favour of improving their mood, knowing that in the long run they will have to suffer the consequences of the needless delay (e.g., Pychyl & Sirois, 2016; Tice & Bratslavsky, 2000).

Although emotion-regulation was not directly assessed in the present research, students' responses to the emotion items across the four predetermined phases of procrastination together with the description of their experiences of emotions indicated how misregulation of emotions in the form of mood repair could be playing an important role in procrastination. The procrastinating students in the present studies confirmed that they did make the choice to put off their academic tasks (a choice that is key to procrastination) after they attempted to work on the academic task, they perceived to be

aversive. The choice to postpone working on the academic task contributed to a better mood but they also acknowledged that they knew the decision to delay the academic task was a poor one. As discussed in Chapter 2, emotions affect action tendencies, that is, emotions towards a goal provide important feedback to whether that goal will be pursued or avoided (e.g., Frijda, 1986; Gross, 2014; Lazarus, 1991; Loewenstein et al., 2015). When the emotional response to a goal is aversive, the typical response is to find a way to decrease negative emotions and increase positive emotions (e.g., Gross, 2014; Gross et al., 2006; Quoidbach et al., 2010) as people's natural tendency is to feel better and eliminate pain (e.g., Larsen 2000). In the present research, students reflected on experiencing aversive emotions (elevated negative emotions and reduced positive emotions) when they attempted the academic task they eventually procrastinated on. Their initial response to these aversive emotions was task avoidance which reduced their negative emotions and elevated their positive emotions.

Students further confirmed that when they formed the intention to work on the academic task later and gave in to other alternate activities (e.g., browsing social media, cleaning, taking a nap), they experienced a further boost in mood (again, up-regulation of positive emotions and down-regulation of negative emotions). At the person level, some students implied that they made these choices to improve their mood whereas others had a clear insight into their attempt to improve their mood. They knew that they were going to regret these choices near the deadline when they must make a hasty last-minute effort under tremendous time pressure. Participation in procrastinating alternate activities can be understood using the *attentional deployment* step of Gross' process model which is the diversion of attention from a situation that triggered an emotional response. An example

of attentional deployment is distraction (Gross, 2013). Students' description of their procrastination experience suggest that they used alternate activities as distractions not only to avoid their academic tasks but also, to get rid of the academic task-induced aversive emotions. These findings are also in line with the need-oriented function of Koole's emotion-regulation framework which explains that immediate hedonic need-fulfillment takes precedence over important goals when the goals are perceived to be challenging. Drawing on Koole's framework, Pychyl and Sirois (2016) argued that the primacy of mood-repair in procrastination parallels hedonic emotion-regulation strategy as individuals who procrastinate give in to hedonic needs (i.e., pleasurable activities) that interfere with their goal attainment. In the present research, students explained that they knowingly chose alternate activities over their academic tasks which indicates that they intentionally focused on hedonic need-fulfillment. When students indulged in alternate activities to improve their mood, they took an emotionally driven approach that sabotaged their ability to make proactive decisions to deal with the aversive emotions associated with their academic tasks. As Tice and Bratslavsky (2000) explains, in procrastination, mobilization of the emotion misregulation strategies can get in the way of exercising the necessary proactive self-regulatory strategies to achieve the long-term goals. Thus, misregulation of emotions seems to be at play in procrastination given students' preference towards achieving a hedonic shift in emotions in the short-term, even when they had the opportunity to take actions to work on the pending academic task.

Students also explained that they go through cycles of mood-repair every time they attempt the academic task when there is sufficient time left for them to complete the

academic task or until the deadline is very close. That is, each time they tried to attempt their academic tasks, the aversive emotions associated with the academic tasks derailed them from working on the academic tasks, they formed intention updates, and chose to take part in alternate activities, until the deadlines of the academic tasks were very close. These explanations are consistent with Andreou's (2007) intransitive preference loop where procrastinators make moment-to-moment decisions which have irreversible negative consequences that they are likely to face near the deadline (see Figure 1-3 in Chapter 1). When the academic task is far away from the deadline, students reported having several opportunities to start the task and yet, they did not. Because students found their academic tasks aversive leading to elevated negative emotions and reduced positive emotions, each time they made an attempt to get started, they put their effort in improving their mood each time. The cycle of mood-repair that students described during the interview session is depicted using Andreou's diagram of intransitive preference loop (see Figure 8-1). It is important to note that the four predetermined momentary phases of procrastination may not be occurring exactly in that sequence for every student. There may be individual differences in how the series of momentary choices are made which is yet to be determined in future studies.

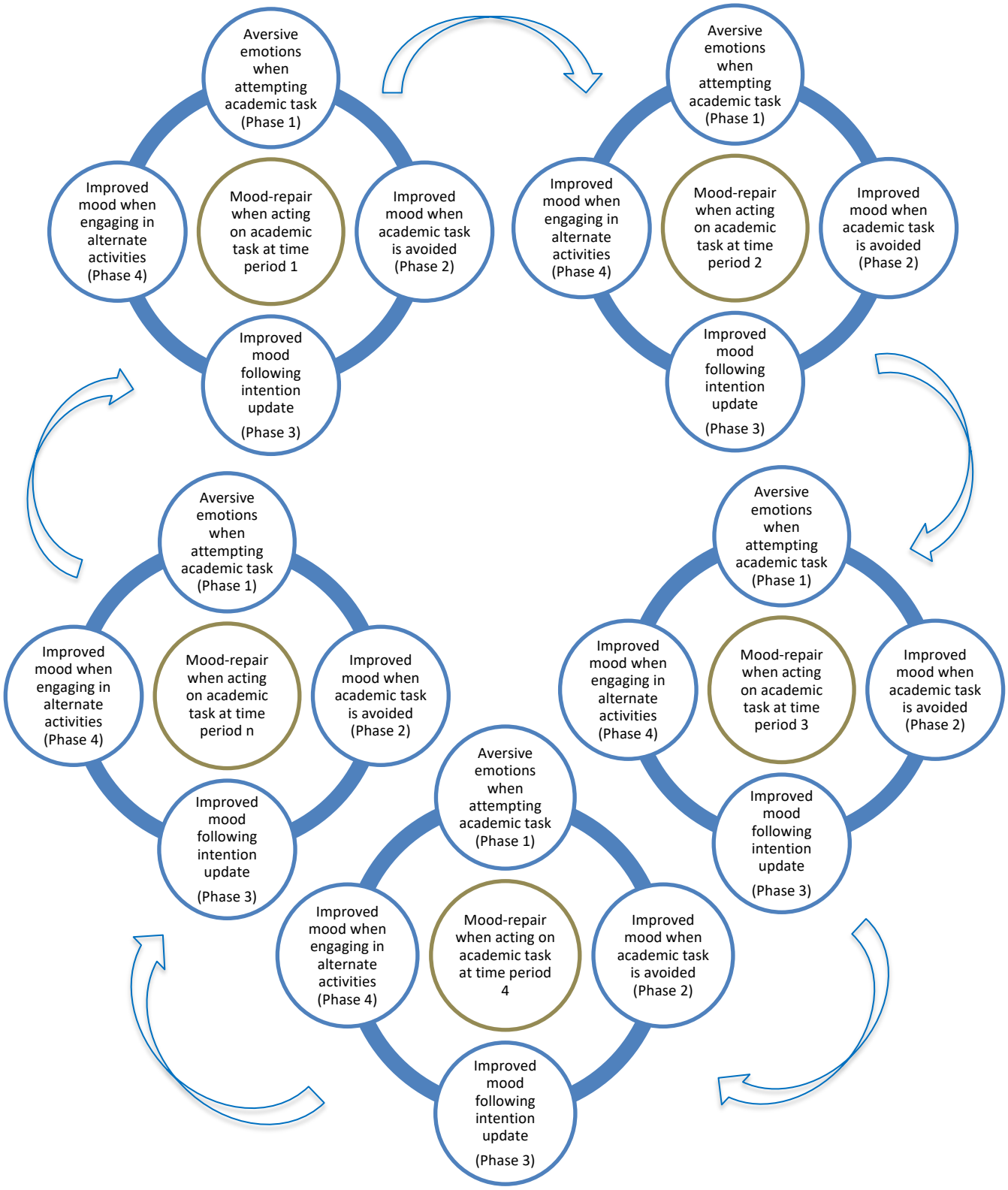


Figure 8-1

Temporal Mood-Repair Embedded in the Andreou's (2007) Intransitive Preference Loop to Reflect Students' Explanation of how they Prioritize Short-Term Mood Repair during the Procrastination Episodes

A Proposed Emotion-Cognitive Model of Temporal Mood-Repair and Irrational Beliefs

I found strong evidence for the interplay of mood-repair and irrational beliefs in procrastination both at the group level as well as at the person level. While students engaged in mood repair, certain task- and situation-specific irrational justifications accompanied them during the procrastination episodes. In the quantitative study, the pattern of negative correlations found between irrational beliefs and procrastination also complemented previous findings (e.g., Flett et al., 2012; Haghbin & Pychyl, 2015; Balkis et al., 2013). Additionally, in the qualitative study, I found that students did not endorse distinct irrational beliefs across the four momentary phases of procrastination. Instead, the justifications demonstrated overlap across these phases. To reap the momentary positive outcomes of feeling good now, students relied on their irrational beliefs to justify why they can postpone working on the academic task (e.g., I have more time to work on this academic task). Thus, the mood-repair process coupled with irrational justifications motivates the decision to needlessly delay the academic task.

Several belief items were selected from previous research to understand the irrationality in thought processes related to the tasks that students procrastinated on. Among the items selected, only a few belief items predicted students' procrastination (e.g., '*I will feel more like it tomorrow to work on this academic task'*). A question that could not be answered using the group-level aggregate results is whether students perceived these beliefs as irrational. That is, the belief item '*I am too tired to work on this academic task*' may not be deemed irrational if a student is *actually* tired due to their other academic and personal commitments. The irrationality of this justification can be

established if the tiredness is simply an excuse to unnecessarily delay an academic task. Students' narratives confirmed the irrational nature of the justifications because students admitted that the justifications they used (to needlessly delay their academic tasks) were, in fact, irrational. They had prior experience of procrastination and therefore, they had insights into the task-specific justifications they typically use during procrastination. The irrational justifications these students used to support the unwarranted delay of the ongoing academic tasks they spoke about during the interview sessions did not deviate much from the justifications they use for other academic tasks they procrastinate on. They clearly delineated that most of these justifications were unfounded in their view. For instance, many students reflected that they often use justifications like "*I have more time"* to work on this academic task, but they used the same justification every day until the deadline was too close to ignore.

The evidence that procrastination has an irrational core working in conjunction with the mood-repair process highlights that it is operating on the affective system (e.g., Lowenstein et al., 2015) of the affective-deliberative dual-process model. The affective system is influencing this problematic delay in a way that thwarts students' timely initiation, maintenance, and completion of the academic task. As explained previously, the affective system, when inappropriately used, leads to impulsive decision-making that offers immediate rewards from hedonic goals and neglects better long-term rewards from instrumental goals; whereas deliberative system acts as a compass to help sustain the pursuit of long-term instrumental goals and earn the associated larger rewards (Lowenstein et al., 2015; Miller et al., 2014). In procrastination, the affective system suppresses the deliberative system that facilitates rational reasoning needed for goal

pursuits (e.g., Lowenstein et al., 2015) and, as such, it is not surprising that students resorted to the short-term affective solution (i.e., assuage negative emotions and boost positive emotions) to tackle their task-generated emotional distress. They focused on alleviating their mood and the accompanying justifications (e.g., *I will feel more like it tomorrow*) were to support the short-term solution. By relying on the affective system, students become incapable of envisioning the future rewards following the completion of their academic tasks as has been demonstrated in previous studies (e.g., Blouin-Hudon et al., 2015).

In essence, students were engaging in myopic behaviour (e.g., Lowenstein et al., 2015; Sirois, 2016) where they were acting in accordance with obtaining immediate rewards of feeling better and not having to worry about the academic task. Research evidence in the procrastination literature has indicated that justifications that are used to prevent the self from initiating an important, productive task fosters self-regulation failure (de Witt Huberts et al., 2014; Hill et al., 2021). Similarly, irrational justifications worked against procrastinating students' capacity to override the undesired behaviours prompting them to make poor choices (i.e., postpone working on the academic tasks, engaging in alternate activities) and, thereby, supported the myopic emotion-based decision that satisfy individuals' short-term emotions at the long-term cost. Students chose to serve their hedonic needs with either pleasurable and tempting rewards (e.g., browsing social media) or with seemingly productive tasks (e.g., cleaning, going to the gym) that were not important to be carried out at the moment. Students' mood-repair and irrational beliefs during procrastination jointly preventing them from recruiting

appropriate emotion regulation strategies (e.g., reappraising task-related aversive emotions) that could ensure task completion.

Lingering Thoughts of the Academic Tasks during Procrastination Episodes

The synergistic role of mood-repair and task- and situation- specific irrationality in procrastination, as evident in the present research, are consistent with Anderson's (2016) argument that individuals who procrastinate are culpable for the unwarranted delay as they choose to avoid the important tasks they ought to complete. Although students provided unique narrations of their procrastination experience during the one-on-one conversations, the common underlying story was that they knew their decision to delay was not the right one. In fact, students were completely aware of their culpability at the time they were procrastinating on their academic task and, yet they procrastinated on the task. A theme that emerged in the conversation with all students was that they had lingering thoughts about the pending academic task when they were procrastinating on the task. Even when students indulged in other specious, pleasurable activities, they could not fully evade the thought that they were supposed to work on the academic they have been avoiding. Students reported experiencing mood-repair, but they also reported feeling guilty, stressed, or ashamed of not completing their academic task when they were procrastinating. The thoughts that they have yet to finish the academic task and the associated negative emotions identified are in line with studies that examined guilt, shame, self-blame, and regret during procrastination. Individuals who procrastinate suffer guilt, engage in self-blame, and feel ashamed for wasting time during procrastination and regret later why they did not start early (e.g., Fee & Tangney, 2000; Lavoie & Pychyl, 2001; Pychyl et al., 2000; Rahimi et al., 2016).

The findings of the present work revealed that students do recognize the utility of committing to their intention to work on the academic task, but they simply do not as they give in to feeling good to avoid displeasure. A recent study has demonstrated that when it comes to solving a self-control problem that involves task initiation, a decision made that favours task avoidance and ultimately, self-regulation failure, leads to experiencing negative affect and feeling worse, compared to a decision made that helps sustain one's self-regulation and initiate the task (Hill et al., 2021). The procrastinating students who participated in my research understood they formulated the intention to act on the academic task and the delay they were engaging was needless. Additionally, they were focused on satiating their hedonic needs by partaking in activities that were unimportant to take part in at that moment. These students had confirmed that they had procrastinated before and, as such, they knew that they would regret not working on the academic task. Although students were able to uplift their mood via the mood-repair process, they were not fully guilt free but felt culpable as they knew they were participating in a self-defeating behaviour like procrastination. This is similar to Hill and colleagues' (2021) empirical findings, and it is negative emotions like guilt and self-blame that trigger the thoughts that they should commence working on the academic task. Having a pending academic task that needs to be completed can be psychologically draining (Landsiedel & Gilbert, 2015) which may be another a reason for why they were unable to ignore the pending academic task completely. Given the persistent thought pertaining to academic tasks during procrastination episodes, it seems procrastination does not fully contribute to hedonic well-being and students are not able to achieve the long-term positive outcomes of timely, successful completion of the academic task.

Affective Forecasting through Intention Updates during Procrastination Episodes

In the third momentary phase of the temporal mood-repair model, students reported that they formed intention updates to work on the academic task later when they were procrastinating. At the person-level, some students explained that they either formed a vague mental note that they will work on the academic task later whereas others made concrete notes by updating their planner or calendar. Students mostly predicted that they would feel more like it tomorrow to work on the academic task. Of course, they did not engage in the academic task despite their good intention to start until it was very close to the deadline. By forming an intention update, it seems students were deceiving themselves that they were going to take actions. In essence, they were stepping into an affective forecasting trap.

Affective forecasting (Gilbert & Wilson, 2000; Wilson & Gilbert, 2003, 2005) refers to people's predictions of how they will feel in a future situation. The forecasters may be accurate or inaccurate in predicting their future feelings depending on the specific emotions they will feel in a situation, the valence of their future feelings and the intensity with which they will experience the emotions in a situation (Wilson & Gilbert, 2003). Given the relevance, I only focused on the inaccuracy in affective forecasting and how this human bias may be linked to procrastination. It is possible that individuals who procrastinate make an erroneous assumption that the affective state they are expecting to be in when they act on their updated intention will be the same as it is at present. Often the anticipated affective state tends to be more positive when people intend a future action (Wilson & Gilbert, 2003; Hanna et al., 2019). Students' narrations revealed that they experienced a temporary relief and a better mood from not having to act on the

academic task now, and the intention update gave them a false sense of hope that they will be more in the mental state to act on their intention next time. With the renewed intention, students perceived that they would feel more like it tomorrow to act on the academic task; however, what they did is incorrectly forecast how they may feel when they will take actions. When the time came to take actions, the task was again postponed to a later date as the academic task was again perceived to be aversive.

Differential Role of Alternate Activities in Mood-Repair Process

As hypothesized, both nomothetic and idiographic approaches revealed that participating in alternate activities such as watching Netflix, social media use, doing chores (e.g., cleaning, walking the dog), engaging in health behaviours (e.g., exercising), and socializing (e.g., with family and friends) helped uplift mood and achieve temporary emotional relief from the aversive academic tasks during procrastination. Undoubtedly, alternative activities played a critical role in both avoiding the academic tasks and fulfilling the hedonic needs. These results are in line with previous procrastination studies that showed how tempting activities (i.e., more pleasurable, and less aversive) take precedence over academic tasks in procrastination (e.g., Amali, 2019; Meier et al., 2016; Pychyl et al., 2000; Sirois & Giguère, 2018).

Although it is true that alternate activities contributed to up-regulation of positive emotions and down-regulation of negative emotions during procrastination, person-level results showed that students did not perceive all alternate activities as equally pleasurable. Consequently, the extent of mood-repair experienced was not the same for all activities they took part in. Students described that some alternate activities as more stimulating and enjoyable whereas other activities as relatively less stimulating and mind

numbing. Many students endorsed tasks like cleaning, preparing meals, going to the gym as more enjoyable and engaging as opposed to working on the aversive academic task. In fact, several students even preferred working on other academic tasks that they find gratifying compared to the aversive academic task they were unnecessarily delaying. Students perceived that they were at least being productive and getting some important tasks done that needed to be completed but it happened to be at the cost of the academic task that was being put off.

There are several ways these results can be interpreted. Studies have shown that temptations can interrupt long-term goal accomplishment (Hoffman et al., 2012) when individuals decide to shift their priorities from long-term goals to short-term temptations (Sirois & Giguère, 2018). Students have endorsed these alternate activities as more pleasant. They also reported that these activities helped lessen the aversive emotions generated by the academic task they were procrastinating on. When the choice is between working on a cognitively demanding academic task or some alternate activities that make them feel productive, students may be more tempted to indulge in the latter. For this reason, students may have prioritized the short-term tempting choices over the important academic task that can offer more satisfying outcomes in the long term. An alternate, more plausible explanation is that procrastinating students were attempting to resolve their experience of cognitive dissonance. People experience cognitive dissonance during procrastination because their action (e.g., irrational delay of a task) is in direct conflict with their intention (i.e., the intention to act on the task, e.g., De Witt et al., 2014; Simpson & Pychyl, 2009). Cognitive dissonance causes discomfort that people are strongly driven to eliminate either via a transformative or destructive process (e.g.,

Cooper, 2007). When students are prioritizing feeling good in the short-term over their academic task, it may be that they are using the productive alternate activities to eliminate their cognitive dissonance. As de Ridder and colleagues (2011) said in a different context, “not doing bad things is equivalent to doing the good things.” (p. 1010). However, this statement is relevant in procrastination because students are knowingly engaging in these seemingly productive activities that are deceiving as these activities are further promoting their problematic delay.

Surprisingly, most students ranked watching Netflix as less exciting and more mind-numbing despite Netflix’s rising popularity. Although watching Netflix was the most reported alternative activity, most students appraised this activity to be uninteresting. Students used this activity to distract themselves from the academic task they were procrastinating on as it was indeed much more pleasant and less cognitively demanding than the academic task they needed to complete. Most students acknowledged that they knew that they were wasting time watching TV shows and movies mindlessly, and that they experienced guilt for not working on their academic task. Self-conscious emotions like guilt are triggered depending on the context in which media is being used. Research shows that recreational media use is a productive behaviour that helps individuals to be instrumental in attaining goals following recovery and remain guilt free (Reinecke & Hoffman, 2016). Unlike recreational media use, procrastinatory media use tend to get in the way of instrumental goals, generating emotional reactions such as guilt (Lavoie & Pychyl, 2001; Hoffman et al., 2009; Reinecke & Hoffman, 2016). Procrastinating students are aware of their culpability that they are participating in a

dysfunctional behaviour because they are spending time watching Netflix to avoid the academic task they should be working on.

Students reported that compared to other alternate activities, Netflix was less successful in helping them forget about their academic task. The less stimulating aspect of this activity made room for lingering thoughts of the pending academic tasks while students watched Netflix. They perceived watching Netflix to be unproductive and, so, it is possible that this activity was less successful in resolving the cognitive dissonance during procrastination compared to the alternate activities that students deemed relatively more productive during procrastination. To eliminate the persistent thoughts of the academic task, students reported that they often engaged in multitasking. More commonly, they texted their friends or used social media such as Facebook, Instagram on their smartphone while they watched Netflix. Students' narratives of their technology and media use when procrastinating is not unpredictable as spending more time on smartphones has been linked to procrastination (Aalbers et al., 2022). In situational procrastination, individuals have been found to exhibit dysfunctional behaviour where they aimlessly browsed social media for hours (Kohler, 2015). This is because uncontrolled media use (e.g., Xu et al., 2016) can help individuals to temporarily disengage from stressful tasks and immerse in activities that can elevate mood (Meier et al., 2018). Kohler (2015) explains that media use serves as escapism in procrastination where students try to escape the negative emotions associated with certain responsibilities and attain momentary relief, in other words, mood-repair. Given that Netflix alone could not help them completely escape the negative emotions triggered by the academic task, students resorted to texting or media use on their smartphone when watching Netflix.

Interestingly, students reported that reaching out to their smartphone has become an automatic behaviour or more simply put, has become a habit. As such, when attempting their academic task that induced aversive emotions, they automatically accessed their smartphone for hedonic pleasure. There is empirical evidence to suggest that individuals' propensity to check their smartphones can contribute to their procrastination and this is driven by their internal emotional state. That is, if they feel frustrated or bored, they are more inclined to check their phones (Meier & Reinecke, 2017). Similarly, other research showed that habitual media use (e.g., checking Facebook frequently, high enjoyment associated with Facebook use) contributes to irrational delay of academic tasks (Meier et al., 2016). The underlying mechanism is essentially the same in the previous studies as well as the current research that an emotion-focused coping is being employed in the form of mood-repair. For students, the automatic utility of immersive, substitute procrastinatory activities is an attempt to replace the aversive emotions from academic tasks with more positive ones.

Preference Reversal from Procrastination to Action

Another important goal of the present research was to examine why people decide to act on the academic task near the deadline (i.e., the last-minute effort episodes) after the prolonged period of inaction (i.e., the procrastination episodes). The present research revealed that deadlines are perceived as signalling a threat by individuals who procrastinate, and this strong negative affect and associated thoughts plays a pivotal role in shifting the decision of avoiding the academic task to finally undertaking the task. Neuroscientific studies have demonstrated that people's decisions between short-term goals and long-term goals involves whether the affective or the cognitive area of the brain

is dominant (e.g., Hare et al., 2009). As such, it is not simply the relative distance between short-term smaller rewards and long-term larger rewards that explains why immediate rewards are chosen over long-term rewards. Rather the myopia (Sirois, 2004) induced by the focus on feeling good at present (e.g., Sirois & Pychyl, 2013) sways individuals' decision to needlessly delay academic tasks. Then, as the deadline approaches, the deadline itself is perceived as signalling a potential threat (e.g., receiving a failing grade, social shame). To relieve themselves from this perceived threat, individuals who procrastinate take actions to complete their academic tasks, and this creates a strong enough negative reinforcement effect, contributing to what we know as the "procrastination habit."

The present results identify limitations of the preference reversal argument presented in the hyperbolic discounting model of procrastination. Proponents of this model (e.g., Dewitte & Schouwenburg, 2002; Steel, 2007) claim that students who procrastinate have low utility, in other words motivation, to work on the task because the rewards associated with the academic task can be obtained in the distant future. However, when the deadline is nearby, students decide to act on the task because the reward of the task is immediately redeemable and, thus, increases the utility to work on the task. The present results highlight that students are not motivated to complete the academic task near the deadline because of the immediate rewards they are anticipating. In fact, it was the opposite that students perceived the deadline as signalling a threat and were concerned about the consequences of not getting the academic task done. There is ample empirical evidence to show that concerns like being evaluated by others (e.g., Bui, 2007) and fear of failing (e.g., Haghbin et al., 2012; Rahimi & Hall, 2021) can be perceived as

threatening by individuals who procrastinate. While these concerns make individuals escape their academic work (e.g., Haghbin et al., 2012), they can also reinforce taking actions near the deadline as the present results using a mixed methods design demonstrated. The idiographic approach more precisely helped uncover how the repercussions of not completing the academic task are realized more intensely when the deadline is nearby and not earlier when students have plenty of time to commence working. Thus, it was pertinent to investigate the role of the deadline through the lens of emotions and cognitions in preference reversal during procrastination which studies to date, to my knowledge, did not directly investigate.

Changes in Appraisals of Motivation and Cognition from Procrastination to Action

As expected, both qualitative and quantitative results showed that procrastinating students were less motivated to work on their academic task and more motivated to engage in alternate activities during the procrastination episodes. In essence, students experienced motivational conflicts. Generally, motivational conflicts arise when there are multiple goals and pursuing one goal gets in the way of pursuing another goal due to limited resources such as the effort needed to complete a task (Hofer et al., 2007; Hofer & Fries, 2016). The motivational conflicts students face are not only between academic and leisure activities, but they can also be between two competing academic activities (e.g., Ariely & Wertenbroch, 2002; Capelle et al., 2021; Fries & Dietz, 2007). The present studies revealed that such conflicts are evident during procrastination as well, but the motivational conflicts surfaced because of the conflict between hedonic need fulfillment and goal-directed behaviour. Aversive emotions elicited by academic task-triggered the conflicts and students choose tempting leisure activities as well as pleasant

academic tasks or other productive tasks to eliminate the conflict. These results highlight that the motivational low points to engage in the academic task is experienced not simply because the temporal landmark (i.e., deadlines) is far away along with the rewards of the academic task as predicted using hyperbolic discounting (e.g., Dewitte & Schouwenburg, 2002; Steel, 2007). As the present qualitative research uncovered, students employed both mood-repair and irrational justifications that worked in favour of their hedonic need fulfilment as opposed to their goal-directed intentions, and thereby resolved their motivational conflicts when they were procrastinating.

Generally during goal pursuits, motivational conflicts between academic goals and leisure activities have been found to diminish near the deadlines and the inclination to study seemed to have increased (Capelle et al., 2021). For the procrastinating students in the present study, the same was true given that their motivation to study increased during the last-minute effort episodes. An important motivating factor for these students seemed to be the perceived threat associated with the impending deadline. They did find the cost of not completing the academic task threatening and finally acted on their intention to complete the academic task closer to the deadline. However, as some students noted, their level of motivation to complete the task varied even when they are running out of time. As such, it cannot be assumed that motivation peaks and remains to be persistently elevated for every individual near the deadline until the task is completed. Considerations must be given to individual differences in appraisal of motivation.

The quantitative results of autonomy and control also supported my hypothesis that autonomy to engage in the academic task on one's own volition and control of academic project were greater during the last-minute effort episodes compared to the

procrastination episodes. Although these results are in line with the previous studies (Blunt & Pychyl, 2000), the qualitative results unveiled individual differences in perceptions of autonomy and control as well as provided insights into why the differences exist. Contrary to quantitative findings, most students who were interviewed reported having some feelings of control and autonomy to make the decision to start working on the academic task when they were procrastinating. They acted against their better judgement and simply avoided the task. Some of these students explained that developing plans to act on the academic task generated an illusion of control, but they still did not act on that plan until the last minute. This is not surprising given that it was probably the students' way of protecting themselves from the aversive emotions associated with the academic task and feel better as the planning (in other words, an intention update) provided a false sense of accomplishment. In the last-minute action phase, students either reported having some control and autonomy when they started working or they felt less control and autonomy because of the tremendous time pressure.

Students' perception of their competence to work on the academic task also produced varying results. On the one hand, the quantitative results indicated no difference in perceived competence between the procrastination episodes and last-minute effort episodes. On the other hand, qualitative results showed that students' perception of competence is not as consistent across the two time segments as it was found in the quantitative study. The group-level analysis masked important differences in the perceived competence students experienced. When procrastinating, task-specific context can influence people's appraisal of competence in one of the three possible ways: overestimating how competent they are to work on the academic task when

procrastinating, underestimating how competent they are to work on the academic task when procrastinating, and perceiving no change in competence level compared to when they take actions near the deadline. Even when taking action at the last minute, the level of competence can vary as students make progress.

Like the appraisal of competence, the quantitative and qualitative results of the appraisals of task difficulty and challenge as well as outcome expectancy also differed. The quantitative results indicated no differences in the appraisals of task difficulty, task-related challenges, and outcome expectancy between the procrastination and the last-minute effort episodes. The qualitative results, on the contrary, revealed that students' appraisals were sensitive to their unique task-specific situation: some perceived their academic task to be difficult and challenging in the procrastination episodes only, some found the task to be difficult when they acted near the deadline, and others persistently found the task to be difficult and challenging across both time segments. When appraising outcome expectancy, some students said they were expecting to succeed on the academic task despite their procrastination, whereas others were not expecting to succeed and yet they procrastinated. In the last-minute effort episodes, some students continued to think that they could still succeed, whereas others were not convinced that they could succeed.

The mixed results at the group- and person-level suggest that perceptions of autonomy, control, competence, task difficulty, task-related challenges, and outcome expectancy are important to evaluate for different task-specific situations at the person-level. Researchers have emphasized that group-level results largely focus on students' average levels of motivation in goal pursuits and their general trait-level predictors and

outcomes, and falls short on identifying the differences in perceptions within and across individuals depending on the task-specific situation they are in (e.g., Eccles & Wigfield, 2020; Parrisius et al., 2021). For this reason, the classic expectancy-value theories (Vroom, 1964; Eccles et al., 1983) that focused on the probability of achieving desired outcomes when pursuing distal goals (i.e., expectancy) have been modified. More recently, a situated expectancy-value theory (SEVT; Eccles & Wigfield, 2020; Wigfield & Eccles, 2020) was proposed which emphasized the importance of analyzing both self- and task-specific beliefs as proximal predictors (e.g., value beliefs, expectancy, competence, task difficulty) of achievement choices, task-specific utility (or motivation) and task performance. The rationale for revising this model is that mostly trait-like predictors of motivation that remain stable over time have been over studied at the group-level in the education context. In contrast, the processes associated with task-specific fluctuations in motivation have received very little attention even though students' perceived beliefs of competence, value and autonomy can be influenced by task-specific situation (Eccles & Wigfield, 2020). The present findings are consistent with the idea that self- or task-specific beliefs and appraisals at the person-level can provide further insights into how these elements influence choices and decision-making for a specific short-term pursuit.

Two different aspects of task-related value and importance were also investigated in the present research and, again, the person-level results provided more clarity than the group-level results. The quantitative results based on group-level investigation revealed that students found it less important to work on the academic task during the procrastination episodes compared to the last-minute effort episodes. However, the

interview evidence suggests that the value of working on the academic task did not vary across the two time segments. They also explained that their overall perception of task importance and the extent to which the task is congruent with their values did not change when they procrastinated versus when they finally took actions near the deadline. Despite recognizing their goals to be important and congruent with their values, several students still procrastinated. Therefore, how a task is perceived in terms of importance and value congruency is independent of how a person may feel when they are attempting to work on the task. Important tasks can have aversive qualities and, as such, people can still find the task difficult and challenging, and experience aversive emotions that make them postpone the task attainment. In this sense, it is not surprising that students entertained hedonic fulfillment over the completion of the important task (i.e., tasks that they valued). They also irrationally justified the problematic delay even though they had the opportunity to start early. Overall, the present results underscore the importance of examining appraisals of different cognitive and motivational features using person-level data to identify the nuances of perceptions. It is inaccurate to assume that one-size-fits-all. Instead, gaining insights into people's perceptions of tasks and events is imperative which then can be further explored at the group level.

Implications

A potential implication of my research relates to the intervention implications. Interventions that have been developed thus far either target the irrational cognitions *or* the emotion-generative and regulatory processes in procrastination. For example, interventions developed using the REBT framework emphasize that irrational cognitions need to be modified to reduce procrastination (e.g., Dryden & Sabelus, 2012). In contrast,

Eckert and colleagues (2015) have investigated an intervention targeting emotions, and they showed how increasing emotional tolerance and modifying negative emotions induced by aversive tasks can reduce procrastination. Despite the separation of cognitions and emotions in this previous research, it is important to note that there is preliminary evidence available from clinical interventions that target both emotions (teaching students to reduce task-related anxiety and guilt) *and* cognitions (i.e., modifying irrational thoughts) from a project-analytic perspective has proven to be beneficial in reducing procrastination (Pychyl & Binder, 2004). With the findings from the qualitative and quantitative studies, it was determined how emotions and cognitions both play important roles in procrastination. These findings can be used to develop more effective interventions for procrastination where interventions of procrastination can include training individuals to regulate and modify both aversive emotions and maladaptive cognitions simultaneously when they experience chronic procrastination problems.

Furthermore, the specific types of emotions and maladaptive cognitions generated during academic procrastination were identified in my studies. The types of emotions and irrational beliefs in the studies were chosen based on previous research, but participants also reported other emotions and cognitions that were not listed in the questionnaires. Identifying specific aversive emotions and maladaptive cognitions is important, as interventions can be developed to target these emotions and cognitions more specifically. Individuals can be counselled to be aware of these specific feelings and thoughts that might be contributing to their needless deferral of important tasks.

Another implication of my thesis is that I used Personal Projects Analysis (PPA) together with a mixed methods design to collect data from students about their experience

of procrastination. As summarized in chapter 2 of my thesis, studies examining the mood-repair process in procrastination thus far have used experimental designs (e.g., Tice, Bratslavsky, & Baumeister, 2001). While the internal validity of these studies is high, the inferences drawn from these results demonstrate low external validity as participants' mood was artificially manipulated in these studies to see whether negative mood increased the degree of procrastination. Furthermore, the nature of the delay in this experimental work does not operationalize procrastination completely, as it is difficult to know whether participants truly had an intention to engage in the experimental task from which they eventually became distracted (i.e., there is no real evidence of an intention-action gap inherent to the definition of procrastination in the experimental work). With the use of PPA in the present studies, the external validity was high as participants reported on their experience of academic procrastination from everyday life when completing all the questionnaires and the interview sessions. This approach complemented and extended existing research using a much sounder operational definition of procrastination.

A final important contribution of my research is that we have very little understanding of why individuals who procrastinate change their decision from not working on the academic tasks (procrastinating) to taking actions specifically prior to the deadlines. Based on the framework of hyperbolic discounting, previous researchers have argued that these reversals in preference in procrastination occur due to the presence of rewards nearer the deadlines. That is, when the deadlines of the long-term academic goals are far away, individuals are more focused on short-term alternate activities that provide immediate rewards as opposed to the long-term goals that offer distal but larger rewards.

However, when a deadline approaches, the rewards associated with the long-term academic goals are not distant anymore and, consequently, individuals who procrastinate finally engage in these goals (e.g., Dewitte & Schouwenburg, 2002; Schouwenburg & Groenewoud, 2001; Steel, 2007). I argued that this is a rather simplistic view to explain procrastination focused only on deliberative processes. The results of Study 3a and 3b provided an alternative understanding of moving from "not doing" to "doing" as deadlines approach from an affective perspective.

Limitations and Future Directions

Despite the strengths of this research, there are several limitations. First, although the task-specific irrational belief items included in Study 2a (quantitative) were selected from a wide breath of beliefs from the literature (e.g., Egan et al., 2007; Haghbin & Pychyl, 2015; Lindblom-Ylänne et al., 2015; McCown et al., 2012), there were additional beliefs discovered in my qualitative study (Study 2b) that were not included in this list. More specifically, the results of Study 2b (qualitative) revealed that there are other task-specific irrational beliefs (e.g., *I have more time to work on the academic task*) that students hold and use to justify their procrastination, beyond the items included in Study 2a. In future studies, it would be beneficial for researchers to use cognitive interviewing with narrative inquiry to determine other important belief items that were overlooked in the quantitative study. Cognitive interviewing (Willis, 1999) is a technique that is beneficial for examining how respondents mentally process and respond to survey questions, and for understanding the challenges associated with assessing the items, response options and instructions. More specifically, the semi-scripted verbal probing method of this interview technique could be particularly useful to identify whether

participants experienced any difficulties with comprehension and retrieval of information from existing scripted items and new items that are spontaneously generated during the interview. This way the validity of the irrational belief items examined in the present study can be evaluated and other justifications that were not identified in the present research can be discovered.

Second, in the quantitative study (Study 3a), students had difficulty understanding the question pertaining to "importance." Students were more specifically asked to rate how important the academic task was to the student, but they misinterpreted this question as how important it is to work on the academic task at the moment. Although the qualitative results helped distinguish the nuances, these results need to be replicated using a quantitative study to assess the generalizability of the results at the group-level. Third, during the interview sessions, it was established that students appraised different alternate tasks differently and, as such, the elevated mood and relief they experienced varied depending on the activity they participated in while procrastinating. This distinction was not examined using group-level quantitate data and it is possible that the level of elevated mood observed was underestimated. In future research, the more stimulating alternative tasks need to be assessed separately to have a more accurate understanding of the changes in mood across the four momentary phases of procrastination.

Fourth, the present research relied on retrospective studies which are prone to recall bias. It is possible that the results were to some extent affected by students' ability to recall their experience of procrastination. However, students who participated in the interview studies admitted that they had procrastinated on other aversive academic tasks before and, thus, it is safe to assume that they have better insights into their

procrastination problem and possibly reflected on their emotions and thoughts with some precision. As such, they may have provided close to accurate account of their experience of procrastination. Another downside of using retrospective study is that it does not allow researchers to establish causal relations between variables. The same is true of correlational research. As a result, it would not be appropriate to conclude that the significant relations obtained between irrational belief items and procrastination are casual in nature. However, the irrational belief items used in this study are conceptually, theoretically, and empirically relevant to procrastination, and the present findings are in line with past research findings. Nonetheless, in future investigations, a better alternative would be to use experience-sampling method together with interviews to limit the recall bias and establish causality. Unlike the present studies, interviews can be conducted first to identify the nuances in task-specific emotions and thought processes during the momentary phases of procrastination and the last-minute effort episodes. These results can be used to track daily changes in these mental processes for a specific academic task over time. The change in the trend of mood-repair of procrastinating students from the time a task is assigned to the time the task is submitted very close to the deadline can be assessed.

Lastly, another important limitation to discuss is that I did not directly investigate students' difficulties in emotion regulation in my dissertation. Instead, I inferred students' difficulties in recruiting appropriate emotion regulation strategies from their description of mood-repair, irrational justifications for the problematic delay and, finally, their account of behaviours. Their explanation underscored how they alleviated their negative emotions and uplifted their positive emotions and their overall mood by doing something

else and not their pending academic task. Students had ample time to finish the academic task and yet, they knowingly did not take any actions and engaged in irrational delay. They gave into momentary pleasure that jeopardized their possibility to succeed on the task. In future replications, researchers can assess students' difficulties in emotion regulation and determine how the trait-level emotion misregulation influence mood-repair and irrational thought processes when procrastinating on an aversive academic task.

In Chapter 1 of my dissertation, I critiqued the use of hyperbolic discounting as a model of procrastination (Dewitte & Schouwenburg, 2002) as well as the Temporal Motivational Theory of procrastination that utilized hyperbolic discounting and expectancy theory to understand procrastination as a problem with utility (Steel, 2007). In light of the present findings, it is clear that these theories do fall short in taking into consideration the interplay of affective and irrational thought processes in decision-making during procrastination and the role of affect in preference reversal from inaction to taking actions near the deadlines. Despite the strong support found for an emotion-cognition model of temporal mood-repair model and irrational beliefs in the present studies, it is important to replicate these findings to obtain further support and eliminate competing theories with too many shortcomings. Axel Cleeremans (2021) made a compelling point on this topic that researchers tend to work in silos when it comes to developing theories in the scientific literature and finding support for their theories. He advocated for adversarial collaboration where he encouraged researchers working on competing theories to take initiatives and work together to falsify and eliminate theories that are conceptually and empirically deficient. In a future research, procrastination

researchers should strongly consider taking a collaborative approach to assessing competing theories like temporal mood-repair model and TMT, and work together to build a more comprehensive theory that provides a conceptually strong foundation to understand the core mental processes in procrastination.

Conclusion

The burgeoning number of studies within the emotion-regulation literature investigating emotion-generative processes and emotion regulation more generally underscores the significance of emotions in our decision-making processes (e.g., Gross, 1999, 2014; Koole, 2009a, 2009b). It is surprising that there are only few studies to date that examined emotion regulation in procrastination to explain why individuals who procrastinate avoid their important tasks and succumb to hedonic alternate activities instead. Beginning with Baumeister and his colleagues, a small group of researchers have conceptualized procrastination as an emotion-regulation problem as individuals who procrastinate avoid their intended tasks to repair their mood (e.g., Pychyl & Sirois, 2016; Tice & Bratslavsky, 2000; Tice, Bratslavsky, & Baumeister, 2001).

In my thesis research, not only did I address the need for more studies focusing on emotion misregulation in our understanding of procrastination, but I investigated emotion misregulation together with cognitive processes (i.e., irrational beliefs) to understand how emotions and cognitions may co-create a challenge to maintaining self-regulation. Additionally, I examined preference reversal near the deadline and found that procrastinating students act on their academic task when the deadline is looming because they perceive the academic task deadline as signalling a threat which motivates them to finally pursue the task last-minute under tremendous time pressure. To my knowledge,

the studies of procrastination have not investigated the interplay of emotions and cognitions in this way, nor did they investigate preference reversal through a affective lens. Therefore, the investigation of the interplay of emotions and cognitions and preference reversal makes an important contribution to the conceptualization of procrastination in the literature. Researchers have separately investigated irrationality (e.g., Balkis, Duru, & Bulus, 2013; Solomon & Rothblum, 1984) and emotion misregulation (e.g., Baumeister & Heatherton, 1994; Tice, Bratslavsky, & Baumeister, 2001) in procrastination. The problem with these separate investigations is that how these two processes interact to contribute to the self-regulation failure is not understood well.

As discussed in the earlier Chapters, neuroscientific studies have demonstrated that affective and cognitive processes in the brain are intertwined when it comes to making decisions or choices (e.g., Hu et al., 2018; Schlüter et al., 2018). The interactions of activities among brain structures during affective and cognitive processing dictate which way a decision will be swayed during goal-pursuits. When cognitive or deliberative processes are more dominant than affective processes, the decisions tend to favour important long-term goals, whereas when affective processes are more dominant than cognitive or deliberative processes, the decisions lean toward short-terms goals that have hedonic properties (e.g., Hare et al., 2009). To the extent that my research is successful, the findings of my studies move towards filling in this gap in the literature by investigating how individuals who procrastinate experience the interplay between their thoughts and emotions in the pursuit of their everyday, academic goals and how emotions play a role in procrastination.

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Appendix A
Tables

Table 6-12
Students' Explanation of Why They Think They were Procrastinating to Assess their Understanding of Procrastination

Students' Anonymous ID	Explanation of Procrastination
S1	Usually in high school, if I wasn't going to procrastinate on something [academic tasks], I either do it like weeks before it's due. But I do something [other academic tasks] 5 minutes before it's due. It is like an exaggeration, but definitely 11 o'clock the night before when it's due at 9 in the morning is a little late for me for sure. I would have liked to have it done earlier, maybe even work on it over the reading week. But I just didn't end up getting to it at all. I probably started [the psychology assignment] on Monday afternoon, I answered like 2 or 3 of the 10 questions and then I did everything else on Tuesday night and it was due on the Wednesday.
S2	Whenever I struggle to understand something, whenever I find it [academic task] challenging, I don't like to handle it. I don't know how to handle it. I don't know how to study it and I just get very confused. I guess I feel embarrassed to ask for help because I feel stupid now, I feel dumb. I never considered myself a very smart person. So, whenever I'm struggling, I just avoid it altogether. When I was in high school, I'd do it [academic tasks] the day before. Since I am in university, I can't get away with avoiding them that much. So, probably be like three days before [before the due date] because I need at least a little bit extra time to get it done.
S3	I think it was more just like I know what procrastination is and I know I've always done it. I can see when I just keep doing other stuff like watching Netflix or going out with my friends. That weekend I probably went out a few nights when I should have been studying [for Chemistry midterm] or knowing that I have an assignment but choosing to FaceTime my boyfriend or go do something else that I enjoy more. So, I realized that I am pushing it but I'm just telling myself that, *Oh, it's fine. I have time to do it. I can get it done all in one day. That's fine.*
S4	For that exam [Chemistry midterm], it only took, well it was a midterm and so, half the course content that we learned so far. With that I procrastinated because I plan on going through everything, which most people don't do. They usually break it up into manageable bits. But in my head, I was breaking it up into manageable bits but the overall thought of having to go through all the content like stressing me out a lot. So, I put it off a lot if you know what I mean. I planned on going through all of the assignments that we did so far along with all the readings, all the textbook work, all the textbook questions, and all the review midterms and all the tutorial assignments. If I started at a good time, I would have been able to get everything done within a little bit. But the more I thought about it, the more it stressed me out, the more I put it off and the less manageable those bits became.

Table 6-12 continues.

Students' ID	Explanation of Procrastination
S5	Yeah, I think it's more of a selfish reason. Because in high school, I was really, like, I was a great kid in high school. And I'm obviously proud of that. And there are a lot of things in high school where I just left everything last second, not like last second, like the day before, and I was able to have great grades with all those. And I thought if I can transition what I did in high school, it'll be the same thing in high school or in university. So, I kind of had that mentality, thought of like, *hey, if I did well in high school then it shouldn't be too hard in university*. But once you receive that grade that you really did not appreciate and like really tore you down.
S6	Yeah, I kind of leave them at the last second. For the CS [computer science] midterm, it's like I'll just get stuck and I'll be like, *okay, I'll ask for help tomorrow*. And I'd much rather do work that I can actually do and just like build them. Yeah, essentially the ones that I can actually do, I'll do that. But the ones that I find harder, I'll just put those off and then do them last minute.
S7	I'm not sure to be honest. I think it's the things that matter the most that I just pushed aside. I've just always procrastinated all through high school, elementary school, college, etc. Like I've always procrastinated and I'm really not sure why I do it at all. I think it's just more like, *I don't want to deal with the stress right now*, or like, *Oh, that seems really boring. I'll do it another day*. And then another day becomes another day and another day and then all of a sudden, it's the day before the thing [academic task] is due and I have to like rush to get it done. So, you know, that's kind of the case.
S8	Well, it's because I kind of convinced myself that, *you know, it's not that hard*. Like I would, for example, if we get that assignment and I read it, I'd be like, *oh okay, you know, I just have to do this, this and this*. But then I like, put it off so long and when I come to actually do the assignment, I'm like, *oh my God! I have to do all of this*. And in the right format, and after… and then… and I'm like, *why didn't I start this before*. Every time and I never started early [referring to procrastination].
S9	Um, I mean, obviously just taking forever to get started [with the academic task], like finding little excuses of things to do instead. Like I was in the library, supposed to be doing those things [work on the academic task], and, you know, you open your laptop and you go to get started and then you know, you do something else like I don't know. You just open YouTube or something for like, *oh, it's just 10 minutes and then I'll get started*. And then you know, it was like 45 minutes later, and you kind of like still haven't looked at it [academic task].
S10	Um, I tend to like…if I start to work on something, I'll tend to get bored easily or just a little bit stressed out when like looking at it. It's just like scary to look at a term paper and know I have to do that. And in my brain like I can think about it sometimes, I will be very like motivated. I want to get things done. But then I tend to use that motivation and like, I don't know why, I'll just like either do something else, like a different assignment maybe or I'll like go out and like, leave my house to go do something [engage in an alternate task]. And then by the time I'm back, it's like later and I've been like hanging out with one of my friends. And then I won't be as motivated to do that specific task anymore. So, I know I'm procrastinating.

Table 6-12 continues.

Students' ID	Explanation of Procrastination
S11	I'm probably just like, specifically the papers, just all the work that I see go into them and like the drafts and the rewriting and editing and all that stuff. And then like, it's just really intimidating to see the blank page like in front of you. I'm like to really start going in, like start writing.
S12	I was procrastinating because every time I did attempt to do it [work on academic task], I would switch over to something else or I would do something even more unproductive. I would go on my phone and scroll. All the new thing has been occupying my mind because of the little funny short clip videos and I would make myself laugh rather than actually focusing on my work [academic task]. Oh no…and then I looked at my Screen Time too [feature on Smartphones] and it makes me feel even more disappointed in myself when I do look at it. I'm like, *oh my god, how much time I spend on these apps!* But I need to clear my head with these [the videos participant watches].
S13	I work on them [academic task] last minute. The quiz… I listened to it last night; like I listened to the article last night. I was going to do some of the work like trying to get into the answers. I read through the document, so I like I read it beforehand, so I could go into the reading or listening to it with the proper things to look out for. I have an idea of what some of the answers are going to be. I just haven't written any of them out. Um, so I'm going to be rushing that tonight to be honest because it's not due at midnight; it's due at 9pm, which is odd. It's not like most classes. And I have classes after this.

Table 7-15

Students' Explanation of Why They Think They were Procrastinating to Assess their Understanding of Procrastination

Students' Anonymous ID	Explanation of Procrastination
S1	So, like I said, like, it definitely is kind of boring sometimes. But also, like, I have a ton of other things to do. And sometimes I find like, you know, something that's going to be marked a little bit more important than something that they don't even actually know if I'm doing it or not [completing chapter reading before class]. And like, it definitely helps reinforce your learning because it's like more word for students. But I don't know, it's hard to get the motivation for it [chapter reading before class] when you know, they're going to teach you basically the exact same thing in class, except for like, minor details that you can go back and just look for really like in the reading.
S2	Well, the due date was coming up [for the academic task] and it was again, like two or three days before and I kind of, well, I kind of knew it [deadline of the academic task] through those two, three weeks…. Well, I kind of rationalized it, um, in the sense that it's two, three weeks away. I have other stuff and other classes to do. I need to do those first. So, I kind of rationalized it like that. But there was definitely a time where I had free time, but I just knew about it [referring to the pending academic task], but I just didn't do this [it] like, *Oh, yeah, I got it*, but I still decided not to do it.
S3	Actually, recently, it was my Law assignment. So, I had a case brief to do. And my case brief is like you have to read about 40 pages of the case and then you put it into four pages with like this specific stuff. So, I honestly like after, like, like before a week that it was due, my friend was telling "You have to, like, start reading the case." And I was like, *Yeah, I have time*, because I didn't know it was 40 pages or like 50 pages. And she kind of forced me to do it. So, if I if it wasn't for her, and she didn't tell me [it] was that long, I wouldn't have done it. But um, it was about 50 pages. And I told myself that the first step that I would do is at least read them and like, highlight the important parts of the pages. So, I started off by doing that. And I feel like after I did the reading, I was like, *Okay, I can do the assignment, no problem*. And so, I put it off for a few days. And as I said, only had like a week before, so about two days before, I wrote like 300 words like, which is like half a page, right? And then she was like, my friend kept on telling me like, "you have to do this, like I'm already kind of done like, it's a long process." I'm like, *I have time like two three days*. She's like, you just start they do a little bit of work. So, she's been forced me to do it and I got like, two pages done until the morning that it was due. Like it was due at midnight, I'm pretty sure and I did it in the morning and I had to finish everything. So, it started off with me saying I won't do this like two weeks early until like, one week and then two days and then finished doing it the same morning.
S4	So, I was just like, *Oh, we have one every month*. We choose like a current, like, human rights issue going around, like, either anywhere in the world or like, like close to us, um, and I knew it was coming up. I didn't like start it until I'm pretty sure the day before and I also have a lot of time because I went back home. But I didn't work on it at all. And like, instead I gave priority to assignments that were due later on.

Table 7-15 continues.

Students' ID	Explanation of Procrastination
S5	Um, well, for me, I find like I can't cram. I know a lot of students who like cram…. but I don't work well under pressure. So, if I were to leave that like even that's like way past procrastinating at that point for me, like for studying purposes [reading lectures]. Papers [writing papers] I can like, I have been known to wait till the night before. So yeah, I guess it's just like in that situation for me that's procrastinating just because I like to stay on top of like, they're worth 50% of my mark so that for me it was.
S6	It was for my anthropology class and we had two weeks and essentially, we had to find a place, a public place to like view people. We had to write about it, but we also have to make based on our research question, we have to like find an article online to expand on and explain. I'd say I had two weeks [to complete the assignment]. I completed it two days before.
S7	Yeah, I was taking psychology last term too. And I had to read a chapter from the psychology textbook every week, one chapter a week. And for me, it was like I'm pretty slow reader. So, it's hard to kind of get into it from high school being first year and kind of like start like reading that much information every week and then have quizzes on it. So, I get like really stressed. When I get really stressed, sometimes I'll just kind of put things off and kind of work on other things that are kind of less important. And then it kind of builds up and, and then you have to read all at once. I had about a week, less than a week for each.
S8	Okay, so I was 100% sure. I was going to feel good, no doubt about it. But I still studied like I studied beforehand, I kind of focused more on the [midterm exam on earth science course on dinosaurs] honestly more than the other exams, okay, because I didn't want to fail but I kind of still knew right, and I guess, well, I got through like most of the content, but that's I didn't have time obviously because I started really late. And then I went to the into the exam. It was fine. Like, I didn't think that I did really well, but I actually passed the course. Like I passed but I honestly wish that I could have just studied beforehand as usual.
S9	I feel like for the first week I thought to myself *well, you know I don't really need to get started*. But as soon as I was thinking, okay, like it would be really good to get started and then didn't. I think that was when I was really like, actually procrastinating and not just being logistical and scheduling stuff. So that was probably like a week before it was due. Yeah, I'd be sitting there doing something else just like relaxing and thinking, *well, I could probably get started now*, and I still wouldn't.
S10	I did not get started until the day before the quiz because I thought I would have lots of time. First of all, I thought I could get [reading a 250 pages long book] done in one day. Before that, you know, I was like, you know, I have other stuff to do. So, it's like, okay, you know, I'll get the other stuff done first and you know, this is not a priority. I think it is procrastination because I certainly could manage my time better to have read this book instead of waiting until the last day. Like, I know, I use the excuse that *oh, I had other stuff to do*, but I certainly, I certainly believe that if I had managed my time better, I could have finished reading the book a long time ago. Yeah.

Appendix B
Study 1a & 1b: Informed Consent

The purpose of an informed consent is to ensure that you understand the purpose of the study and the nature of your involvement. The informed consent is intended to provide sufficient information, such that you have the opportunity to determine whether you wish to participate in the study.

Study Title: Emotions and Thoughts related to Academic Procrastination

Contact Information
Shamarukh Chowdhury (Ph.D. candidate at Carleton University, principal investigator, Shamarukh.Chowdhury@carleton.ca).

Dr. Tim Pychyl (Faculty member at Carleton University, thesis supervisor, Tim.Pychyl@carleton.ca, phone: 1 613-520-2600 ext. 1403).

Ethical concerns
If you have any ethical concerns with the current study, please contact the REB Chair of the Carleton University Research Ethics Board-B (CUREB-B), phone: 613-520-2600 ext. 4085, email: ethics@carleton.ca).

Purpose and Task Requirements: The purpose of the study is to explore which emotions you feel and the thoughts you have when you procrastinate on your academic tasks using a retrospective study. First, you will be asked to answer some questions about the specific emotions you tend to experience when procrastinating on academic tasks. Additionally, you will be asked about the types of thoughts you tend to have to justify, explain or make sense of needless delay of your academic tasks when you procrastinate. This study consists of self-report questionnaires only and should take approximately 15-20 minutes to complete.

Potential Risk and Discomfort: We have no reason to anticipate any psychological or physical risks to our participants. However, you may skip questions or withdraw from the study at any time without penalties if the items upset you in any way.

Compensation: You will receive **a 0.25% grade increase** towards your introductory psychology or second-year statistics in psychology final grade for completing the questionnaires.

Anonymity/Confidentiality: All collected data will remain confidential and anonymized once downloaded from Qualtrics. Please note that identifiers will be linked to the data through SONA to allow for compensation and withdrawal before identifiers are deleted at the end of the term.

If the results are published, only aggregated data will be shown (e.g., means, correlations), with no participant-specific data included. Research data will be accessible

by the researcher, the research supervisor and the survey company. No personal information or IP addresses will be linked to any of the data provided. The data from this study may be used for presentations, publications, and future teaching, and/or may be shared in online repositories and with trusted colleagues; however, participants will not be identified. Participants' anonymity will be maintained at all times. Anonymous electronic data files will be retained on secure, password-protected computers in the Department of Psychology for 7 years after publication of the data. At the end of 7 years, all research data will be deleted. We will collect data through the software, Qualtrics, which uses servers with multiple layers of security to protect the privacy of the data (e.g., encrypted websites and password protected storage). The data will be kept on the Qualtrics account for 3 years before being deleted. For your information, the Qualtrics server is located in the U.S. The United States Patriot Act permits U.S. law enforcement officials, for the purpose of an anti-terrorism investigation, to seek a court order that allows access to the personal records of any person without that person's knowledge.

Right to Withdraw: Your participation is completely voluntary. You may choose to not answer certain questions or withdraw at any point without any penalty. If you decide to withdraw, your compensation will still be given in full and your responses will be deleted. However, if you do decide to withdraw we recommend that you press next to skip to the end of the study so you may read the Debriefing form. Please note that if you complete the study you will no longer be able to withdraw from the study.

This study has been cleared by the Carleton University Research Ethics Board – B (CUREB-B Clearance # 111149).

Consent: By clicking on the "I agree" button below, I acknowledge that I have read the description of the research and I understand that this study examines the emotion and thought processes associated with academic procrastination. I understand that the data in this study will be used for research and application purposes. I understand that my participation is completely voluntary, and that all information given will be kept confidential.

I agree and wish to participate | **I do not wish to participate**

Appendix C
Study 1a & 1b, Study 2a & Study 3a: Demographic Questionnaire

Instruction: The following questions include background information. All information provided will be kept strictly confidential. The background information will be used only to describe the sample from whom we collect our data and for data analyses such as group comparisons (e.g., gender differences).

1. What is your gender?
   - ❑ Men
   - ❑ Women
   - ❑ Trans
   - ❑ Other, specify here if you use a particular label: _____
   - ❑ Prefer not to answer

2. How old are you (in years)? _____

3. Please indicate which options best represent your ethnic background.
   - ❑ White (e.g., Caucasian, European descent)
   - ❑ Black (e.g., African, Caribbean)
   - ❑ Indigenous (e.g., First Nations, Métis or Inuit)
   - ❑ East Asian (e.g., Chinese, Korean)
   - ❑ South Asian (e.g., Indian, Pakistani)
   - ❑ Latin American (e.g., Mexican, Columbian)
   - ❑ Middle Eastern (e.g., Syria, Egypt)
   - ❑ Bi- or multi-ethnic/racial (e.g., White/Black, East Asian/South Asian)
   - ❑ Other, please specify_____
   - ❑ Prefer not to answer

4. Is English your first language?
   - ❑ Yes
   - ❑ No

5. If you answered no, for how long have you spoken English (in years)? _____

6. How would you rate your English reading comprehension?

1	2	3	4	5
Beginner	Intermediate	Advanced	Superior	Native

7. How would you rate your writing skills in English?

1	2	3	4	5
Very low	Low	Medium	High	Very High

Appendix D
Study 1a and 1b: Positive and Negative Emotions Questionnaires

Instruction: We are interested to learn about your experience of specific emotions and thought processes when you needlessly delay your academic tasks, that is, the problematic delay commonly known as procrastination. **Procrastination means to put something off needlessly even though we have the intention to do the task.** Procrastination is prevalent in academic settings. Academic tasks have deadlines and when students procrastinate, they tend to put off their academic tasks until it is too close to the deadlines where they complete these tasks under tremendous pressure.

Below is a list of important and common tasks in university setting. Please tell us the major academic tasks you typically do in your courses (Choose ALL that apply).

- ❑ Exam preparation (studying for exams)
- ❑ Writing assignment
- ❑ Assigned readings
- ❑ Writing Term paper
- ❑ Writing Essay
- ❑ Writing Thesis
- ❑ Lab report
- ❑ Illustration projects or drawing
- ❑ Problem sets
- ❑ Questions on readings or discussions
- ❑ Presentation
- ❑ Practical projects (e.g., software or game development; programming)
- ❑ Group project
- ❑ Statistics or math assignment
- ❑ Other: _____

Among the academic tasks you have noted above, please select the tasks you frequently procrastinate on (Choose ALL that apply).

- ❑ Exam preparation (studying for exams)
- ❑ Writing assignment
- ❑ Assigned readings
- ❑ Writing Term paper
- ❑ Writing Essay
- ❑ Writing Thesis
- ❑ Lab report
- ❑ Illustration projects or drawing
- ❑ Problem sets
- ❑ Questions on readings or discussions
- ❑ Presentation
- ❑ Practical projects (e.g., software or game development; programming)
- ❑ Group project
- ❑ Statistics or math assignment
- ❑ Other: _____

From the list below, now please select one of the academic tasks that you procrastinate on the most (Only choose ONE TASK).

- ❑ Exam preparation (studying for exams)
- ❑ Writing assignment
- ❑ Assigned readings
- ❑ Writing Term paper
- ❑ Writing Essay
- ❑ Writing Thesis
- ❑ Lab report
- ❑ Illustration projects or drawing
- ❑ Problem sets
- ❑ Questions on readings or discussions
- ❑ Presentation
- ❑ Practical projects (e.g., software or game development; programming)
- ❑ Group project
- ❑ Statistics or math assignment
- ❑ Other: _____

Now please reflect on the specific emotions that you experienced when you procrastinated on this academic task you have noted. On a scale of 0 (Not at all) to10 (Extremely), to what extent do you feel the following emotions?

	0 (Not at all)	1	2	3	4	5 (Neutral)	6	7	8	9	10 (Extremely)
1. Boredom											
2. Frustration											
3. Resentment											
4. Anxious											
5. Stressed											
6. Afraid of failure											
7. Distressed											
8. Upset											
9. Angry											
10. Irritated											
11. Nervous											
12. Happy or pleased											
13. Enjoyment											
14. Fun											
15. Excited											
16. Enthusiastic											
17. Content											
18. Relaxed											
19. Relief											

Appendix E
Study 1a and 1b: Debriefing Form

Study Title: Emotions and Thoughts related to Academic Procrastination

Thank you for completing these questionnaires.

What are we trying to learn in this research?

Procrastination is a very common problem among students where students needlessly delay their academic work even though they know the consequences of this delay will be harmful. When students procrastinate, they often use phrases such as "I don't feel like it" or "I will feel like it tomorrow" which demonstrates the dysfunctional emotional aspect of academic procrastination. The purpose of this study is to understand which specific emotions and irrational thought processes are associated with this prevalent problem. We want to understand the types of positive and negative emotions you experience and to what extent you experience these emotions. We expect that students will report experiencing more negative emotions and fewer positive emotions when they procrastinate on academic tasks. Additionally, we hypothesize that students will report having more irrational thoughts to justify their procrastination. We're interested in just what emotions and thoughts students are having.

Why is this study important to researchers or to the general public?

Due to the self-defeating nature of procrastination, procrastination has been studied extensively over the years. Procrastination researchers have mostly examined the irrational cognitions and little focus has been placed on the emotional aspect of procrastination. We want to further explore the role of emotions together with the irrational cognitions to better understand procrastination.

This study is a part of a Ph.D. thesis. Your answers to the questions in this study will be used to develop questionnaires for two other studies in this Ph.D. thesis. The emotions and irrational thoughts more frequently noted by participants in this study will be included in the questionnaires of the subsequent studies to understand students' momentary experience of procrastination. More specifically, we will investigate the maladaptive emotion regulation strategies in procrastination (i.e., mood repair) and procrastinatory cognitions at the moment when students try to engage in their academic tasks but end up delaying their academic tasks. Understanding these specific experiences will be beneficial to students as they may become more aware of their difficulties in emotion regulation during procrastination and adopt proactive coping strategies to reduce their procrastination.

Contact Information

The following people are involved in this research project and may be contacted at any time if you have any further questions about the project, what it means, or concerns about how it was conducted:

- **Shamarukh Chowdhury** (Ph.D. candidate, Shamarukh.Chowdhury@carleton.ca)
- **Dr. Tim Pychyl** (Faculty member, Tim.Pychyl@carleton.ca, phone: 613-520-2600 ext. 1403).

If you have ethical concerns about this study, please contact the REB Chair of the Carleton University Research Ethics Board-B (CUREB-B), phone: 613-520-2600 ext. 4085, email: ethics@carleton.ca).

Where can I learn more?
To learn more about procrastination in general and find new research on the subject, visit the website for the Procrastination Research Group: www.procrastination.ca. This is a research website with access to blogs and even podcasts that can teach you about procrastination.

Is there anything I can do if I found this experiment emotionally upsetting?

If you feel anxious or distressed after participating in this study, please feel free to contact the Carleton University Health and Counselling Services at: 613-520-6674, or the Ottawa Distress Centre at 613-238-3311.

Thank you for your participation!

This study has been cleared by the Carleton University Research Ethics Board – B (CUREB-B Clearance # 111149).

To ensure maximum confidentiality, please exit this browser by clicking "Next" at the bottom of this page.

Appendix F
Study 2a: Informed Consent [for the online study]

The purpose of an informed consent is to ensure that you understand the purpose of the study and the nature of your involvement. The informed consent is intended to provide sufficient information, such that you have the opportunity to determine whether you wish to participate in the study.

Study Title: Academic Procrastination: Exploring the Role of Task Appraisals, Affect and Cognitions

Contact Information
Shamarukh Chowdhury (Ph.D. candidate at Carleton University, principal investigator, Shamarukh.Chowdhury@carleton.ca).

Dr. Tim Pychyl (Faculty member at Carleton University, thesis supervisor, Tim.Pychyl@carleton.ca, phone: 1 613-520-2600 ext. 1403).

Ethical concerns
If you have any ethical concerns with the current study, please contact the Chair of the Carleton University Research Ethics Board-B (CUREB-B), phone: 613-520-2600 ext. 4085, email: ethics@carleton.ca).

Purpose and Task Requirements: The purpose of this study is to explore academic procrastination among university students. You will be asked to report your current experience of procrastination on a specific task. We want to understand how you appraise this academic task that you are procrastinating on the most and the associated momentary thoughts that you have about this task when you needlessly delay this academic task. We also want to understand how you feel *at the moment* when you decide to delay this academic task. This is an online study that consists of self-report questionnaires and will take approximately 75-90 minutes to complete.

Potential Risk and Discomfort: We have no reason to anticipate any psychological or physical risks to our participants. However, you may skip questions or withdraw from the study at any time without penalties if the items upset you in any way.

Compensation: You will receive **a 0.75% grade increase** towards your introductory psychology or second-year statistics in psychology final grade for completing the questionnaires.

Anonymity/Confidentiality: All collected data will remain confidential and anonymized once downloaded from Qualtrics. Please note that for this online survey, unique identifiers will be linked to the data through SONA to allow for compensation and withdrawal before identifiers are deleted at the end of the term. If the results are published, only aggregated data will be shown (e.g., means, correlations), with no participant-specific data included. Research data will be accessible by the researcher, the

research supervisor and the survey company. No personal information or IP addresses will be linked to any of the data provided. The data from this study may be used for presentations, publications, and future teaching, and/or may be shared in online repositories and with trusted colleagues; however, participants will not be identified. Participants' anonymity will be maintained at all times. Anonymous electronic data files will be retained on secure, password-protected computers in the Department of Psychology for 7 years after publication of the data. At the end of 7 years, all research data will be deleted. We will collect data through the software, Qualtrics, which uses servers with multiple layers of security to protect the privacy of the data (e.g., encrypted websites and password protected storage). The data will be kept on the Qualtrics account for 3 years before being deleted. For your information, the Qualtrics server is located in the U.S. The United States Patriot Act permits U.S. law enforcement officials, for the purpose of an anti-terrorism investigation, to seek a court order that allows access to the personal records of any person without that person's knowledge.

Right to Withdraw: Your participation is completely voluntary. You may choose to not answer certain questions or withdraw at any point without any penalty. If you decide to withdraw, your compensation will still be given in full and your response will be deleted. However, if you do decide to withdraw we recommend that you press next to skip to the end of the study so you may read the Debriefing form. Please note that if you complete the study you will no longer be able to withdraw from the study.

This study has been cleared by the Carleton University Research Ethics Board (CUREB-B Clearance # 111460).

Consent: By clicking on the "I agree" button below, I acknowledge that I have read the description of the research and I understand that this study examines how students think and feel about their academic task that they procrastinate on the most, which specific emotions they experience and what thoughts processes they have *at the moment* when they procrastinate on that specific task. I understand that the data in this study will be used for research and application purposes only. I understand that my participation is completely voluntary, and that all information given will be kept confidential.

I agree and wish to participate | **I do not wish to participate**

Appendix G
Study 2a: Personal Project Analysis Questionnaire - Four Phases of Emotions

The scenario provided below describes a student's experience of procrastination. **Procrastination means to put something off needlessly even though we have the intention to do the task and even though we expect to be worse off for the delay.** In everyday life, we procrastinate on some tasks but not others. The student in this scenario is procrastinating on writing her psychology essay. Please read this scenario carefully to answer some follow-up questions.

Scenario: *Jessie is taking a psychology course this semester in university. She has an essay due in 3 weeks. To write this essay, Jessie needs to decide on a topic and find 4 academic research articles about her chosen topic to write an argumentative essay. Jessie knows that essay writing is a challenging task as well as time consuming. Jessie has decided on a topic and has the intention to work on the essay. However, every time she attempts to start working on it, she does not feel like doing it and each time she tells herself that she will start working on it tomorrow. Instead of working on the essay, she watches her favourite show on Netflix, surfs the Internet, sends text messages to her friends, walks the dog, cleans her apartment, hangs out with her friends, takes a nap and so on. She knows time is running out to complete her essay and that this needless delay is probably going to hurt her in terms of her grade, but she is continuing to delay working on this essay.*

Now that you have read this scenario, I want you to think about the academic tasks you are currently working on. Think about the **assignments** (e.g., essays, term paper), **assigned readings** (e.g., textbook chapter, research articles, other assigned readings) or **exam preparation** that are due soon. **Are there any projects that you are currently having difficulty getting started with that you feel is procrastination?**

A. In the space below, please list up to 10 academic projects **beginning with the projects you are procrastinating on the most** followed by the projects that are less problematic. I also want you to **provide a rating for the extent to which you think you are procrastinating on each task** on a 0 (NOT procrastinating at all) to 10 (procrastinating a lot).

Provide a list of 10 academic projects	Rate the extent to which you are procrastinating on the academic project										
	0 (Not procrastinating at all)	1	2	3	4	5	6	7	8	9	10 (procrastinating a lot)
1.											
2.											
3.											
4.											
5.											
6.											

7.											
8.											
9.											
10.											

B. Phase 1 question:

Now please reflect on the emotions that you experience *at the moment* when you think about doing the **academic task _____ you are procrastinating on the most**. On a scale of 0 (Not at all) to10 (Extremely), to what extent do you feel the following emotions? [**Note to Ethics committee:** Name of the academic task participants procrastinate on the most from question A will be programmed on Qualtrics to appear in the blank space in this question].

	0 (Not at all)	1	2	3	4	5 (Neutral)	6	7	8	9	10 (Extremely)
20. Bored											
21. Frustrated											
22. Resentment											
23. Anxious											
24. Stressed											
25. Afraid (Fear of failure)											
26. Distressed											
27. Upset											
28. Angry											
29. Irritated											
30. Nervous											
31. Happy or pleased											
32. Enjoyment											
33. Fun											
34. Excited											
35. Enthusiasm											
36. Content											
37. Relaxed											
38. Relieved											

How would you rate your **overall mood** on a scale of 0 (Bad) to10 (Good) when you think about doing the academic task _____ you are procrastinating on the most?

	0 (Bad)	1	2	3	4	5 (Neutral)	6	7	8	9	10 (Good)
Overall mood											

C. Phase 2 questions:

Now please tell us how you feel *at the moment* when you put off this academic task _____. That is, when you thought to yourself that "I am not going to work on this academic task right now" does your mood change? On a scale of 0 (Not at all) to10 (Extremely), to what extent do you feel the following emotions? [**Note to Ethics committee:** Name of the academic task participants procrastinate on the most from question A will be programmed on Qualtrics to appear in the blank space in this question].

	0 (Not at all)	1	2	3	4	5 (Neutral)	6	7	8	9	10 (Extremely)
1. Bored											
2. Frustrated											
3. Resentment											
4. Anxious											
5. Stressed											
6. Afraid (Fear of failure)											
7. Distressed											
8. Upset											
9. Angry											
10. Irritated											
11. Nervous											
12. Happy or pleased											
13. Enjoyment											
14. Fun											
15. Excited											
16. Enthusiasm											
17. Content											
18. Relaxed											
19. Relieved											

How would you rate your **overall mood** on a scale of 0 (Bad) to10 (Good) *at the moment* when you put off this academic task _____?

	0 (Bad)	1	2	3	4	5 (Neutral)	6	7	8	9	10 (Good)
Overall mood											

D. Phase 3 questions:

After you decided that you would not do this academic task right now, what plan do you make to work on that academic task? For example, we make plans like "I will start writing this essay tonight after dinner" or "I will start reading this chapter tomorrow evening."

What was your alternate plan?

How did you feel right after you formed this *new plan for this academic task*? On a scale of 0 (Not at all) to10 (Extremely), to what extent do you feel the following emotions?

	0 (Not at all)	1	2	3	4	5 (Neutral)	6	7	8	9	10 (Extremely)
1. Bored											
2. Frustrated											
3. Resentment											
4. Anxious											
5. Stressed											
6. Afraid (Fear of failure)											
7. Distressed											
8. Upset											
9. Angry											
10. Irritated											
11. Nervous											
12. Happy or pleased											
13. Enjoyment											
14. Fun											
15. Excited											
16. Enthusiasm											
17. Content											
18. Relaxed											
19. Relieved											

How would you rate your **overall mood** on a scale of 0 (Bad) to10 (Good) at that moment right after you formed this *new plan for this academic task?*

	0 (Bad)	1	2	3	4	5 (Neutral)	6	7	8	9	10 (Good)
Overall mood											

E. Phase 4 questions:

When we procrastinate on our academic tasks, we tend to do something else (e.g., play videos games, watch TV, browse the internet, take a nap, hang out with friends). Now tell me about the activities you are mostly engaging in when you are procrastinating on the **academic task** _____ you noted earlier. Please list 5 such activities that you are engaging in when you tend to put off your academic task.

Provide the list of other activities or "projects" you work on when procrastinating on that academic task
1.
2.
3.
4.
5.

Now please reflect on the emotions that you experience *at the moment* when you engage in **alternate activities** instead of the **academic task** _____. On a scale of 1 (Not at all) to10 (Extremely), to what extent do you feel the following emotions? [**Note to Ethics committee:** Name of the academic task participants procrastinate on the most from question A will be programmed on Qualtrics to appear in the blank space in this question].

	0 (Not at all)	1	2	3	4	5 (Neutral)	6	7	8	9	10 (Extremely)
1. Bored											
2. Frustrated											
3. Resentment											
4. Anxious											
5. Stressed											
6. Afraid (Fear of failure)											
7. Distressed											
8. Upset											
9. Angry											
10. Irritated											
11. Nervous											
12. Happy or pleased											
13. Enjoyment											
14. Fun											
15. Excited											
16. Enthusiasm											
17. Content											
18. Relaxed											
19. Relieved											

How would you rate your **overall mood** on a scale of 0 (Bad) to10 (Good) *at the moment* when you engage in **alternate activities** instead of the **academic task _____?**

	0 (Bad)	1	2	3	4	5 (Neutral)	6	7	8	9	10 (Good)
Overall mood											

Appendix H

Study 2a: Personal Project Analysis Questionnaire: Irrational beliefs

Now tell me about what you think when you try to engage in this academic task that you procrastinate on the most. Please read the following statements presented below and rate them on a scale of 0 (Not at all) – 10 (Extremely) in terms of how much these statement describe you while thinking about the academic task you are delaying.

a) I think I am too smart to study for this academic task and so, I don't need it.

0	1	2	3	4	5	6	7	8	9	10
(Not at all)					(Neutral)					(Extremely)

b) I don't think I will benefit from studying for this academic task and so I put it off.

0	1	2	3	4	5	6	7	8	9	10
(Not at all)					(Neutral)					(Extremely)

c) I think I need to be in a good mood to study for this academic task.

0	1	2	3	4	5	6	7	8	9	10
(Not at all)					(Neutral)					(Extremely)

d) I don't like forming habits to work on this academic task.

0	1	2	3	4	5	6	7	8	9	10
(Not at all)					(Neutral)					(Extremely)

e) I need to have more free time and studying for this academic task seems to steal them.

0	1	2	3	4	5	6	7	8	9	10
(Not at all)					(Neutral)					(Extremely)

f) This academic task is too difficult and so I decide to deal with it tomorrow.

0	1	2	3	4	5	6	7	8	9	10
(Not at all)					(Neutral)					(Extremely)

g) This academic task is too difficult/challenging and so, I will not do well even if I start early.

0 (Not at all)	1	2	3	4	5 (Neutral)	6	7	8	9	10 (Extremely)

h) I will work better on this academic task tomorrow.

0 (Not at all)	1	2	3	4	5 (Neutral)	6	7	8	9	10 (Extremely)

i) I believe that I will work better under pressure on this academic task.

0 (Not at all)	1	2	3	4	5 (Neutral)	6	7	8	9	10 (Extremely)

j) I think I will feel more like it tomorrow to work on this academic task.

0 (Not at all)	1	2	3	4	5 (Neutral)	6	7	8	9	10 (Extremely)

k) Putting off this academic task helps me to relax.

0 (Not at all)	1	2	3	4	5 (Neutral)	6	7	8	9	10 (Extremely)

l) This academic task is too much to get into.

0 (Not at all)	1	2	3	4	5 (Neutral)	6	7	8	9	10 (Extremely)

m) I am too stupid to benefit from studying for this academic task and so, I will hangout on Facebook or do something else.

0 (Not at all)	1	2	3	4	5 (Neutral)	6	7	8	9	10 (Extremely)

n) It is hopeless to study for this academic task.

0 (Not at all)	1	2	3	4	5 (Neutral)	6	7	8	9	10 (Extremely)

Appendix I
Study 2a and Study 3a: Multifaceted Measure of Academic Procrastination (MMAP)

Instruction: This questionnaire asks about delay in your academic life in general. It may be very frequent, or you may almost never delay anything. We are interested in your thoughts and emotions when you do delay on academic tasks such as studying for exams, writing assignments (e.g., essays, reports, thesis), or assigned readings.

Please note the following before answering:

- There are no right or wrong answers. We are only interested in how often you delay academic tasks and how it affects you.
- Some questions may seem similar to each other. Your answers to all questions are important for our study.
- In answering the questions, **please consider the major academic tasks and what you have typically done in the recent past (current semester or last semester).**

Procrastination Behaviour Scale (PBS)

Instructions: Please choose the appropriate response for each item:

Response options:

1	2	3	4	5	6
Never	Almost never	Occasionally	Often	Very often	Always

Items:

1. When academic tasks are assigned, I tell myself that I will not start them late, but I end up delaying them without a good reason.
2. I don't intend or plan to work on academic tasks, and I do other fun things instead.
3. I keep putting off academic tasks until later without any rational reason.
4. I am not interested in starting academic tasks ahead of time because I would rather do more enjoyable things instead.
5. I needlessly delay working on academic tasks despite the fact that I know I will not be happy about doing so later.
6. I intentionally fill my time with a lot of fun and exciting activities as opposed to planning and working on school tasks on time.
7. Despite my intention to start and finish academic tasks on time, I engage in other unnecessary activities instead.
8. I choose to do academic tasks at the last minute so I leave more time for fun stuff instead.
9. When I receive academic tasks, I plan to work on them ahead of time, but I needlessly delay starting them.
10. I am focused on fun and enjoyable activities and do not bother myself with academic tasks until the last minute.

Procrastination Negative Consequences Scale (PNCS)
Instructions: Please choose the appropriate response for each item:

Response options:

1	2	3	4	5	6
Never	Almost never	Occasionally	Often	Very often	Always

Items:

1. Delaying needlessly on academic tasks has made me a less successful student.
2. My needless delay on academic tasks has caused me to not enjoy my life.
3. I don't like my habitual delay of academic tasks.
4. There are negative effects on my health when I delay working on academic tasks.
5. My needless delay on academic tasks is one of the factors that has negatively affected my grades.
6. My needless delay on academic tasks does not allow me to fully enjoy social activities.
7. I am not happy with my needless delay on academic tasks.
8. Repeatedly postponing academic tasks until the last minute has had a negative impact on my health.
9. The quality of my work has suffered from my delay on academic tasks.
10. My needless delay on academic tasks has affected my personal life in a negative way.
11. I really would like to learn how to avoid needless delay on academic tasks.
12. There are negative effects on my well-being when I delay working on academic tasks.
13. As a result of delaying academic tasks, my professors are not satisfied with the quality of my work.
14. When I have delayed working on academic tasks, it has led me to not be at my best in my personal relationships.
15. In general, my needless delay on academic tasks bothers me.

Negative Emotion Scale (NES)

The following questions are about the feelings that one may experience at different stage of dealing with academic tasks. It is important that you answer these questions **based on what you have actually felt or experienced** at similar situations in recent semesters, NOT what you believe that you should ideally feel in the future

Response options:

1	2	3	4	5	6
Never	Almost never	Occasionally	Often	Very often	Always

Items:

1. Whenever I am about to start working on academic tasks, I feel anxious.
2. Whenever I am about to start working on academic tasks, I feel hopeless.
3. Whenever I am about to start working on academic tasks, I feel bored.
4. Whenever I am about to start working on academic tasks, I feel guilty.
5. Whenever I am about to start working on academic tasks, I feel sluggish or sleepy.
6. Whenever I am about to start working on academic tasks, I feel emotional distress.
7. Whenever I am about to start working on academic tasks, I feel one or more of the following emotions: relaxed, content or calm.
8. Whenever I am about to start working on academic tasks, I feel one or more of the following emotions: attentive, active, joy, excited, hopeful or enthusiastic.
9. While I am needlessly delaying on an academic task despite my initial plan, I feel anxious.
10. While I am needlessly delaying on an academic task despite my initial plan, I feel angry.
11. While I am needlessly delaying on an academic task despite my initial plan, I feel hopeless.
12. While I am needlessly delaying on an academic task despite my initial plan, I feel bored.
13. While I am needlessly delaying on an academic task despite my initial plan, I feel guilty.
14. While I am needlessly delaying on an academic task despite my initial plan, I feel sluggish or sleepy.
15. While I am needlessly delaying on an academic task despite my initial plan, I feel emotional distress.
16. While I am needlessly delaying on an academic task despite my initial plan, I feel one or more of the following emotions: relaxed, content or calm.
17. While I am needlessly delaying on an academic task despite my initial plan, I feel one or more of the following emotions: attentive, active, joy, excited, hopeful or enthusiastic.

MMAP-Peripheral Sections:

Task Priming Questions (TPQ)

TP_Q1) Below is a list of important and common tasks in school setting. What major academic tasks do you typically do in your courses? (Choose ALL that apply)

- Exam preparation (studying for exams)
- Writing assignment
- Assigned readings
- Writing Term paper
- Writing Essay
- Writing Thesis
- Lab report
- Illustration projects or drawing
- Problem sets
- Questions on readings or discussions
- Presentation
- Practical projects (e.g., software or game development; programming)
- Group project
- Other: _____

TP_Q2) On which task do you delay more? (Only choose ONE TASK even if you delay many)

- Exam preparation (studying for exams)
- Writing assignment
- Assigned readings
- Writing Term paper
- Writing Essay
- Writing Thesis
- Lab report
- Illustration projects or drawing
- Problem sets
- Questions on readings or discussions
- Presentation
- Practical projects (e.g., software or game development; programming)
- Group project
- Other: _____

Task Reflection Question (TRQ)

TR-Q1) When you were answering the questions related to delaying on academic task(s), which task(s) did you have in mind? (Choose all that apply)

- Exam preparation (studying for exams)
- Writing assignment
- Assigned readings
- Writing Term paper
- Writing Essay
- Writing Thesis
- Lab report
- Illustration projects or drawing
- Problem sets
- Questions on readings or discussions
- Presentation
- Practical projects (e.g., software or game development; programming)
- Group project
- Other: _____

TR-Q2) When you were answering the questions related to delaying on academic task(s), which task were you thinking about the most? (Only choose ONE TASK)

- Exam preparation (studying for exams)
- Writing assignment
- Assigned readings
- Writing Term paper
- Writing Essay
- Writing Thesis
- Lab report
- Illustration projects or drawing
- Problem sets
- Questions on readings or discussions
- Presentation
- Practical projects (e.g., software or game development; programming)
- Group project
- Other: _____

Questionnaire for Study 2a:

Please choose the appropriate response for each item presented below when you think about the **academic task _____ that you procrastinate on the most**. [**Note to Ethics committee:** Name of the academic task participants procrastinate on the most from question A will be programmed on Qualtrics to appear in the blank space in this question]. Response options:

1	2	3	4	5	6
Never	Almost never	Occasionally	Often	Very often	Always

1. When this academic task was assigned, I told myself that I will not start it late, but I am delaying it without a good reason.
2. I am putting off this academic task until later without any rational reason.
3. I am needlessly delaying working on this academic task despite the fact that I know I will not be happy about doing so later.
4. Despite my intention to start and finish this academic task on time, I am engaging in other unnecessary activities instead.
5. When I received this academic task, I planned to work on it ahead of time, but I am needlessly delaying starting it.

Questionnaire for Study 3a:

Now please choose the appropriate response for each item presented below.

Response options:

1	2	3	4	5	6
Never	Almost never	Occasionally	Often	Very often	Always

1. When this academic task was assigned, I told myself that I will not start it late, but I delayed it without a good reason.
2. I put off this academic task until later without any rational reason.
3. I needlessly delayed working on this academic task despite the fact that I knew I would not be happy about doing so later.
4. Despite my intention to start and finish this academic task on time, I engaged in other unnecessary activities instead.
5. When I received this academic task, I planned to work on it ahead of time, but I needlessly delayed starting it.

Appendix J
Debriefing Form [for the online study]

Study Title: Academic Procrastination: Exploring the Role of Task Appraisals, Affect and Cognitions

Thank you for completing these questionnaires.

What are we trying to learn in this research?

Procrastination is a very common problem among students where students needlessly delay their academic work even though they know the consequences of this delay will be harmful. When students procrastinate, they often use phrases such as "I don't feel like it" or "I will feel like it tomorrow" which demonstrates the dysfunctional emotional aspect of academic procrastination – they don't "feel" like doing it. The purpose of this study is to understand momentary emotional experience of students and the irrational thought processes students have when they procrastinate. We want to understand the types of positive and negative emotions students' experience and to what extent students experience these emotions at the moment when they procrastinate. We expect that students will report experiencing more negative emotions and fewer positive emotions when they procrastinate on academic tasks, but when they update their intention to work on the academic task later and when they engage in an alternate activity when they procrastinate they may experience more positive emotions. Researchers call this "mood repair," as the task avoidance provides temporary improvement in our emotional state or mood. Additionally, we hypothesize that students will report having more irrational thoughts to justify their procrastination.

Why is this study important to researchers or to the general public?

This study is for a Ph.D. thesis. Due to the self-defeating nature of procrastination, procrastination has been studied extensively over the years. Procrastination researchers have mostly examined the irrational cognitions and little focus has been placed on the emotional aspect of procrastination. We want to further explore the role of emotions *together* with the irrational cognitions to better understand procrastination. More specifically, we are investigating the maladaptive emotion regulation strategies in procrastination (i.e., mood repair) and procrastinatory cognitions at the moment when students try to engage in their academic tasks but end up delaying their academic tasks. Understanding these specific experiences will be beneficial to students as they may become more aware of their difficulties in emotion regulation during procrastination and adopt proactive coping strategies to reduce their procrastination.

Contact Information

The following people are involved in this research project and may be contacted at any time if you have any further questions about the project, what it means, or concerns about how it was conducted:

- **Shamarukh Chowdhury** (Ph.D. candidate, Shamarukh.Chowdhury@carleton.ca)
- **Dr. Tim Pychyl** (Faculty member, Tim.Pychyl@carleton.ca, phone: 613-520-2600 ext. 1403).

If you have ethical concerns about this study, please contact the REB Chair of the Carleton University Research Ethics Board-B (CUREB-B), phone: 613-520-2600 ext. 4085, email: ethics@carleton.ca).

Where can I learn more?
To learn more about procrastination in general and find new research on the subject, visit the website for the Procrastination Research Group: www.procrastination.ca. This is a research website with access to blogs and even podcasts that can teach you about procrastination.

Is there anything I can do if I found this experiment emotionally upsetting?

If you feel anxious or distressed after participating in this study, please feel free to contact the Carleton University Health and Counselling Services at: 613-520-6674, or the Ottawa Distress Centre at 613-238-3311.

Thank you for your participation!

This study has been cleared by the Carleton University Research Ethics Board (CUREB-B Clearance # 111460).

Appendix K
Study 2b: Informed consent [for the interview session]

The purpose of an informed consent is to ensure that you understand the purpose of the study and the nature of your involvement. The informed consent is intended to provide sufficient information, such that you have the opportunity to determine whether you wish to participate in the study.

Study Title: Academic Procrastination: Exploring the Role of Task Appraisals, Affect and Cognitions

Contact Information
Shamarukh Chowdhury (Ph.D. candidate at Carleton University, principal investigator, Shamarukh.Chowdhury@carleton.ca).

Dr. Tim Pychyl (Faculty member at Carleton University, thesis supervisor, Tim.Pychyl@carleton.ca, phone: 1 613-520-2600 ext. 1403).

Ethical concerns
If you have any ethical concerns with the current study, please contact the Chair of the Carleton University Research Ethics Board-B (CUREB-B), phone: 613-520-2600 ext. 4085, email: ethics@carleton.ca).

Purpose and Task Requirements: The purpose of this study is to explore academic procrastination among university students. You will be asked to report your current experience of procrastination on a specific task. We want to understand how you appraise this academic task that you are procrastinating on the most and the associated momentary thoughts that you have about this task when you needlessly delay this academic task. We also want to understand how you feel *at the moment* when you decide to delay this academic task.

You have already completed our online study, which is why we want to invite you to take part in an interview session. The purpose of this interview session is to have an in-depth understanding of students' procrastination problems in their own words. We will ask you some open-ended questions about the academic tasks you are currently procrastinating on the most. That is, we want to learn how you feel and think at the moment when you are delaying these academic tasks and discuss your experience of procrastination in your own words. You will also complete a brief paper and pencil task to indicate to what extent alternate tasks impact your academic tasks. This interview is expected to last an hour.

Please note that we will audiotape our interview using a digital voice-recorder such that we can accurately transcribe each student's experience of procrastination in their own words to analyze the qualitative data. Note that you will not be identified in the recording, and that once the interview recording has been transcribed to text, we will delete the recording itself.

Compensation: For participating in the interview, you will receive **an additional 1% grade increase** towards your introductory psychology or second-year statistics in psychology final grade.

Potential Risk and Discomfort: We have no reason to anticipate any psychological or physical risks to our participants. However, you may let the researcher know when you wish to skip any question during the interview session that you feel uncomfortable answering. You can also withdraw from the study at any time without penalties if any of the interview questions upset you in any way.

Right to Withdraw: Your participation is completely voluntary. You may choose to not answer certain questions or withdraw at any point without any penalty. If you decide to withdraw, your compensation will still be given in full, your response will be deleted and you will be provided the Debriefing form. Please note that if you complete the interview you will no longer be able to withdraw from the study.

Anonymity/Confidentiality: All collected data will remain confidential and anonymized once transcribed. Please note that for the interview session your name will be noted only for the purpose of granting credits to you through SONA. Once the interview is complete, your credits will be granted right away. In the recording, only the unique identifier that was given to you for completing the online study will be recorded to link your online data to your answers from the in-person interview. Your name will not be recorded in the audiotape to maintain anonymity.
Research data will be accessible by the researcher and the research supervisor. No personal information will be linked to any of the data provided. The data from this study may be used for presentations, publications, and future teaching, and/or may be shared in online repositories and with trusted colleagues; however, participants will not be identified. Participants' anonymity will be maintained at all times. Anonymous electronic files of the transcribed data will be retained on a secure, password-protected computer in the Department of Psychology for 7 years after publication of the data. At the end of 7 years, all research data will be deleted.

This study has been cleared by the Carleton University Research Ethics Board (CUREB-B Clearance # 111460).

Consent: If you wish to participate in the interview session, please respond to the email by stating **"I agree and wish to participate."** If you agree to participate then it means you acknowledge that you have read the description of the research and you understand that this study examines students' current experience of academic procrastination, particularly which specific emotions they experience and what thoughts processes they have *at the moment* when they procrastinate on specific tasks. It also means you understand that the data in this study will be used for research and application purposes, and that your participation is completely voluntary, and that all information given will be kept confidential.
If you do not want to participate please respond to this email by stating "I do not wish to participate."

Appendix L
Study 2b: Open-Ended Interview Questions for the Qualitative Interview

Phase 1: Questions pertaining to academic tasks that participants are procrastinating on

1. Tell me about the academic task that you are procrastinating on the most [*Researcher will remind the task participant noted in the online study*]. What are the specific requirements of this task that you need to fulfill to successfully complete this task?
2. What makes you think you are procrastinating on this academic task? Why do you think you are putting off or delaying this specific academic task more than others?
3. Tell me about the moment when you intended to work on this academic task. You noted in the online study that you experience these specific emotions [*Researcher will list the emotions the participants noted in the online study*] when you think of engaging in this task. In your own words, can you also elaborate on this, that is, how did you feel when you tried to engage in this academic task that you are procrastinating on the most?
4. What were you thinking when you tried to engage in this academic task that you are procrastinating on the most?
5. What specific qualities of this academic task affected you the most?
6. Do you experience the same emotions when you try to engage in the other academic tasks, which you also procrastinated on?

Phase 2: Questions pertaining to putting off the academic task

1. Now tell me about the time when you decided to postpone the task? How did you feel at that moment when you decided that you would put it off? You have noted some emotions in the online study [*Researcher will note the list of emotions*]. Can you please elaborate on this experience?
2. How do you justify at that moment that putting off this academic task is ok?

Phase 3: Questions pertaining to intention update

1. After you decided that you will not work on this academic task as intended, what plan do you make to work on that academic task, that is, when will you work on this task next?
2. How do you feel when you form this alternate plan for this academic task? You noted these emotions in your online study [*Researcher will list the emotions participants noted in their online study*]. Can you tell me more about these momentary emotional experiences?
3. What tends to come to mind in terms of thoughts that justifies the delay of this academic task at that moment?

Phase 4: Questions pertaining to the alternate activities that participants are using to procrastinate on their academic tasks
1. Tell me about the alternate activities that you engage in when you were procrastinating on the specific academic task that you have listed.
2. Why do you think you chose these specific alternate activities instead of working on your academic task? What specific qualities of these alternate activities attracted you to it?
3. You told me about the specific emotions [*Researcher will list the emotions the participant previously noted in the online study*] you felt when you engaged in these alternate activities. Can you tell me more about these feeling states when you engage in these other tasks?
4. What tends to come to mind in terms of thoughts that justifies engaging in the alternate tasks at that moment?
5. How do you think these activities affect the academic tasks that you are procrastinating on?

Appendix M
Study 2b: Debriefing Form [for the interview study]

Study Title: Academic Procrastination: Exploring the Role of Task Appraisals, Affect and Cognitions

Thank you for completing these questionnaires.

What are we trying to learn in this research?

Procrastination is a very common problem among students where students needlessly delay their academic work even though they know the consequences of this delay will be harmful. When students procrastinate, they often use phrases such as "I don't feel like it" or "I will feel like it tomorrow" which demonstrates the dysfunctional emotional aspect of academic procrastination. The purpose of this study is to understand momentary emotional experience of students and the irrational thought processes students have when they procrastinate. We want to understand the types of positive and negative emotions students' experience and to what extent students experience these emotions. We expect that students will report experiencing more negative emotions and fewer positive emotions when they procrastinate on academic tasks, however when they update their intention to work on the academic task later and when they engage in an alternate activity, we expect that they may feel better – something researchers call "mood repair" in relation to procrastination. Additionally, we hypothesize that students will report having more irrational thoughts to justify their procrastination. *Your answers to the interview questions together with your ratings from the online study will help us to have an in-depth understanding of the emotions and thoughts students experience during procrastination.*

Why is this study important to researchers or to the general public?

This study is for a Ph.D. thesis. Due to the self-defeating nature of procrastination, procrastination has been studied extensively over the years. Procrastination researchers have mostly examined the irrational cognitions and little focus has been placed on the emotional aspect of procrastination. We want to further explore the role of emotions *together* with the irrational cognitions to better understand procrastination. More specifically, we are investigating the maladaptive emotion regulation strategies in procrastination (i.e., mood repair) and procrastinatory cognitions at the moment when students try to engage in their academic tasks but end up delaying their academic tasks. Understanding these specific experiences may be beneficial to students as they may become more aware of their difficulties in emotion regulation during procrastination and adopt proactive coping strategies to reduce their procrastination.

Contact Information

The following people are involved in this research project and may be contacted at any time if you have any further questions about the project, what it means, or concerns about how it was conducted:

- **Shamarukh Chowdhury** (Ph.D. candidate, Shamarukh.Chowdhury@carleton.ca)
- **Dr. Tim Pychyl** (Faculty member, Tim.Pychyl@carleton.ca, phone: 613-520-2600 ext. 1403).

If you have ethical concerns about this study, please contact the REB Chair of the Carleton University Research Ethics Board-B (CUREB-B), phone: 613-520-2600 ext. 4085, email: ethics@carleton.ca).

Where can I learn more?
To learn more about procrastination in general and find new research on the subject, visit the website for the Procrastination Research Group: www.procrastination.ca. This is a research website with access to blogs and even podcasts that can teach you about procrastination.

Is there anything I can do if I found this experiment emotionally upsetting?

If you feel anxious or distressed after participating in this study, please feel free to contact the Carleton University Health and Counselling Services at: 613-520-6674, or the Ottawa Distress Centre at 613-238-3311.

Thank you for your participation!

This study has been cleared by the Carleton University Research Ethics Board (CUREB-B Clearance # 111460).

Appendix N
Study 3a: Informed consent [for the online study]

The purpose of an informed consent is to ensure that you understand the purpose of the study and the nature of your involvement. The informed consent is intended to provide sufficient information, such that you have the opportunity to determine whether you wish to participate in the study.

Study Title: Academic Procrastination: Exploring the Role of Task Appraisals, Affect and Cognitions

Contact Information
Shamarukh Chowdhury (Ph.D. candidate at Carleton University, principal investigator, Shamarukh.Chowdhury@carleton.ca).

Dr. Tim Pychyl (Faculty member at Carleton University, thesis supervisor, Tim.Pychyl@carleton.ca, phone: 1 613-520-2600 ext. 1403).

Ethical concerns
If you have any ethical concerns with the current study, please contact the Chair of the Carleton University Research Ethics Board-B (CUREB-B), phone: 613-520-2600 ext. 4085, email: ethics@carleton.ca).

Purpose and Task Requirements: The purpose of this study is to explore academic procrastination among university students. You will be asked to report your experience of procrastination on a specific academic task that occurred in the last couple of weeks. We want to understand how you appraised this academic task that you procrastinated on. We also want to understand how you felt (i.e., your specific emotional experience) when you were procrastinating on this academic task and when you started working on this task close to the deadline. This is an online study that consists of self-report questionnaires and will take approximately 75-90 minutes to complete.

Potential Risk and Discomfort: We have no reason to anticipate any psychological or physical risks to our participants. However, you may skip questions or withdraw from the study at any time without penalties if the items upset you in any way.

Compensation: You will receive **a 0.75% grade increase** towards your introductory psychology or second-year statistics in psychology final grade for completing the questionnaires.

Anonymity/Confidentiality: All collected data will remain confidential and anonymized once downloaded from Qualtrics. Please note that for this online survey, unique identifiers will be linked to the data through SONA to allow for compensation and withdrawal before identifiers are deleted at the end of the term. If the results are published, only aggregated data will be shown (e.g., means, correlations), with no participant-specific data included. Research data will be accessible by the researcher, the

research supervisor and the survey company. No personal information or IP addresses will be linked to any of the data provided. The data from this study may be used for presentations, publications, and future teaching, and/or may be shared in online repositories and with trusted colleagues; however, participants will not be identified. Participants' anonymity will be maintained at all times. Anonymous electronic data files will be retained on secure, password-protected computers in the Department of Psychology for 7 years after publication of the data. At the end of 7 years, all research data will be deleted. We will collect data through the software, Qualtrics, which uses servers with multiple layers of security to protect the privacy of the data (e.g., encrypted websites and password protected storage). The data will be kept on the Qualtrics account for 3 years before being deleted. For your information, the Qualtrics server is located in the U.S. The United States Patriot Act permits U.S. law enforcement officials, for the purpose of an anti-terrorism investigation, to seek a court order that allows access to the personal records of any person without that person's knowledge.

Right to Withdraw: Your participation is completely voluntary. You may choose to not answer certain questions or withdraw at any point without any penalty. If you decide to withdraw, your compensation will still be given in full and your response will be deleted. However, if you do decide to withdraw we recommend that you press next to skip to the end of the study so you may read the Debriefing form. Please note that if you complete the study you will no longer be able to withdraw from the study.

This study has been cleared by the Carleton University Research Ethics Board (CUREB-B Clearance # 111581).

Consent: By clicking on the "I agree" button below, I acknowledge that I have read the description of the research and I understand that this study examines how students appraise their academic task, as well as how they feel when they procrastinate on a task and when they start to work on the task near the deadline. I understand that the data in this study will be used for research purposes only. I understand that my participation is completely voluntary, and that all information given will be kept confidential.

I agree and wish to participate | **I do not wish to participate**

Appendix O
Study 3a: Personal Project Analysis Questionnaire of Affective and Cognitive Appraisals

The scenario provided below describes a student's experience of procrastination. **Procrastination means to put something off needlessly even though we have the intention to do the task and even though we expect to be worse off for the delay.** In everyday life, we procrastinate on some tasks but not others. The student in this scenario is procrastinating on writing her psychology essay. Please read this scenario carefully to answer some follow-up questions.

Scenario: *Jessie is taking a psychology course this semester in university. She had an essay due in 3 weeks. To write this essay, Jessie needed to decide on a topic and find 4 academic research articles about her chosen topic to write an argumentative essay. Jessie knew that essay writing is a challenging task as well as time consuming. Jessie decided on a topic and had the intention to work on the essay. However, every time she attempted to start working on it, she did not feel like doing it and each time she told herself that she would start working on it tomorrow. Instead of working on the essay, she watched her favourite show on Netflix, surfed the Internet, messaged her friends, walked the dog, cleaned her apartment, hung out with her friends and so on. She continued to delay working on this essay until it was too late. Now, she had only two days left. She needed to find 4 research articles to write the essay, which took a lot of time and she still had to start writing the essay. Jessie worked on the essay for 2 days without getting much sleep and finally submitted the essay.*

Now that you have read this scenario, I want you to think about one similar situation that took place recently, within the last couple of weeks, where you intended to work on your academic task but you kept delaying this task unnecessarily even though you knew that the outcome of delaying this task would not be good. This academic task can be **an assignment** (e.g., essay, term paper), **an assigned reading** (e.g., textbook chapter, articles, other assigned reading) or **preparing for an exam.** In the space below, please name and describe the academic task that you delayed. What were the specific requirements of this task?

A. Name of the academic task: _____

B. In the space below, please explain what you needed to do to complete this task:

Task description:

C. How many days were given to complete the academic task you procrastinated on? (For example, 7 days)

_____ days

D. When did you actually start working on the task, that is, how many days before the deadline? (For example, 2 days before the deadline)

_____ days before the deadline

Phase 1: Procrastination episode questions

1. Now, please reflect on the emotions that you experienced when you tried to engage in this academic task but you procrastinated instead.

On a scale of 0 (Not at all) to10 (Extremely), to what extent did you feel the following emotions?

	0 (Not at all)	1	2	3	4	5 (Neutral)	6	7	8	9	10 (Extremely)
1. Bored											
2. Frustrated											
3. Resentment											
4. Anxious											
5. Stressed											
6. Afraid (Fear of failure)											
7. Distressed											
8. Upset											
9. Angry											
10. Irritated											
11. Nervous											
12. Happy or pleased											
13. Enjoyment											
14. Fun											
15. Excited											
16. Enthusiasm											
17. Content											
18. Relaxed											
19. Relieved											

2. How would you rate your **overall mood** on a scale of 0 (Bad) to10 (Good) when you tried to engage in this academic task but you procrastinated instead?

	0 (Bad)	1	2	3	4	5 (Neutral)	6	7	8	9	10 (Good)
Overall mood											

3. **During the time when you procrastinated on this academic task**, how *threatened* did you feel for not completing this academic task? By threatened, I mean did you consider fear of failing, poor academic performance, withdrawal from the course, financial penalty of repeating this academic course or any other reason as possible *threats* that motivated you to finally complete the task?

	0 (Not at all)	1	2	3	4	5 (Neutral)	6	7	8	9	10 (Extremely)
How *threatened* did you feel for not completing this academic task											

4. Why do you think you felt this way (threatened or not threatened)?

5. [If selects between 6-10 on question 3 then this question will appear] **During the time when you procrastinated on this academic task**, which of the following reasons made you feel most threatened for not completing this academic task? Please select one answer.
   - ❑ Fear of failing
   - ❑ Having poor academic performance
   - ❑ Withdrawal from the course
   - ❑ Financial penalty of not completing this course
   - ❑ Financial penalty of repeating this academic course
   - ❑ Fear of negative evaluation from parents or important others
   - ❑ Other, please specify _____

6. What did you think of this academic project on the following dimensions **when you were procrastinating**? Please rate these dimensions on a scale of 0 (Not at all) to10 (Extremely).

	0 (Not at all)	1	2	3	4	5 (Neutral)	6	7	8	9	10 (Extremely)
1. Importance											
2. Difficulty											
3. Challenge											
4. Outcome (or Likelihood of success)											
5. Value congruency											
6. Control											
7. Motivated											
8. Competence											
9. Autonomy											

Meaning of the dimensions:
Importance: How important is this academic project?
Difficulty: How difficult did you find it to carry out this academic project?
Challenge: How challenging did you find this academic project?
Outcome (or Likelihood of success): How successful did you think this academic project would be?
Value Congruency: To what extent this academic project was consistent with the values that guide your life?
Control: How much do you feel you were in control of this academic project?
Motivated: How motivated were you to carry out this academic project?
Competence: To what extent did you feel competent to carry out this academic project?
Autonomy: To what extent you felt that you engaged in this academic project on your own choice without any pressure from others?

7. When we procrastinate on our academic tasks, we tend to do something else (e.g., play videos games, watch TV, browse the internet, clean the house/apartment). Now tell me about the activities you engaged in when you were procrastinating on your academic task you noted earlier.

List the alternate activities you mostly engaged in instead
1. 2. 3. 4. 5.

8. Now, please reflect on the emotions that you experienced when you engaged in these **alternate activities** instead of the **academic task**. On a scale of 0 (Not at all) to10 (Extremely), to what extent did you feel the following emotions?

	0 (Not at all)	1	2	3	4	5 (Neutral)	6	7	8	9	10 (Extremely)
1. Bored											
2. Frustrated											
3. Resentment											
4. Anxious											
5. Stressed											
6. Afraid (Fear of failure)											
7. Distressed											
8. Upset											
9. Angry											
10. Irritated											
11. Nervous											
12. Happy or pleased											
13. Enjoyment											
14. Fun											
15. Excited											
16. Enthusiasm											
17. Content											
18. Relaxed											
19. Relieved											

9. What did you think of these alternate activities on the following dimensions? Please rate the dimensions on a scale of 0 (Not at all) to10 (Extremely).

	0 (Not at all)	1	2	3	4	5 (Neutral)	6	7	8	9	10 (Extremely)
1. Importance											
2. Difficulty											
3. Challenge											
4. Outcome (or Likelihood of success)											
5. Value congruency											
6. Control											
7. Motivated											
8. Competence											
9. Autonomy											

Phase 2: Last-minute effort questions

1. Now think about the time **when you actually started working on this academic task**. Please reflect on the emotions that you experienced **when you took actions to complete your academic task** you procrastinated on close to the deadline. On a scale of 0 (Not at all) to10 (Extremely), to what extent did you feel the following emotions?

	0 (Not at all)	1	2	3	4	5 (Neutral)	6	7	8	9	10 (Extremely)
1. Bored											
2. Frustrated											
3. Resentment											
4. Anxious											
5. Stressed											
6. Afraid (Fear of failure)											
7. Distressed											
8. Upset											
9. Angry											
10. Irritated											
11. Nervous											
12. Happy or pleased											
13. Enjoyment											
14. Fun											
15. Excited											
16. Enthusiasm											
17. Content											
18. Relaxed											
19. Relieved											

2. Reflecting back on the time **when you decided to start working on this academic task** that you were procrastinating on, what made you to start working on your academic task or why did you choose to do it now whereas previously you had procrastinated?

3. What consequences would you have faced if you didn't act to complete this academic task?

4. **When you decided to start working on this academic task,** how threatened did you feel for not completing the academic task? By threatened, I mean did you consider fear of failing, poor academic performance, withdrawal from the course, financial penalty of repeating this academic course or any other reason as possible *threats* that motivated you to finally complete the task?

	0 (Not at all)	1	2	3	4	5 (Neutral)	6	7	8	9	10 (Extremely)
How *threatened* did you feel for not completing this academic task											

5. Why do you think you felt this way (threatened or not threatened)?

6. [If selects between 6-10 on question 4 then this question will appear] **When you decided to start working on this academic task,** which of the following reasons made you feel most threatened for not completing this academic task? Please select one answer.
   - ❑ Fear of failing
   - ❑ Having poor academic performance
   - ❑ Withdrawal from the course
   - ❑ Financial penalty of not completing this course
   - ❑ Financial penalty of repeating this academic course
   - ❑ Fear of negative evaluation from parents or important others
   - ❑ Other, please specify _____

7. Now that you took actions to start working on your academic task before the deadline, **please think back to reflect on how you perceived the same academic project on the following dimensions** on a scale of 0 (Not at all) to10 (Extremely).

	0 (Not at all)	1	2	3	4	5 (Neutral)	6	7	8	9	10 (Extremely)
1. Importance											
2. Difficulty											
3. Challenge											
4. Outcome (or Likelihood of success)											
5. Value congruency											
6. Control											
7. Motivated											
8. Competence											
9. Autonomy											

Appendix P
Study 3a: Debriefing Form [for the online study]

Study Title: Academic Procrastination: Exploring the Role of Task Appraisals, Affect and Cognitions

Thank you for completing these questionnaires.

What are we trying to learn in this research?

Procrastination is a very common experience among students where students needlessly delay their academic work even though they know the consequences of this delay will be harmful. When students procrastinate, they often use phrases such as "I don't feel like it" or "I will feel like it tomorrow" which demonstrates the dysfunctional emotional aspect of academic procrastination. The purpose of this study is to understand task appraisals and emotional experience (positive and negative emotions) of students when they procrastinate and when they start working on their academic task closer to the deadline. We want to understand how students perceive task deadlines when they procrastinate on their academic tasks. We expect that students will report experiencing more positive emotions and fewer negative emotions when they procrastinate on academic tasks, and they will perceive the deadline of the academic task as less threatening. We expect that the deadlines of academic tasks will be perceived as a threat when there is insufficient time left to complete the academic tasks.

Why is this study important to researchers or to the general public?

This study is for a Ph.D. thesis. Due to the self-defeating nature of procrastination, procrastination has been studied extensively over the years. However, there is little research done on how deadlines are perceived when students procrastinate on their academic tasks. That is, which specific emotions are particularly experienced and how the academic tasks are appraised when students procrastinate on their academic tasks. We also want to understand whether these emotions and task appraisal change when they initiate their academic tasks near the task deadlines. We are investigating the maladaptive emotion regulation strategies in procrastination (i.e., mood repair) when students procrastinate on their academic tasks and how students shift their focus away from mood repair to their academic tasks as deadline approaches. Understanding these specific experiences may be beneficial to students as they may become more aware of their difficulties in emotion regulation during procrastination and adopt proactive coping strategies to reduce their procrastination.

Contact Information
The following people are involved in this research project and may be contacted at any time if you have any further questions about the project, what it means, or concerns about how it was conducted:

- **Shamarukh Chowdhury** (Ph.D. candidate, Shamarukh.Chowdhury@carleton.ca)
- **Dr. Tim Pychyl** (Faculty member, Tim.Pychyl@carleton.ca, phone: 613-520-2600 ext. 1403).

If you have ethical concerns about this study, please contact the REB Chair of the Carleton University Research Ethics Board-B (CUREB-B), phone: 613-520-2600 ext. 4085, email: ethics@carleton.ca).

Where can I learn more?
To learn more about procrastination in general and find new research on the subject, visit the website for the Procrastination Research Group: www.procrastination.ca. This is a research website with access to blogs and even podcasts that can teach you about procrastination.

Is there anything I can do if I found this experiment emotionally upsetting?

If you feel anxious or distressed after participating in this study, please feel free to contact the Carleton University Health and Counselling Services at: 613-520-6674, or the Ottawa Distress Centre at 613-238-3311.

Thank you for your participation!

This study has been cleared by the Carleton University Research Ethics Board (CUREB-B Clearance # 111581).

Appendix Q
Study 3b: Informed consent [for the interview session]

The purpose of an informed consent is to ensure that you understand the purpose of the study and the nature of your involvement. The informed consent is intended to provide sufficient information, such that you have the opportunity to determine whether you wish to participate in the study.

Study Title: Academic Procrastination: Exploring the Role of Task Appraisals, Affect and Cognitions (Study 2)

Contact Information
Shamarukh Chowdhury (Ph.D. candidate at Carleton University, principal investigator, Shamarukh.Chowdhury@carleton.ca).

Dr. Tim Pychyl (Faculty member at Carleton University, thesis supervisor, Tim.Pychyl@carleton.ca, phone: 1 613-520-2600 ext. 1403).

Ethical concerns
If you have any ethical concerns with the current study, please contact the Chair of the Carleton University Research Ethics Board-B (CUREB-B), phone: 613-520-2600 ext. 4085, email: ethics@carleton.ca).

Purpose and Task Requirements: The purpose of this study is to explore academic procrastination among university students. You have already participated in our online survey entitled "Academic Procrastination: Exploring the Role of Task Appraisals, Affect and Cognitions (Study 2)," which is why we want to invite you to take part in an interview session. The purpose of this interview session is to have an in-depth understanding of students' procrastination in their own words. We will ask you some open-ended questions about your experience of procrastination that occurred in the past month. We want to understand how you appraised the academic task you mentioned in the online study and felt about this academic task during the time when you procrastinated on this task in your own words. Then we want to understand how you appraised this academic task and what emotions your experienced when you started working on this academic task closer to the to the deadline of this task. This interview is expected to last an hour.

Eligibility requirements: To participate in this study, students must consent to….
1) participate in the interview
2) to be audio-recorded

The purpose of audiotaping our interview using a digital voice-recorder is to ensure that we can accurately transcribe each student's experience of procrastination in their own words to analyze the qualitative data. Note that you will not be identified in the recording, and that once the interview recording has been transcribed to text, we will delete the recording itself.

Compensation: For participating in the interview, you will receive **an additional 1% grade increase** towards your introductory psychology or second-year statistics in psychology final grade.

Potential Risk and Discomfort: We have no reason to anticipate any psychological or physical risks to our participants. However, you may let the researcher know when you wish to skip any question during the interview session that you feel uncomfortable answering. You can also withdraw from the study at any time without penalties if any of the interview questions upset you in any way.

Right to Withdraw: Your participation is completely voluntary. You may choose to not answer certain questions or withdraw at any point without any penalty. If you decide to withdraw, your compensation will still be given in full, your response will be deleted and you will be provided the Debriefing form. Please note that following the completion of the interview session you will have 12 hours to withdraw from the study. You will not be penalized if you wish to withdraw within these 12 hours. If you don't contact the researchers within 12 hours of the completion of this interview, you will not be able to withdraw from the study.

Anonymity/Confidentiality: All collected data will remain confidential and anonymized once transcribed. Please note that for the interview session your name will be noted only for the purpose of granting credits to you through SONA. Once the interview is complete, your credits will be granted right away. In the recording, only the unique identifier that was given to you for completing the online study will be recorded to link your online data to your answers from the in-person interview. Your name will not be recorded in the audiotape to maintain anonymity.
Research data will be accessible by the researcher and the research supervisor. No personal information will be linked to any of the data provided. The data from this study may be used for presentations, publications, and future teaching, and/or may be shared in online repositories and with trusted colleagues; however, participants will not be identified. Participants' anonymity will be maintained at all times. Anonymous electronic files of the transcribed data will be retained on a secure, password-protected computer in the Department of Psychology for 7 years after publication of the data. At the end of 7 years, all research data will be deleted.

This study has been cleared by the Carleton University Research Ethics Board (CUREB-B Clearance # 111581).

Consent: If you wish to participate in the interview session, please respond to the email by stating **"I agree and wish to participate."** If you agree to participate then it means you acknowledge that you have read the description of the research and you understand that this study examines how students appraise their academic task, and how they feel when they procrastinate on a task and when they start to work on the task near the deadline. It also means you understand that the data in this study will be used for research

and application purposes, and that your participation is completely voluntary, and that all information given will be kept confidential.

If you do not want to participate please respond to this email by stating “I do not wish to participate.”

Appendix R
Study 3b: Open-Ended Interview Questions for the Qualitative Interview

Procrastination Episodes Phase 1: Questions pertaining to the academic tasks during the procrastination episodes
1. Tell me about the academic task that you noted in the online study that you were procrastinating on the most. [*Researcher will remind the task participant noted in the online study*]. Can you elaborate on the specific requirements of this task that needed to be fulfilled to successfully complete this task? How long did your course instructor give you to do this task?
2. Why do you think you were putting off or delaying the academic task that you described?
3. Tell me about the moments when you intended to work on this academic task but ended up postponing it. You noted in the online study that you experienced these specific emotions [*Researcher will list the emotions the participants noted in the online study*] when you needlessly delayed this academic task. In you own words, can you elaborate on this, that is, how did you feel when you tried to engage in this academic task that you were procrastinating on?
4. What were you thinking when you tried to engage in this academic task that you were procrastinating on?
5. You mentioned that you had less or more [*depending on what student answered in the online study*] autonomy (i.e., being able to act on your own decisions and choices without any pressure from others) when you procrastinated on your academic task. Can you please elaborate why did you think you did or did not have the autonomy?
6. You also mentioned that you were less or more [*depending on what student answered in the online study*] competent to work on your academic tasks. Can you explain this further?
7. Do you think you had control over your academic task when you were procrastinating?
8. You mentioned that the academic task were more or less [*depending on what student answered in the online study*] difficult and challenging. Can you tell me why did you think this task was more or less difficult and challenging?
9. Do you think this academic task was important? Why do you think so?
10. Do you think this academic task was congruent/consistent with your values? Why?

Procrastination Episodes Phase 4: Questions pertaining to the alternate tasks during the procrastination episodes
1. Tell me about the alternate activities that you engaged in when you were procrastinating on the specific academic task that you described.
2. Why do you think you chose these alternate activities instead of working on your academic task? What specific qualities of these alternate activities attracted you to them?
3. You told me about the specific emotions [*Researcher will list the emotions the participants noted in the online study*] you felt when you engaged in this alternate activity in the online study. Can you tell me more about these feeling states when you engaged in these other tasks?
4. How do you think these activities affected the academic task that you delayed?

Last-minute efforts episodes: Questions pertaining to "last-minute efforts" episodes near the deadlines
1. You mentioned you were needlessly delaying the tasks but then eventually you completed this academic task. When did you start working on this task?
2. You mentioned that _____ [*Researcher will note the answer participants provided in the online PPA questionnaire*] motivated you to complete the academic task. Can you please elaborate on this experience more?
3. You mentioned that you would have faced the following consequences _____ [*Researcher will note the answer participants provided in the online PPA questionnaire*], if you didn't act to complete this academic task. How would you have felt if you didn't complete this task?
4. When you were procrastinating on this academic task, did you experience these feelings? Why or why not?
5. You mentioned that you had less or more [*depending on what student answered in the online study*] autonomy (i.e., being able to make act on your own decisions and choices without any pressure from others) when you started working on your academic tasks near the deadlines. Can you explain this further, that is, why did you think you did or did not have the autonomy?
6. You also mentioned that you were not competent enough or you were competent [*depending on what student answered in the online study*] once you have attempted your academic tasks near the deadlines. Why do you think you were not competent or you were competent to work this task? Can you tell me more about this?
7. Now that you had attempted the tasks as the deadline approached, do you think you had control over your academic task?
8. After attempting the task, did you find this academic task to be more or less [*depending on what student answered in the online study*] difficult and challenging? Can you tell me why did you think this task was more or less [*depending on what student answered in the online study*] difficult and challenging?
9. After attempting the task, do you think this academic task was important? Why do you think so?
10. After attempting the task, do you think this academic task was congruent/consistent with your values? Why?

Appendix S
Study 3b: Debriefing Form [for the interview study]

Study Title: Academic Procrastination: Exploring the Role of Task Appraisals, Affect and Cognitions

Thank you for completing these questionnaires.

What are we trying to learn in this research?

Procrastination is a very common experience among students where students needlessly delay their academic work even though they know the consequences of this delay will be harmful. When students procrastinate, they often use phrases such as "I don't feel like it" or "I will feel like it tomorrow" which demonstrates the dysfunctional emotional aspect of academic procrastination. The purpose of this study is to understand task appraisals and emotional experience (positive and negative emotions) of students when they procrastinate and when they start working on their academic task closer to the deadline. We want to understand how students perceive task deadlines when they procrastinate on their academic tasks. We expect that students will report experiencing more positive emotions and fewer negative emotions when they procrastinate on academic tasks and will perceive the deadline of the academic task as less threatening. We expect that the deadlines of academic tasks will be perceived as a threat when there is insufficient time left to complete the academic tasks. *Your answers to the interview questions together with your ratings from the online study will help us to have an in-depth understanding of how students appraise academic tasks they procrastinate on and how they perceived deadline during procrastination.*

Why is this study important to researchers or to the general public?

This study is for a Ph.D. thesis. Due to the self-defeating nature of procrastination, procrastination has been studied extensively over the years. However, there is little research done on how deadlines are perceived when students procrastinate on their academic tasks. That is, which specific emotions are particularly experienced and how the academic tasks are appraised when students procrastinate on their academic tasks. We also want to understand whether these emotions and task appraisal change when they initiate their academic tasks near the task deadlines. We are investigating the maladaptive emotion regulation strategies in procrastination (i.e., mood repair) when students procrastinate on their academic tasks and how students shift their focus away from mood repair to their academic tasks as deadline approaches. Understanding these specific experiences may be beneficial to students as they may become more aware of their difficulties in emotion regulation during procrastination and adopt proactive coping strategies to reduce their procrastination.

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