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The Relations among Affect-related Personality Traits, Mood, Temptation and Academic
Procrastination in Everyday Life

by

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Abstract

The current research study made use of daily diaries and personality assessment to examine academic procrastination behaviour in the everyday lives of university students. Undergraduate students ($n = 84$) completed self-report measures on trait affect intensity, distress tolerance and emotion regulation difficulties before engaging in ten days of daily-diaries. Multilevel regression analyses were used to examine whether within-person variations in the intensity of experienced negative moods and temptations predicted levels of self-reported procrastination behaviour, and whether these relations were moderated by individual differences in affect-related personality traits. As hypothesized, at the day-level of analysis, both the extent of negative affect and the strength of experienced temptations positively predicted levels of academic procrastination behaviour. Contrary to what was hypothesized, none of the affect-related personality traits directly or indirectly predicted procrastination behaviour, except for trait levels of emotion regulation difficulties which positively predicted average levels of daily procrastination behaviour.

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The Relations among Affect-related Personality Traits, Mood, Temptation and
Academic Procrastination in Everyday Life

Our behaviour may be directed towards momentary pleasure such as leisure activities or invested towards long-term goals such as studying (e.g., Carver & Scheier, 1998; Hofmann, Baumeister, Förster, & Vohs, 2012). Often times, the pursuit of long-term desires may be hindered by momentary temptations for pleasure, or at the very least relief of discomfort. For example, one may desire the delayed pleasure of achieving academic success; yet avoid the work necessary to achieve this success at the moment because of the competing temptation of having fun instead. Similarly, the pursuit of momentary hedonic pleasure (e.g., procrastination) may lead to undesired future outcomes. In sum, working towards long-term goals requires making hedonic sacrifices such as missing out on pleasure and persevering through displeasure (Sirois & Pychyl, 2013; Milyavskaya & Werner, 2018; Kuhl, 1992).

From this perspective, self-regulation failure may be thought of as behavioural choice to attain immediate pleasure or relief of discomfort at the cost of our higher-order goals (Baumeister & Heatherton, 1996). Procrastination is a prevalent example of such, as it involves the prioritization of momentary hedonic wellbeing over valuable long-term goals (Sirois & Pychyl, 2013; Tice & Bratslavsky, 2000). In the words of Tice and Bratslavsky (2000), “We give in to feel good.” The irrationality reflected by such self-defeating action (or lack of) has sparked long-held interest in the determinants of self-regulation failure (e.g., Baumeister, Heatherton, & Tice, 1994; Loewenstein & Thaler, 1989; Ainslie, 1975).

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Importantly, the psychological literature traditionally attributed between-person variance in self-regulation failure, including procrastination, to individual differences in volitional traits such as conscientiousness and its facet trait self-control (de Ridder, Lensvelt-Mulders, Finkenauer, Stok, & Baumeister, 2012; Steel, 2007; Dewitte & Schouwenburg, 2002; Schouwenburg & Groenewoud, 2001; Schouwenburg & Lay, 1995). In contrast to this focus on volitional assets, the role of affect-related dispositions in one's propensity for self-regulation failure has been relatively overlooked until recently. Various affect-related factors are known to play a role in self-regulation failure, including negative affective states (e.g., Larsen, 2000; Tice, Bratslavsky & Baumeister 2001; Sirois & Giguère, 2018; Augustine & Larsen, 2011) and the intensity of experiences of temptation (e.g., Milyavskaya & Inzlicht, 2017; Hofmann et al., 2012a). Given that the nature of both our experience of temptation (Giuliani & Berkman, 2015; Kavanagh, Andrade & May, 2005) and our procrastination behaviour is inherently affective (Pychyl & Sirois, 2016; Tice & Bratslavsky, 2000), it is clear that more research is needed to examine the role of affect-related dispositions in this form of self-regulation failure.

In order to address this gap, this research study examined the role of three affect-related personality traits in moderating the day-to-day influence of moods and experiences of temptations in relation to academic procrastination, a common form of self-regulation failure. In my thesis research, I argue that affect-related personality traits may predispose some individuals to higher levels of self-regulation failure through the experience of intensified negative moods and temptations. I posed three research hypotheses. First, at the day-level of analysis, the experience of stronger negative affect

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and temptations were hypothesized to predict higher levels of self-reported academic procrastination. Second, at the person-level of analysis, trait levels of affect intensity, distress intolerance and emotion regulation difficulties were hypothesized to predict higher average levels of self-reported academic procrastination. Finally, trait levels of affect intensity, distress intolerance and emotion regulation difficulties were hypothesized to moderate the extent to which daily negative moods and temptations were related to procrastination behaviour. In sum, I expected individuals who are affectively intense, have less tolerance for the experience of negative affect or have difficulties in regulating negative affect to report higher levels of daily academic procrastination compared to their less emotionally-labile counterparts.

My thesis begins with a review of psychological literature on the relation between personality and self-regulation failure. In this section, I summarize how traditional approaches to this relation focused on cognitive self-regulatory processes and individual differences, while more recent empirical findings have highlighted the role of affect-related factors in self-regulation failure. Following this, I explain the self-regulation of affect as the process through which affect-related individual differences may predispose some people to higher levels of self-regulation failure than others. Finally, I discuss the results of my study that extends this research literature in important new directions.

Literature review

Self-regulation and its failure

Humans' history with poor choices date back to religious stories of Adam and Eve who chose an apple over paradise. This origin story clearly reflects the self-defeating choice of smaller immediate rather than larger delayed rewards that commonly manifest

in our day-to-day lives (e.g., Hofmann et al., 2012a; Baumeister & Heatherton, 1996).

For example, we may choose the short-lived pleasure of an unhealthy meal or the momentary relief of skipping exercise at the cost of our bodily fitness and wellbeing.

Similarly, we may excessively indulge in pleasurable activities only to suffer later guilt for wasting time and not making sufficient progress on important long-term goals. These problematic behaviours are considered instances of self-regulation failure because they provide short-term gain while disregarding long-term cost (Baumeister & Heatherton, 1996). In this review of psychological literature, I address two central questions: 1) *why do people act against their best interests?* and 2) *why do some people do so more than others?*

The answer to this question has been evolving in self-regulation literature alongside the emergence of novel insights by means of advanced empirical methods (Vohs & Baumeister, 2011; de Ridder et al., 2012; Milyavskaya & Inzlicht, 2017; Hofmann et al., 2012a; Leduc-Cummings, Werner & Milyavskaya, 2018). Self-regulation is a multidimensional process that unfolds simultaneously at multiple levels of human experience, including the self-regulation of affect (i.e., emotion and mood regulation) as well as cognitive forms of self-regulation such as behavioural decision-making (Carver, 2006; Leduc-Cummings et al., 2018; Saunders & Inzlicht, 2016; Gross, 2015; Koole, 2009). Accordingly, psychological literature incorporates several theoretical frameworks through which self-regulation-failure may be understood (Carver, 2006; Baumeister & Heatherton, 1996; Saunders & Inzlicht, 2016; Leduc-Cummings et al., 2018).

At the highest level of abstraction, self-regulation is defined as the psychological mechanism through which humans balance the behavioural pursuit of momentary

pleasure and long-term wellbeing (Carver, 1998; Carver, 2006; Leduc-Cummings et al., 2018). In reverse, self-regulation failure is simply failure to do so (Baumeister & Heatherton, 1996). To illustrate, neither excessive pursuit of momentary hedonic wellbeing at the cost of long-term goals (e.g., procrastination) nor excessive pursuit of long-term goals at the expense of one's health (e.g., workaholism) are considered adaptive, and thus both constitute a form of self-regulation failure (Carver, 2006; Vohs & Baumeister, 2011; Wojdylo, Baumann & Kuhl, 2017). Nonetheless, due to humans' natural inclination for momentary pleasure (Ainslie, 1975; Loewenstein & Thaler, 1989), the former example is the more prevalent form of self-regulation failure (Baumeister & Heatherton, 1996; Tice & Bratslavsky, 2000). As such, adaptive self-regulation is commonly construed as a beneficial function through which we steer behaviour towards the attainment of long-term goals and away from overindulgence in momentary pleasure (Leduc-Cummings et al., 2018; de Ridder et al., 2012).

Traditional views of self-regulation failure

Traditionally, the psychological literature has construed the self-regulation of behaviour from a cognitive lens, such that theoretical frameworks and empirical studies commonly focused on the role of top-down volitional regulation in self-regulatory success (Tangney, Baumeister, & Boone, 2004; Milyavskaya & Inzlicht, 2017; de Ridder et al., 2012; Leduc-Cummings et al., 2018). In particular, self-regulatory success was commonly seen as the outcome of active inhibition of impulses (Baumeister, Tice & Vohs, 2018; Friese & Hofmann, 2009). One prominent example of such view is the *strength model of self-control* (Baumeister, Vohs & Tice, 2007) which attributes self-regulatory success to the conscious overriding of problematic impulses or *effortful self-*

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control (Baumeister, 2002). Such an active form of behavioural regulation is postulated to be dependent on limited mental resources (Baumeister, 2002; Muraven & Baumeister, 2000; Baumeister, Bratslavsky, Muraven & Tice, 1998). Baumeister and colleagues argue that our capacity for effortful self-control resembles a muscle, and that the repeated use of self-control depletes it such that we are temporarily unable to battle temptations (i.e., *ego depletion*; Baumeister et al., 2007). This perspective understands self-regulation failure as a consequence of our finite capacity for self-restraint; that is, giving in to temptations is viewed as the result of insufficient exertion of effortful self-control. In short, within-person variance in self-regulatory success is attributed to fluctuations in one's ability to exercise top-down behavioural inhibition (Baumeister, 2002; Baumeister et al., 1998; Muraven & Baumeister, 2000).

Importantly, this cognitive view of self-regulatory success has been mirrored at the level of individual differences such that between-person variance in behavioural indicators of self-regulatory success (e.g., resisting temptations) has been largely attributed to individual differences in one's capacity for effortful self-control or *trait self-control* (Tangney et al., 2004; Imhoff, Schmidt & Gerstenberg, 2014). This view implies that some individuals have higher levels of self-regulatory success than others because they are predisposed with an enhanced capacity for effortful self-control, in Baumeister's terms, bigger "muscles" (Tangney et al., 2004; Imhoff et al., 2014; Duckworth & Seligman, 2017; Milyavskaya & Inzlicht, 2017). Indeed, numerous lines of empirical evidence have demonstrated the relation between trait self-control and various indicators of self-regulatory success. For example, cross-sectional studies have shown that higher trait levels of self-control significantly predict better academic and interpersonal success

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(Tangney et al., 2004), less procrastination, more time studying, and less time-wasting (Duckworth & Seligman, 2017).

Nonetheless, the contemporary self-regulation literature argues against the centrality of effortful self-control mechanisms in mediating the relation between trait self-control and self-regulatory success. Specifically, empirical evidence argues against the notion that individuals with high levels of trait self-control are endowed in terms of self-restraint abilities (Milyavskaya & Inzlicht, 2017; Hofmann et al., 2012a; de Ridder et al., 2012). A recent meta-analysis on self-regulation literature has suggested a reconceptualization of trait self-control is necessary (de Ridder et al., 2012). de Ridder and colleagues (2012) have reached the conclusion that trait self-control is related to higher levels of self-regulatory success mainly through the implementation of adaptive behavioural routines (i.e., habits) that foster the attainment of desired outcomes such as avoiding temptations, rather than improving resistance to temptations. That is, their meta-analysis revealed that trait self-control was related to self-regulatory success through strategic forms of self-regulation rather than “swimming against the tide” of hedonic impulses through active resistance (de Ridder et al., 2012). Similar conclusions were reached in a series of six studies by Galla and Duckworth (2015) in which they found that individuals with higher levels of trait self-control had better long-term outcomes due to the use of good habits rather than more effortful inhibition of temptations (Galla & Duckworth, 2015). Along the same lines, one large-scale experience-sampling study has shown that trait self-control is a significant predictor of adaptive behavioural routines in everyday life such as maintaining a healthy weight, sleep schedule and diet (Baumeister, Wright & Carreon, 2018).

Two recent experience-sampling studies have further argued against the centrality of trait self-control and the utility of state self-control in terms of adaptive self-regulation in everyday life. More importantly, I later discuss how the findings of these two studies have directed attention toward the role of within-person and between-person affect-related factors in self-regulatory success (Hofmann et al., 2012*a*; Milyavskaya & Inzlicht, 2017).

Hofmann and colleagues (2012*a*) conducted a week-long experience-sampling study in which participants provided multiple self-reports per day on experiences of desire including the strength of the desire experienced, the extent to which the desire conflicted with personal goals, the extent of self-control used to resist the enactment of the desire-related behaviour, and whether this resistance was successful. They found that high levels of trait self-control were related, on average, to less exertion of active resistance when faced with problematic desires. That is, paradoxically, individuals who are assumed to be predisposed with an enhanced capacity for effortful self-control in fact use less effortful self-control to counter everyday temptations. Specifically, trait self-control (Tangney et al., 2004) was shown to moderate neither the extent of resistance to conflicting desires (i.e., tendency to resist temptations), nor the extent of successful resistance to conflicting desires (i.e., self-regulatory success). In line with other research findings (de Ridder et al., 2018; Galla & Duckworth, 2015), high levels of trait self-control were related to less experience of problematic desires (i.e., lower average levels of desire strength and conflict), rather than more frequent or more effective resistance of temptations (Hofmann et al., 2012*a*).

Similar results were found in another experience-sampling study that investigated the utility of effortful self-control in terms of attainment of long-term goals (Milyavskaya & Inzlicht, 2017). In this study, participants reported four personal goals they planned on pursuing during the semester, before engaging in a week-long experience-sampling phase during which time they provided multiple reports per day of experienced temptations, the extent to which temptations conflicted with each of their personal goals and the extent to which effortful self-control used to resist each temptation. Multilevel regression analysis showed that neither within-person nor between-person differences in active resistance of temptations predicted the extent of progress made on long-term goals at the end of the semester. That is, individuals who generally exerted more effortful self-control in the face of derailing temptations were not any better at making progress towards their long-term goals. Once again, in line with other research, Milyavskaya and Inzlicht concluded that successful self-regulation does not necessarily involve active resistance of temptations.

Taken together, these findings emphasize the need for a broader understanding of the role of dispositional factors in self-regulatory success, one that goes beyond individual differences in top-down volitional assets such as self-control (Inzlicht & Schmeichel, 2012; Inzlicht, Schmeichel & Macrae, 2014; Kurzban, Duckworth, Kable, & Myers, 2013). In other words, individual differences in self-regulatory success seem to involve much more than one's capacity for or tendency to use effortful self-control. It is evident that between-person variance in self-regulatory success cannot be attributed to individual differences in trait self-control alone (Hofmann et al., 2012a; Milyavskaya and Inzlicht, 2017; Galla & Duckworth, 2015). The argument against the validity of trait self-control is supported by the notion that personality traits represent distribution of states

(Fleeson, 2001; Augustine & Larsen, 2011). As such, high levels of trait self-control should be positively related to higher average levels of effortful state self-control, compared to low levels of trait self-control. Nonetheless, various research studies have demonstrated that this is not the case (Hofmann et al., 2012*a*; Milyavskaya and Inzlicht, 2017).

Importantly, the strength model of self-control serves as the foundation for the conceptualization of trait self-control. That is, this traditional view of the role of personality in self-regulatory success was shaped by the lens through which we examined self-regulation (i.e., the strength model of self-control). Perhaps examining self-regulation from the perspective of dual-systems of behaviour may allow us to understand how other dispositional differences may play a role in self-regulation failure (Milyavskaya & Inzlicht, 2017; Hofmann et al., 2012*a*; Hofmann et al., 2009).

Dual-systems views of self-regulation failure

In line with emerging empirical evidence, contemporary theoretical frameworks of behavioural self-regulation recognize that between-person differences in self-regulatory success are not attributable solely to cognitive dispositions. The role of affect-related factors and processes in self-regulatory success is recognized in contemporary psychological literature, both in theory (e.g., Saunders & Inzlicht, 2016; Loewenstein, O'Donoghue & Bhatia, 2015; Giuliani & Berkman, 2015; Gross, 2015; Kahneman, 2011; Hofmann et al., 2009) and in terms of empirical findings (e.g., Milyavskaya & Inzlicht, 2017; Hofmann et al., 2012*a*; Augustine & Larsen, 2011; Sirois & Giguère, 2018; Buczny, Layton & Muraven, 2015).

The *dual-systems perspective* of self-control considers both reflective (i.e., cognitive) and impulsive (i.e., affective) processes to be responsible for guiding human behaviour (Loewenstein et al., 2015; Hofmann et al., 2009). From this perspective, behaviour choice is construed as the outcome of two rival systems of self-regulation: an impulsive system that seeks momentary pleasure and a reflective system that seeks “the greater good” (p. 168, Hofmann et al., 2009). The impulsive system is postulated to direct behaviour towards fulfilment of hedonic desires through activating a network of affective reactions (e.g., positive affect) and associated cognitions (i.e., mental representations) in reaction to internal (e.g., hunger) or external (e.g., favourite snack) activating stimuli. In contrast, the reflective system is responsible for deliberate forms of self-regulation that battle our hedonic impulses in the service of our higher-order goals and core values, including both effortful and strategic self-control functions (Hofmann et al., 2009; Loewenstein et al., 2015; Leduc-Cummings et al., 2018).

Importantly, the dual-systems perspective recognizes the role of affect-related contextual factors (e.g., temptation strength) and dispositions (e.g., reactivity to temptations) in limiting the success of our attempts at self-control. Hofmann and colleagues (2009) have termed such out-of-control factors as *impulsive determinants* of self-control success. From this perspective, our failure to regulate our behaviour may be due to stronger activation of the impulsive system (e.g., experiencing stronger temptations), not necessarily weaker activation of the reflective system (e.g., insufficient self-control; Hofmann et al., 2009; Hofmann et al., 2012; Milyavskaya & Inzlicht, 2017).

In line with this hypothesized role of impulse potency in self-regulatory success, two experience-sampling studies on self-regulation in everyday life (which were

introduced earlier) have shown that within- and between-persons variation in temptation strength significantly predict self-regulatory success (Hofmann et al., 2012a; Milyavskaya & Inzlicht, 2017). First, Hofmann and colleagues (2012a) found that within-person variations in the potency of one's temptation experience significantly predicted self-regulatory success such that individuals were less able to resist temptations that were experienced more strongly. Similarly, at the between-person level of analysis, Milyavskaya and Inzlicht (2017) found that the characteristic experience of temptations in an intense manner significantly predicted lower goal attainment. That is, individuals who regularly experienced stronger temptations were less likely to make progress on their personal goals. Taken together, these findings have demonstrated the importance of considering the *potency* of the tempting stimuli and *the tendency to react intensely* to tempting stimuli as determinants of self-regulatory success (Milyavskaya & Inzlicht; 2017; Hofmann et al., 2012a). In other words, our capacity for effortful self-control is limited by the strength of the temptation we are attempting to tame, which in turn may partly vary as a function of our affective dispositions (Holman, 2013; Larsen, 2000).

In sum, empirical approaches to self-regulation failure traditionally focused on the role of deficiencies in cognitive self-regulatory mechanisms (e.g., *effortful self-control*). As such, self-regulation failure has been commonly construed as a lapse in volitional control. In contrast, recent empirical evidence has shed light on the role of affect-related factors and processes in self-regulatory success. Contemporary models of behavioural self-regulation recognize that top-down cognitive mechanisms (e.g., exertion of effortful self-control) are not alone in determining behaviour choice, and that bottom-up affective mechanisms (e.g., affective reactivity to tempting stimuli) play an important role in

determining whether or not one surrenders to goal-derailing temptations or invests effort towards long-term goals. In order to explain the psychological processes through which affect-related factors influence self-regulation failure, a discussion of self-regulation of affect follows.

The role of affect regulation in self-regulation failure

Affect is a higher-order term that encompasses “felt subjective experiences,” including both short-lived emotions as well as mood states that are experienced over longer-time frames (Gross, 2014). As such, self-regulation of affect encompasses both *emotion regulation* (Gross, 2014) as well as *mood regulation* (Larsen, 2000). A detailed distinction between the two is beyond the scope of this discussion, thus both are used interchangeably under the umbrella of self-regulation of affect (Gross, 2014; Larsen, 2000; Koole, 2009). Both emotion regulation and mood regulation are discussed as the mechanisms by which affect regulates our behaviour or is regulated by our behaviour (Gross, 2014).

The interplay between behaviour and affect is a core principle of psychology, however the dynamics of this relationship is known to be complex (Koole, 2009; Gross, 2015). Gross (2014) describes this complexity by asserting: “*we are at once governed by and governors of our emotions*” (p. xi). One way to delineate the intertwined self-regulation of affect and behaviour is by visualising their relationship as a two-way street (Gross, 2014; Gross, 2015; Koole, 2009). On one side of this street, there is *regulation of emotion*, the self-regulatory process through which individuals modify the intensity or duration of their affective experiences by behaving in a certain manner. On the other lane,

there is *regulation by emotion*, which is defined as the process through which our affective experiences direct behaviour (Gross, 2014).

For example, an individual may feel bored (affective experience) and thus decide to do something fun (behaviour). In this case, the behavioural pursuit of pleasure down-regulates feelings of boredom, reflecting regulation of affect by behaviour. At the same time, it is the feeling of boredom (affective experience) that pushed the individual to do something fun (behaviour), reflecting regulation of behaviour by affect (Gross, 2014; Koole, 2009). In this section, regulation of affect is discussed in order to demonstrate how procrastination, avoidance behaviour aimed towards alleviation of negative affect, is a form of hedonic emotion regulation (Sirois & Pychyl, 2013; Tice & Bratslavsky, 2000). Regulation by affect is discussed to illustrate how our affective states (e.g., moods) may direct behaviour towards immediate gratification (*mood-repair*; Pychyl & Sirois, 2016; Larsen, 2000).

Hedonic emotion regulation

Emotion regulation is defined as the self-regulatory process through which we modify the intensity, duration and manifestation of our emotional experiences (Gross, 2014). Up-regulation is the process through which we intensify or prolong the emotive experience, while down-regulation is the process through which we dampen or shorten emotive experiences (Gross, 2014; Gross, 2015; Koole, 2009). Up- and down-regulation of emotion is done through adjusting our cognition (e.g., thought processes) and behaviour (Gross, 2015). For example, we may up-regulate positive affect through cognitive means such as fantasizing or through behavioural means such as enacting desires. Similarly, we may down-regulate negative affect through cognitive means such

as suppression of negative thoughts or in a behavioural manner such as avoidance of unpleasurable activities (Gross, 2015; Gross, 2014; Koole, 2009). Moreover, parallel to the notion of self-regulation of behaviour, emotion regulation may be reactive and intervention-based (*response-focused*; Gross, 2015) such as directing attention away from an aversive stimuli once encountered, or proactive and prevention-based such as avoiding environments that evoke unwanted emotional experiences (*antecedent-focused situation selection*; Gross, 2015; Duckworth, Gendler & Gross, 2016).

On the one hand, emotion regulation may be contra-hedonic and goal-directed (Gross, 2014; Kuhl, 1992). For instance, an experience-sampling study on emotion regulation in everyday life showed that individuals down-regulate positive affect when its experience is deemed socially inappropriate in order to avoid interpersonal conflict (English, Lee, John & Gross, 2017). On the other hand, and more frequently, emotion regulation serves short-term hedonic motives such as down-regulating negative affect (i.e., relief of discomfort) or up-regulating positive affect (i.e., pleasure seeking; English et al., 2017; Gross, 2014; Pychyl & Sirois, 2016; Larsen, 2000). Hedonic emotion regulation is not considered inherently self-defeating, as it serves an adaptive function by maintaining the wellbeing of the present-self when practiced with moderation (Gross, 2015; Koole, 2009; Saunders, Milyavskaya, Inzlicht, 2015a). Contemporary psychological literature recognizes that human self-regulation functions to balance the wants and needs of both present- and future-self, that is, balancing short- and long-term wellbeing (Berkman, Hutcherson, Livingston, Kahn, & Inzlicht, 2017; Kool & Botvinick, 2013; Vohs & Baumeister, 2011; Hofmann et al., 2009; Leduc-Cummings, et al., 2018; Wojdylo et al., 2017). As such, hedonic emotion regulation is not considered failure at

self-regulation as long as its long-term cost does not outweigh the momentary hedonic benefit (Berkman et al., 2017; Kool & Botvinick, 2013).

Nonetheless, the pursuit of long-term goals often requires contra-hedonic emotion regulation, such as persevering through unpleasurable instrumental behaviour and missing out on pleasurable alternatives (Kool & Botvinick, 2013; Pychyl & Sirois, 2016; Sirois & Pychyl, 2013). Accordingly, hedonic emotion regulation often conflicts with the implementation of instrumental action and steers behaviour away from long-term goals in a self-defeating manner (Kool, McGuire, Rosen & Botvinick, 2010; Gross, 2014; Koole, 2009; Kuhl, 1992). For instance, up-regulating positive affect (i.e., seeking pleasure) and down-regulating negative affect (i.e., avoiding displeasure) may be at odds with engaging in an aversive academic task (Sirois & Pychyl, 2013). Indeed, hedonic emotion regulation has been recognized as the foundation of various forms of self-regulation failure including procrastination in particular (Tice, Bratslavsky & Baumeister, 2001; Tice & Bratslavsky, 2000; Sirois & Pychyl, 2013; Pychyl & Sirois, 2016).

English and colleagues (2017) have shown that hedonic forms of emotion regulation represent the majority of individuals' attempts at self-regulation of affect in everyday life. That is, individuals commonly regulate their emotions in such ways that up-regulate positive affect and down-regulate negative affect. In particular, attempts at down-regulation of negative affect were reported more frequently than attempts at up-regulation of positive affect (English et al., 2017). Importantly, when asked about their motivation for emotion regulation, individuals most commonly reported wanting to change their mood, especially when they were experiencing negative affect (English et al., 2017). In sum, the experience of negative affect is known to motivate hedonic

emotion regulation, that is, *mood-repair* behaviour (Tice & Bratslavsky, 2000; Sirois & Pychyl, 2013).

Mood-repair

One agreed upon principle in self-regulation literature is that human behaviour is generally directed towards desired affective states or away from undesired affective states (Carver, 2003; Carver, 2006). In fact, the notion that affect steers our behaviour represents the foundation for the most prominent framework of behavioural self-regulation (*Cybernetic Control Theory*; Carver & Scheier, 1982; Carver & Scheier, 1998). Carver and Scheier (1982) postulate that experiences of affect function as error signals through which our wants and needs demand attention and behavioural priority (Carver, 2006; Carver & Scheier, 1998; Carver & Scheier, 1982). For example, the negative affect elicited by the experience of hunger motivates seeking and consuming food. In line with this foundational self-regulation model, psychological research agrees that affect steers behaviour, however the process by which such effects unfold has received less agreement.

Based on previous research, I discuss two psychological mechanisms through which the experience of negative affect may lead to self-defeating mood-repair behaviour. First, I consider a motivational perspective through which the experience of negative affect is seen to decrease one's willingness to engage in effortful behaviour such as aversive activities, that is, strategic engagement in hedonic emotion regulation (Larsen, 2000; Berkman et al., 2017). Second, I consider how the experience of negative affect may undermine one's ability to practice self-control and thus increase the likelihood of engaging in self-defeating behaviour.

Larsen (2000) applied the cybernetic control function of Carver and Scheier (1982) in his *mood regulation model* in which he emphasized the role of affective states in directing behaviour choice. In essence, this cybernetic view of mood regulation posits that humans are motivated to maintain hedonic equilibrium between the extent of positive and negative affect experienced over time. As such, the detection of deviations from desired affective states motivates corrective action that restores this hedonic equilibrium. Indeed, the experience of negative affect is known to motivate hedonic behaviour that up-regulates positive affect and down-regulates negative affect (Larsen, 2000; Gross, 2014; Tice et al., 2001; Sirois & Pychyl, 2013).

This notion of mood repair has also been recognized in other contemporary models of behavioural self-regulation. The *value-based view of behaviour choice* (Berkman et al., 2017) agrees on the notion that individuals voluntarily pursue momentary pleasure or avoid discomfort in response to negative affect (Duckworth et al., 2016). In essence, this model postulates that behaviour choice is determined by a valuation process of the perceived benefits and costs associated with enacting a course of action relative to alternative courses of action. For example, the decision to study is thought to be motivated by one's perceived value of long-term academic success, yet demotivated by the perceived negative valence of studying and the perceived positive valence of behavioural alternatives (e.g., temptations; Milyavskaya, Inzlicht, Hope & Koestner, 2015; Milyavskaya, Inzlicht, Johnson & Larson, 2019; Kool et al., 2010). From this perspective, when one experiences negative affect, cognitively taxing (i.e., effortful) behaviour such as working towards long-term academic goals is perceived to be of higher cost and consequently less likely to be enacted (Berkman et al., 2017; Milyavskaya et al.,

2019; Kool & Botvinick, 2013; Kool et al., 2010). In contrast, the experience of negative affect inflates the subjective value of hedonic behaviour that provides momentary pleasure or relief of discomfort (Larsen, 2000).

The idea that the experience of negative affect leads to strategic and voluntary mood-repair behaviour is in line with previous empirical findings. In an experimental design, Tice and colleagues (2001) examined whether participants induced to experience negative affect delayed gratification to a lesser extent than participants induced to experience positive affect or neutral affect (i.e., control condition). They used a computerized task to measure participants' tendency to delay gratification in favor of larger monetary payouts. Their findings showed that the induction of negative moods led participants to delay gratification to a lesser extent compared to participants in the control condition. Importantly, in a follow-up study, the decrease in delaying gratification was only observed for participants who were made to believe that their mood states are changeable. In contrast, participants who were convinced that their negative mood would not be alleviated by hedonic behaviour did delay gratification in favor of larger rewards. This led the researchers to conclude that pursuing immediate gratification was due to participants' unwillingness, rather than inability, to delay gratification.

Along the same lines, Wilkowski, Ferguson, Williamson and Lappi (2018) conducted an experience-sampling study on self-control in which they found that earlier exertion of self-control led to more enactment of later desires. However, this increase in desire enactment was not due to failure to exert self-control, but rather the absence of later self-control attempts. Put simply, individuals were unwilling rather than unable to exert self-control following earlier self-control effort. Accordingly, the pursuit of

momentary pleasure was a matter of choice rather than a lapse in volitional control (Wilkowski et al., 2018).

In addition to the motivational perspective of strategic mood-repair, self-regulation research has outlined an alternative mechanism through which the experience of negative affect leads to the behavioural pursuit of immediate gratification (Baumeister et al., 1994). Tice and Bratslavsky (2000) reviewed comprehensive empirical evidence suggesting that the experience of negative affect undermines one's higher-order executive functions such as self-control. In contrast to the mood-repair hypothesis, this mechanism implies that the experience of negative affect increases one's vulnerability to engage in self-defeating behaviour through decreasing one's ability, rather than willingness, to practice self-restraint (Tice et al., 2001; Kotabe, Righetti & Hofmann, 2019). Similarly, other research on self-regulation postulates that the experience of negative affect leads to increased depletion of limited self-regulatory resources, and that the prioritization of hedonic emotion regulation in response to negative affect reflects a lapse in volitional control (Baumeister et al., 1998; Muraven & Baumeister, 2000).

The construal of mood-repair behaviour as a lapse in volitional control has been recognized in theory and supported by various lines of empirical evidence. For example, Bruynseel, Dewitte, Franses and Dekimpe (2009) conducted two experimental studies in which they concluded that negative moods predicted an increase in risky decision-making due to decreased ability to control behaviour rather than decreased willingness. Specifically, Bruynseel and colleagues (2009) showed that the extent of negative affect measured when participants were offered the opportunity to buy lottery tickets (i.e., mood repair) did not significantly predict expenditure on lottery tickets. However, the extent of

negative affect measured earlier that day significantly predicted later expenditure on lottery tickets. Based on this finding, the authors argued that earlier experiences of negative affect led to increased depletion as a result of active emotion regulation efforts, and consequently participants' later expenditure on lottery tickets was an instance of ego depletion rather than a deliberate choice of hedonic behaviour (Bruynseel et al., 2009). Despite the discrepancy between their empirical findings and theoretical conclusions, the authors concluded that their findings demonstrated that the experience of negative affect undermines one's capacity to engage in rational decision-making which in turn leads to seeking short-term hedonic pleasure.

Moreover, one prominent example of goal-directed affective experiences is "desire," or put more simply, wanting to have or do something (Kavanagh et al., 2005). The phenomenological experience of desire is described as "an *affectively* charged cognitive event in which an object or activity that is associated with pleasure or relief of discomfort is in focal attention" (Kavanagh et al., 2005, p. 447). Specifically, the experience of desire involves affective stimulation that urges attention and mobilizes behaviour towards its fulfilment (Kavanagh et al., 2005; Giuliani and Berkman, 2015). Importantly, in their *Dynamic Model of Desire*, Hofmann & Van Dillen (2012) outlined how the emotive nature of our experience of desire experience may lead to self-regulation failure. This pathway depicts temptations (i.e., desires that conflict with long-term goals) as emotional floods that occupy our working memory, in effect disinhibiting our potential to engage in reflective and rational thought processes that are required for behavioural self-control (Hofmann et al., 2009).

This view construes temptation enactment as the consequence of impairments in working memory, and this is in agreement with the *Elaborated Intrusion Theory of Desire* proposed by Kavanagh and colleagues (2005), as well as neurological evidence on the role of affective experiences in limiting higher-order executive functions in what is termed *amygdala hijack* (Sirois & Pychyl, 2013; Saunders, Milyavskaya & Inzlicht, 2017; Wagner & Heatherton, 2013). That is, due to the limited nature of our cognitive resources (e.g., attention), the emotive nature of desire experience can be disruptive when incompatible desires are experienced simultaneously (Saunders et al., 2017; Wagner & Heatherton, 2013). Thus, the salience of this emotional experience may determine the extent to which temptations dominate cognitive decision-making processes and the priority of behavioural enactment (Hofmann & van Dillen, 2012). Figuratively speaking, the emotive nature of short-term temptations may “blind” our higher-order executive functions from considering the long-term outcomes of their enactment.

In line with the idea that the experience of desire is cognitively disturbing, Milyavskaya and Inzlicht (2017) have shown that merely experiencing temptations directly influences ego depletion (operationalized here as *mental exhaustion*) above and beyond the indirect effect of temptation experience on ego depletion through the use of self-control (i.e., resisting the enactment of temptations). In other words, the influence of temptations on ego depletion was not necessarily mediated by the use of effortful self-control. Further support for the depleting nature of temptation experience came from the findings of Wilkowski and colleagues (2018) who also showed that earlier experiences of temptation led to increased ego depletion (operationalized here as *subjective fatigue*) and, in turn, to lower levels of self-regulatory success.

In summary, whether through motivating deliberate hedonic behaviour or through depleting self-regulatory resources, the experience of negative affect is known to direct behaviour towards immediate gratification. In other words, despite the disagreement on the mechanism through which such effects occur, earlier research agrees on the notion that the experience of negative affect impedes progress on long-term goals. The irrationality reflected by the enactment of self-defeating behaviour can be better understood when taking into consideration the momentary emotional leverage of the temptations motivating these behaviours. That is, such bias towards immediate gratification may be misled by affectively-induced temporal blindness (i.e., *temporal myopia*; Sirois & Pychyl, 2013; Tice & Bratslavsky, 2000; Sirois & Giguère, 2018).

The role of affect-related dispositional factors in self-regulation failure

Previous research has shown that personality plays an important role in our propensity for self-regulation failure (Hofmann et al., 2012*a*; Tangney et al., 2004; Buczny et al., 2015). However, as discussed earlier, the function of personality in self-regulation failure has been traditionally examined from a relatively narrow lens by focusing on the role of volitional traits in making some individuals less vulnerable to temptations than others (Tangney et al., 2004; Milyavskaya & Inzlicht, 2017; Milyavskaya et al., 2015). Research on the role of personality in procrastination has followed a similar trend, as seen by the focus on the negative relation between trait levels of conscientiousness (and its facet trait self-control) and procrastination (e.g., Schouwenburg & Lay, 1995; for a review, see Steel, 2007). More recently, the growing recognition of the role of affect-related processes in self-regulatory success has shed light on the role of dispositional vulnerabilities in self-regulation failure (Hofmann et al., 2009;

Augustine, Hemenover, Larsen & Shulman, 2010; Augustine & Larsen, 2011). That is, contemporary self-regulation research has extended its scope beyond dispositional assets (e.g., capacity for self-control) to include dispositional liabilities such as the characteristic nature of experiences of temptations (Milyavskaya & Inzlicht, 2017; Hofmann et al., 2012a).

Along the same line, I argue that dispositional differences in experiencing and regulating emotional experiences may predispose some individuals to a greater vulnerability to procrastination than others (Hofmann et al., 2009; Carver, 2006; Buczny et al., 2015). Contemporary psychological research has highlighted two main pathways through which affect-related traits may influence the likelihood of self-regulatory success. First, affect-related dispositions may influence the emotive leverage (i.e., potency) of one's experience of temptation, and accordingly, the extent of top-down self-control required to prevent its behavioural enactment (Milyavskaya & Inzlicht, 2017; Hofmann et al., 2012a). Second, affective dispositions are known to influence the intensity with which one experiences negative mood states (Larsen, 1987; Larsen, 2009; Larsen & Diener, 1985; Augustine et al., 2010), and accordingly one's motivation to engage in hedonic emotion regulation at the cost of long-term considerations (i.e., mood-repair; Larsen, 2000; Augustine et al., 2010). In short, affect-related individual differences may determine an individual's ability and/or willingness to endure short-term pain in the service of long-term pleasure (Larsen, 2000; Augustine et al., 2010).

Our experience of desire is described as an "affectively charged cognitive event", through which our conscious awareness of wants and needs redirect our cognition and behaviour towards their fulfilment (Kavanagh et al., 2005, p. 447; Hofmann & van

Dillen, 2012). In line with the fundamental idea that affective experiences orchestrate our behaviour (Carver & Scheier, 1982; Carver, 2003; Carver, 2006), the affective experience of desire is considered at the heart of self-regulation research, given its central role in directing behaviour towards or away from long-term goals (Hofmann & van Dillen, 2012). This emotive nature of desire experience is known to support adaptive self-regulation of behaviour by motivating approach behaviour towards immediate needs such as eating when experiencing the displeasure of hunger, or motivating adaptive avoidance behaviour away from immediate threats such as fleeing when experiencing feelings of danger (Hofmann & Dillen, 2012). Nonetheless, our affective experience of desire may be maladaptive when the urgency of our perceived needs or threats are exaggerated, and *speciously* compete for cognitive and behavioural resources with our genuine priorities (Ainslie, 1975; Hofmann & van Dillen, 2012). For example, one may desire the emotional relief of abandoning necessary instrumental behaviour (e.g., studying or exercise) due to its aversive nature (Pychyl & Sirois, 2016). In this instance, such desire conflicts with personal long-term interests and constitutes a *temptation* (Hofmann et al., 2012; Milyavskaya & Inzlicht, 2017). Most importantly, it has been shown that individual differences in cognitive and emotional components of the subjective experience of temptations may serve as an important source of variation in self-regulatory success.

Hofmann and van Dillen (2012) asserted that the salience of temptation and its potential to influence behaviour varies as a function of dispositional and contextual factors. That is, personality has been recognized as an important source of variation in the experience of desire and its regulation (Hofmann et al., 2012a; Hofmann & van Dillen,

2012). Specifically, the conceptual framework of desire proposed by Hofmann and colleagues (2012a) posits that personality influences the intensity of our experience of desire, its potential to evoke conflict with personal goals, its potential to evoke self-control attempts and the success of self-control attempts. In other words, individuals are known to differ in how strongly they experience desires, how often they experience intrapersonal conflict as a result of desire, how likely they are to resist conflicting desires (i.e., *temptations*) and how successful they are in resisting temptations (Hofmann et al., 2012a).

Hofmann and colleagues (2012a) used the experience-sampling method in order to examine the ecological validity of their proposed conceptual network, that is, how individual differences influence the experience and regulation of desire in everyday life. Their findings confirmed their initial hypotheses that personality traits are more influential in early stages of the desire, namely, the strength of the desire experience and the perception of conflict with long-term goals. Similarly, another experience-sampling study has demonstrated dispositional differences in the strength with which we experience temptations, which in turn determined the likelihood of one's ability to resist such affective experiences and self-regulatory success (Milyavskaya & Inzlicht, 2017).

Most importantly, given the affective nature of our experience of temptation (Hofmann & van Dillen, 2012; Kavanagh et al., 2005), affect-related dispositional differences may lay the foundation for between-person differences in the perceived or experienced potency (i.e., salience) of temptation experience (Milyavskaya & Inzlicht, 2017). I argue that the intensity of our experience of temptation and its influence on self-

regulatory success may vary as a function of affect-related dispositional factors such as one's reactivity to emotional stimuli (Larsen, 2009; Hofmann et al., 2009).

Moreover, despite that all humans engage in hedonic emotion regulation from time to time (English et al., 2017), some individuals may be naturally more inclined to do so as a consequence of their affective dispositions (Augustine et al., 2010). In other words, the extent to which behaviour is influenced by negative affect is known to vary among individuals (Larsen, 2000; Augustine et al., 2010). For example, Augustine and Larsen (2011) conducted two experimental studies in which they demonstrated how the interaction between affective states and an affect-related personality trait (i.e., neuroticism) influence behavioural decision-making. Specifically, they supported their hypothesis that state negative affect and trait neuroticism jointly influenced the extent to which individuals engage in irrational behaviour choice, which was operationalized as the discounting rates of delayed rewards.

This notion of person specificity is emphasized in Larsen's (2000) theoretical framework of mood regulation, which outlines the role of personality in predisposing some individuals to higher rates of *mood-regulation biases*, that is, the extent to which individuals engage in hedonic emotion regulation (Augustine et al., 2010). In line with Larsen's (2000) cybernetic mood-regulation model, and central to my thesis argument, Augustine and Larsen (2011) assert that "*the further one moves from their ideal state, the more likely one is to engage in affect regulation*" (p.405). This means that if people experience negative affect more intensely or are dispositioned to lower tolerance of negative affect, then they are more likely to engage in mood-repair behaviour that restores hedonic wellbeing (Larsen, 2000; Augustine et al., 2010).

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In a similar vein, affect intensity is a personality dimension that describes stable and consistent individual differences in the characteristic intensity with which people experience both positive and negative affect (Diener, Larsen, Levine & Emmons, 1985; Larsen & Diener, 1987; Schimmack & Diener, 1997; Larsen, 2009). Larsen (1984, 2009) differentiated trait affect intensity from other affect-related personality traits (e.g., neuroticism and extraversion) by describing it as a dispositional difference in the *style*, rather than the *content*, of one's experience of affect. Specifically, affect intensity is considered independent from the characteristic frequency with which we experience affect (Diener et al., 1985; Schimmack & Diener, 1997). In other words, affectively intense individuals react more strongly to emotive stimuli when encountered, however the frequency with which intense affect is experienced is determined by the frequency with which emotive stimuli is encountered (Schimmack & Diener, 1997).

Importantly, such characteristic experience of pleasure (i.e., positive affect) and displeasure (i.e., negative affect) in an intense manner may deem some individuals more hedonic than others. First, individual differences in characteristic reactivity to affective stimuli may partly determine how intensely we experience temptations and, consequently, our perceived self-control of such emotional experiences (Larsen & Diener, 1987). Second, the experience of negative affect in an intensified manner may lead to the primacy of immediate emotional relief more frequently. Indeed, high levels of affect intensity are linked to the tendency to use maladaptive forms of coping such as emotion-oriented and avoidance-oriented coping as well as negative mood regulation expectancies (Holman, 2013; Flett, Blankstein & Obertynski, 1996; Amali, Chowdhury & Pychyl, 2017). In sum, the frequent experience of emotional events (e.g., urges) in an

intensified manner and the maladaptive coping mechanisms commonly used by affectively intense individuals, may lead to the primacy of immediate emotional relief more frequently and more enactment of desire-related behaviours and problematic mood-repair as a result (Amali et al., 2017).

Emotional distress tolerance is another personality trait that is relevant to the experience and regulation of desire. Emotional distress tolerance is defined as an individual difference in the ability to experience and resist negative emotional states (Simons & Gaher, 2005). “Distress tolerance is posited to result in individual differences in the appraisal of distress, which in turn may increase the perceived intensity and aversiveness of negative emotions” (Simons & Gaher, 2005, p. 85). Thus, in a similar fashion to heightened affect intensity, low levels of trait emotional distress tolerance may inflate the subjective value of momentary emotional relief and subsequently lead to more enactment of desire-related behaviours such as procrastination. Moreover, our personal tolerance of negative affect may play a role in resistance of temptations. Individuals with low thresholds for negative affect may perceive negative emotional experiences as unbearable, and therefore tend to use maladaptive emotion regulation strategies that prioritize the alleviation of negative emotions at all costs (Simons & Gaher, 2005; Holman, 2013).

Finally, both the perceived and experiential intensity of experienced negative affect may also play a role in how the individual decides to regulate this experience (Gross, 2014). In other words, the choice of an emotion regulation strategy is influenced by the intensity of the emotion to be regulated (Gross, 2014). For instance, individuals reported a preference to use distraction instead of reappraisal to regulate their emotions at

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high levels of emotional intensity, however this preference was reversed at low levels of emotional intensity (Sheppes, Scheibe, Suri, & Gross, 2011; Gross, 2014). The choice of an emotion regulation strategy is also influenced by person-based factors such as emotion regulation expectancies. For example, emotion regulation self-efficacy refers to one's beliefs about their own ability to implement a particular emotion regulation strategy, which may increase or decrease the likelihood of engaging in that particular emotion regulation strategy (Gross, 2014; Kool, 2009). As such, the constant experience of strong temptations and self-regulation failure by individuals with emotionally vulnerable personalities may take its toll on individuals' perception of their emotion-regulation abilities. Inferior beliefs of one's self-efficacy at regulating their own emotions would possibly only make things worse, by demotivating attempts at emotion regulation and "raising the white flag" at every frustrating event in the pursuit of long-term goals (Flett et al., 1996; Amali et al., 2017).

In sum, I think it is clear that high trait levels of affect intensity and low trait levels of distress tolerance may contribute to self-regulation failure or misregulation of emotions through two pathways. The first pathway is through increasing the perceived or experiential intensity of experiences of temptation (Larsen, 2000; Simons & Gaher, 2005). The second pathway is a consequence of the former, that is, through fostering maladaptive forms of emotion regulation (e.g., emotion-focused coping) in response to experiences of negative affect. This reflects a maladaptive temperament that is characterized by approach of momentary positive affect and avoidance of momentary negative affect at the cost of long-term goals. As such, trait levels of emotional intensity, tolerance for negative emotional states, and emotional self-control (i.e., emotion

regulation difficulties) are posited to play an important role in the regulation of temptations and the pursuit of long-term goals. In essence, the characteristic experience of pleasure and displeasure in an intense manner may deem some individuals more hedonic than others (Larsen, 2000).

Procrastination

Self-regulation failure may manifest as self-defeating action such as overeating and overspending; that is, approach behaviour directed towards momentary pleasure at the cost of long-term goals such as personal health and wealth (Carver, 2006; Carver and Scheier, 1998). Likewise, self-regulation failure characterizes self-defeating inaction such as avoiding aversive instrumental behaviour towards long-term goals; that is, avoidance behaviour directed away from momentary displeasure at the cost of long-term goals (Carver, 2006; Carver and Scheier, 1998). Procrastination is a prevalent example of such self-destructive action or lack of, as it involves the avoidance of instrumental behaviour and the pursuit of immediate gratification at the cost of long-term goals (Pychyl & Sirois, 2016; Chowdhury & Pychyl, 2018). In other words, like many other forms of self-regulation failure, procrastination reflects an excessive focus on momentary hedonic wellbeing such that short-lived pleasure takes precedence over long-term goals (Sirois & Pychyl, 2013; Tice et al., 2001; Tice & Bratslavsky, 2000).

Procrastination is formally defined as the delay of intended courses of action despite one's awareness of the negative long-term consequences (Sirois & Pychyl, 2013; Dewitte & Schouwenburg, 2002). Procrastination is considered a quintessential form of self-regulation failure (Pychyl & Flett, 2012; Dewitte & Schouwenburg, 2002; Steel, 2007; Sirois & Kitner, 2015), and attempts to frame this phenomenon as adaptive in any

sense have been empirically refuted (Chowdhury & Pychyl, 2018). Pychyl and Sirois (2016) highlighted the irrationality of procrastination behaviour by remarking that procrastinators pay the price of their needless delay in terms of their physical and psychological health as well as academic performance (Sirois, Melia-Gordon, & Pychyl, 2003; van Eerde, 2003); all in order to “*feel good now.*” In addition, Pychyl and Sirois pointed out that not only is the emotional relief provided by procrastination short-lived, procrastinators commonly suffer additional experiences of emotional distress such as stress and guilt (Sirois & Kitner, 2015). Overall, procrastination is fundamentally self-defeating as it is neither very effective in providing hedonic wellbeing nor does it contribute to long-term success. As Steel (2007) concluded in his meta-analysis, procrastination is usually harmful and never helpful.

Self-regulation of affect forms the foundation of procrastination behaviour. Put simply, procrastination is the avoidance of what makes us *feel* bad (Sirois & Pychyl, 2013). Pychyl and Sirois (2016) have demonstrated that hedonic emotion regulation underlies this irrational phenomenon through their construal of procrastination as avoidance behaviour that alleviates the experience of negative affect elicited by aversive tasks (Sirois and Pychyl, 2013).

Sirois and Pychyl (2013) formulated the *mood repair model* of procrastination, which postulates that the experience of negative affect motivates hedonic forms of emotion regulation, such as avoiding the displeasure of aversive tasks and approaching more pleasurable alternatives (Pychyl & Sirois, 2016; Sirois & Pychyl, 2013). In essence, by postulating that affective experiences direct behaviour towards immediate gratification, the mood repair model of procrastination implies the notion of *regulation of*

behaviour by affect, which was introduced earlier (Gross, 2015). Indeed, previous research has shown that various dimensions of task aversiveness are significantly related to procrastination behaviour, including boredom, frustration, resentment, stress and negative emotions (Blunt & Pychyl, 2000). Moreover, academic tasks often require considerable cognitive effort, and its exertion is known to be emotionally aversive (Botvinick, 2007; Kool et al., 2010), which may contribute to their perceived negative valence (Dunn, Inzlicht, & Risko, 2019). In sum, we procrastinate because instrumental behaviour feels tedious or effortful, that is, hedonically unappealing (Blunt & Pychyl, 2000; Pychyl & Sirois, 2016; Sirois & Pychyl, 2013).

Procrastination behaviour reflects maladaptive emotion-focused coping that prioritizes the alleviation of negative affect, rather than task-focused coping that fosters progress towards valued long-term goals (Pychyl & Sirois, 2016; Sirois & Kitner, 2015; Kuhl, 1992). Such focus on momentary hedonic wellbeing is considered excessive and unarguably counter-productive because long-term goals are presumably worth the hedonic sacrifice (Pychyl & Sirois, 2016). As such, the underlying self-regulation of affect (i.e., hedonic emotion regulation) is considered self-defeating because it provides short-lived emotional relief at the cost of long-term goals (Sirois & Pychyl, 2013). From this perspective, procrastination is an instance of self-regulation failure that involves *misregulation*, that is, misdirected efforts at self-regulation rather than the absence of self-regulation or *under-regulation* (Pychyl & Sirois, 2016; Sirois & Pychyl, 2013). In essence, procrastination embodies the dual nature of our behavioural self-regulation as it reflects misalignment between our farsighted cognitive processes and short-sighted affective processes (Pychyl & Sirois, 2016; Sirois & Pychyl, 2013).

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Two previous studies have examined the relation between affective states and procrastination behaviour. First, Pychyl, Lee, Thibodeau and Blunt (2000) used the experience-sampling method to examine the day-to-day relations between affective states and academic procrastination behaviour among undergraduate students. In this study, participants were asked to self-report on their momentary affective and cognitive states as well as their procrastination behaviour at eight randomly-selected times per day. The experience-sampling phase extended over five days before major academic deadlines, the phase at which the negative affect elicited by procrastination is known to peak (Pychyl et al., 2000). On the one hand, procrastination was hypothesized to be related to higher levels of positive affect, given the mood-repair function it serves. On the other hand, procrastination was hypothesized to be related to higher levels of negative affect such as guilt and anxiety, which have been known to characterize procrastination behaviour. Contrary to the hypotheses, neither positive nor negative affect were significantly related to procrastination behaviour, in the moment. However, procrastination behaviour was positively related to experiences of guilt and negatively related to motivation levels.

More recently, Sirois and Giguère (2018) conducted two longitudinal studies in which they examined the relations among trait procrastination, procrastination behaviour, social temptations and positive affect. Contrary to the focus of previous research, the researchers examined how the lack of positive affect, rather than the abundance of negative affect, is related to procrastination. First, as hypothesized, lack of task-related positive affect was shown to moderate the extent to which procrastinators spent time engaging in academic procrastination. On the other hand, contrary to mainstream research, task-related negative affect was not significantly related to the extent of time

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spent procrastinating. Moreover, the presence of social temptations was shown to strengthen the link between lack of task-related positive affect and procrastination behaviour. This pattern of findings was replicated in a second study in which they examined procrastination in terms of implementing adaptive health-related behaviors over a 6 month-period. Similarly, perceiving health-related behaviour as less enjoyable (i.e., lower levels of induced positive affect) explained why chronic procrastinators were less successful in doing so compared to individuals with lower trait levels of procrastination.

Taken together and in light of my review of affective processes involved in self-regulation, I argue that day-to-day procrastination behaviour may vary as a function of within-person variation in negative affect and experiences of temptation. Specifically, the experience of intense negative affect and temptations are hypothesized to predict higher levels of mood-repair behaviour such as procrastination. Moreover, individual differences in affect-related personality traits are hypothesized to be related to higher levels of procrastination behaviour in day-to-day life. First, higher levels of trait affect intensity and distress intolerance are expected to influence self-regulatory success through inflating the subjective value of momentary pleasure of temptations (positive reinforcement) and relief of the discomfort of negative affect (negative reinforcement). Put simply, some individuals may be predisposed to higher-levels of procrastination due to biased affective dispositions that deem them, more often than others, more inclined to engage in hedonic mood-regulation (i.e., mood-repair) and less willing to delay gratification in favor of long-term goals (Augustine & Larsen, 2011; Larsen, 2000; Frederick, Loewenstein & O'Donoghue, 2002).

The present study

Metaphorically speaking, the voyage of long-term goal pursuit across the ocean of short-term pleasure is one shared in the human experience (Hofmann et al., 2012a). However, almost every aspect of this voyage is inherently different for different people. Some people may be better equipped for this trip with a capable ship, while others with smaller sailboats are struck by the smallest of waves and manipulated by the weakest of winds. The build of these boats, metaphorically speaking, resembles our capacity for active forms of self-regulation (i.e., effortful self-control). Of course, some may recognize the modest capability of their boats, and thus, may learn to navigate their way around seas of concern and minimize the danger of storms, shoals and low tides altogether, resembling strategic forms of self-regulation such as avoiding tempting environments. In contrast, those without such capabilities may find themselves tossed helplessly about.

Our navigation skills could be improved with our acquired expertise as sailors, in a similar manner to how individuals learn to structure their behavioural routines around their desired goals. Moreover, we may overcome the limits of our sailboats by learning to more effectively navigate when the tides of mood propel us in the opposite direction, in a similar manner to how individuals learn to employ effortful self-control towards attainment of desired outcomes. Yet, one thing that is out of our control in this voyage is the nature of our oceans. That is, how high our waves are (i.e., temptation intensity), how frequently they form (i.e., temptation frequency), and most importantly, how many of those waves it takes before we seek refuge in the nearest island, in effect procrastinating our journey until the weather permits.

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Individuals who experience infrequent or weaker temptations may sail effectively towards their desired destination. In contrast, individuals who experience frequent or strong temptations sail in stormy weather, often with too much fog for them to navigate towards their desired destination. Accordingly, self-regulation research would benefit from expanding its scope beyond the structure of the boat (i.e., capacity for effortful self-control) and the navigation abilities of the sailor (i.e., capacity for strategic self-regulation) to encompass the nature of the ocean (i.e., affect-related dispositions).

In an attempt to fill this gap, my thesis research examined the influence of dispositional and contextual affect-related factors on academic procrastination, a prevalent form of self-regulation failure. Specifically, personality assessment and daily diaries were used to model the relations among negative affect, experiences of temptation and self-reported academic procrastination in day-to-day life. Moreover, trait levels of affect intensity, distress tolerance and difficulties in emotion regulation were hypothesized to be positively predict average levels of daily academic procrastination behaviour. Furthermore, affect-related personality traits were hypothesized to moderate the influence of negative affect and experiences of temptation on daily procrastination behaviour.

Method

Sample

Participants were undergraduate students enrolled in first- and second-year psychology courses at Carleton University, they were compensated with grade-raising credit for their participation in the research study. A total of 174 participants completed the baseline self-report questionnaires, of which 57 cases were excluded from all analyses

due to failing one or more of the attention-check items (i.e., random responding). Moreover, 33 cases were excluded from the analyses due to missing data issues, including 15 cases with incomplete baseline data and 18 cases with less than three of the 10 daily self-reports. The final dataset included 84 participants aged between 18 and 44 years old ($M = 21.19$, $SD = 3.98$), of which 75% identified as female and 55% identified as being of white ethnicity. A total of 697 daily self-reports were included in the analyses. The number of completed daily self-reports ranged among participants between three¹ and 10, with an average of 8.2 self-reports per participant ($SD = 2.39$).

Procedure

Recruitment.

Participants were recruited through an online experimental sign-up system (SONA) for undergraduate students enrolled in first- and second-year psychology courses (Appendix A). Potential volunteer participants were provided with written informed consent (Appendix B) that explained the purpose and procedure of the study, how their participation would be compensated as well as an explanation of the confidentiality of the collected data. Students who agreed to participate in the research study provided their Carleton University e-mail address through which they received links to online Qualtrics surveys to complete the self-report questionnaires and the daily self-reports.

Phase 1: Baseline self-report measures.

In the first phase of the study, participants completed baseline self-report measures including short demographic questionnaire (Appendix C), the Affect Intensity Measure (AIM; Larsen & Diener, 1984), Distress Tolerance Scale (DTS; Simons & Gaher, 2005), the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer,

¹ After excluding the 18 cases with less than three completed daily-self reports.

2004) and the Multifaceted Measure of Academic Procrastination (MMAP; Haghbin, 2015). These self-report questionnaires are discussed with further detail in the *measures* section below.

Phase 2: Daily self-report measures.

The daily self-report phase commenced on the day following the completion of the first phase of the study. In this phase of the study, participants were asked to complete a short self-report questionnaire (Appendix C) between 8:00 p.m. and midnight each day for a period of 10 days. First, participants reported their daily mood states by completing a self-report questionnaire that included a total of 13 items relating to activating and deactivating positive (e.g., energized, calm) and negative (e.g., anxious, lethargic) affective states, which were rated on a Likert-scale ranging from 0 (*not at all*) to 6 (*very strongly*). Second, participants reported desires they experienced throughout their day, including the content of the desire (e.g., *media use, leisure activities*), the strength of the desire experience (on a Likert-scale ranging from 0 [*not at all*] to 6 [*very strongly*]) as well as the perceived conflict between the experience of the desire and each of their academic goals and time-use goals (Instructions were: *please indicate the extent to which each of these desires conflicted with your current academic goals* [e.g., making progress on academic tasks]). Finally, participants were asked to self-report the extent of progress they made on their academic goals, the extent of effort they implemented towards their academic goals and the extent to which they procrastinated that day, on a Likert-scale ranging from 0 (*not at all*) to 6 (*to a great extent*).

Measures

Academic procrastination

The Multifaceted Measure of Academic Procrastination (MMAP; Haghbin, 2015; Appendix D) was used to evaluate the behavioural, cognitive and emotional aspects of academic procrastination. Three subscales of the MMAP were administered to participants: the *Procrastination Behaviour Scale* (PBS; 10 items), the *Perceived Negative Consequences Scale* (PNCS; 15 items) and the *Negative Emotions Scale* (NES; 17 items). The PBS consists of two subscales measuring two types of procrastination behaviour: “*Anxious Procrastination*” (irrational delay; 5 items) and “*Hedonistic Procrastination*” (hedonistic delay; 5 items). Hedonistic procrastination differs from anxious procrastination in terms of the nature of the intention to perform the task and whether the decision to delay is accompanied by irrational beliefs or negative emotions. The PNCS consists of one overall score that quantifies perceived negative consequences pertaining to procrastination across four domains (i.e. subscales): *Personal*, *Academic* and *Health* consequences of procrastination, and *Dissatisfaction* with one’s procrastination behaviour. The NES is composed of four subscales that measure activating and deactivating negative emotions related to task-initiation and task-delay. The psychometric properties of the MMAP have been evaluated in a series of studies (Haghbin, 2015). The MMAP correlates highly with other measures of both academic and general procrastination, and it demonstrates an excellent level of internal consistency (Cronbach’s $\alpha > .90$; Haghbin, 2015).

Trait affect intensity

The 40-item Affect Intensity Measure (AIM; Larsen, 1984; Appendix E) was used to assess the intensity of individuals' emotional reactions. The items in the AIM are worded in a way to tap into the physiological manifestations of affect intensity such as levels of energy and arousal (e.g., *when I'm happy I feel very energetic*), as well as cognitive manifestations (e.g., *I get overly enthusiastic*) (Larsen & Diener, 1987). A single aggregate score is calculated by averaging across all 40 items of the AIM. The AIM showed an excellent level of internal consistency across four separate samples with Cronbach's α ranging from .90 to .94 (Larsen & Diener, 1987). Moreover, scores on the affect intensity measure have been validated using peer-reports, parental reports as well as measures of affective reactions to daily life events (Larsen & Diener, 1987; Diener & Larsen, 1987; Larsen, 1984; Larsen, Diener & Emmons, 1986).

Trait distress tolerance

The Distress Tolerance Scale (DTS; Simons & Gaher, 2005; Appendix F) was used to assess participants' capacity to experience and tolerate negative psychological states. The scale consists of four main subscales that assess individuals' tolerance (e.g., *feeling distressed or upset is unbearable to me*), appraisal (e.g., *my feelings of distress or being upset scare me*), absorption (e.g., *when I feel distressed or upset, I cannot help but concentrate on how bad the distress actually feels*) and regulation (e.g., *I'll do anything to stop feeling distressed or upset*) of negative emotional states. A single aggregate score is calculated by averaging across all items of the DTS. The DTS has been shown to be temporally stable over a 6-month interval and the 14 items included in the scale demonstrated internal consistency ($\alpha = .89$). The DTS has demonstrated good convergent

and discriminant validity with theoretically relevant affective and behavioural variables such as substance use in response to negative affect (e.g., I drink to forget my worries, but not for enhancement motives (e.g., I drink to have fun). Moreover, experimental studies have demonstrated the ability of the scale to predict behavioural indicators of individuals' tolerance of physical and emotional discomfort (Simons & Gaher, 2005; Leyro, Bernstein, Vujanovic, McLeish & Zvolensky, 2011).

Chronic emotion regulation difficulties

The Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004; Appendix G) is a 36-item self-report questionnaire used to assess various aspects of emotion regulation tendencies using six subscales. The subscales are: non-acceptance of emotional responses (e.g., *when I'm upset, I become irritated with myself for feeling that way*), difficulties engaging in goal directed behaviour (e.g., *when I'm upset, I have difficulty getting work done*), impulse control difficulties (e.g., *I experience my emotions as overwhelming and out of control*), lack of emotional awareness (e.g., *I pay attention to how I feel* [reversed]), limited access to emotion regulation strategies (e.g., *when I'm upset, I believe that I will remain that way for a long time*) and lack of emotional clarity (e.g., *I am confused about how I feel* [reversed]). A single aggregate score is calculated by summing across all items. Higher scores on the DERS indicate more severe difficulties in emotion regulation. The DERS has demonstrated good test-retest consistency over periods ranging from 4 to 8 weeks ($\alpha = .88, p < .01$; Gratz & Roemer, 2004). Moreover, the DERS has demonstrated good convergent validity with relevant behavioural indicators and clinically relevant constructs such as trait measures of emotion dysregulation and experiential avoidance as well as measures of substance use problems

(Gratz & Roemer, 2004). Furthermore, the heterogeneous pattern of associations amongst the DERS subscales and behavioural measures of relevant constructs has demonstrated good discriminant validity of the different subscales (Gratz & Roemer, 2004).

Analytical procedure

Data structure

The data have a hierarchical structure such that daily measurements (*the day-level*; level-1) are nested within participants (*the individual-level*; level-2). The day-level variables include: mood states (*positive* and *negative affect*), experiences of temptation (*strength* and *conflict with academic goals*) as well as the extent of procrastination, extent of effort and extent of progress made in relation to academic goals. All level-1 variables were measured on a continuous scale and person-mean centered. Person-mean centering was used in order to estimate the unbiased strength of relations at level-1 of analysis, especially since the research question involves a cross-level interaction effect (Enders & Tofighi, 2007; Raudenbush & Bryk, 2002). Level-2 variables were measured at a single occasion, including trait levels of affect intensity (AIM), distress tolerance (DTS), emotion regulation difficulties (DERS) as well as procrastination behaviour and problems (MMAP). All level-2 variables were measured on a continuous scale and grand-mean centered.

Table 1.

The predictor and outcome variables measured at each level of analysis

Day-level variables (level-1)²	Individual-level variables (level-2)
Mood states: positive and negative affect	Trait affect intensity (AIM)
Temptation (<i>desire strength x conflict</i>)	Trait distress tolerance (DTS)
Procrastination behaviour	Emotion regulation difficulties (DERS)
Effort put towards academic goals	Trait Academic procrastination (MMAP)

Table 2.

Descriptive statistics for level-1 and level-2 variables

Variable	<i>M</i>	<i>SD</i>	<i>n</i>
Average daily negative affect	3.05	.86	84
Average daily temptation strength	2.99	1.15	84
Average daily academic procrastination behaviour	3.81	.90	84
Affect intensity (AIM)	3.28	.44	84
Distress tolerance (DTS; <i>reversed</i>)	2.80	.90	84
Chronic Difficulties in emotion regulation (DERS)	2.72	.77	84
Procrastination behaviour scale (PBS; MMAP)	3.43	1.03	84
Negative emotions at task initiation (NES _{TI} ; MMAP)	3.54	1.04	84
Negative emotions at task delay (NES _{TD} ; MMAP)	3.83	.98	84

Multilevel regression modelling

The nested structure of the data warranted the use of multilevel regression analysis in order to address the dependency among multiple observations from the same individual and to reliably estimate the parameters by which within-person (*level-1*) and

² Day-level measures of positive affect, and goal progress put towards academic goals were collected from participants, however these variables were not included in any of the analyses conducted in this study.

between-person (*level-2*) factors were related to the outcome variable (Raudenbush & Bryk, 2002; Snijders & Bosker, 1999). In addition, multilevel modelling is considered appropriate for statistical analysis of longitudinal data in which the times of measurement vary between participants (Peugh, 2010). A full information maximum-likelihood (FIML) approach was used to deal with missing data.

Power analysis

Given that power is a non-monotonic function of sample size, an *a priori* power analysis was not conducted, and recommendations were followed to estimate the sample size required at both levels of analysis, namely, number of individuals and number of daily measurements per individual. Scherbaum and Ferreter (2009) suggested that increasing the number of level-2 units has more influence on power than increasing level-1 units. Thus, sampling more individuals would increase power more so than sampling individuals for a longer period (i.e., more days sampled per individual). Moreover, previous simulation studies suggested that level-2 units (i.e., number of individuals) have a 15:1 ratio with the number of estimated parameters (Peugh, 2010; Nezlek, 2011). This ratio was met in each multilevel regression model conducted in this study. One-tailed significance tests were used for all hypotheses, based on the *apriori* directional hypotheses.

Multicollinearity

Correlational analyses were conducted in order to determine the extent of shared variance among the level-2 predictor variables. Trait levels of affect intensity (AIM) were significantly positively related to levels of chronic difficulties in emotion regulation ($r = .33, p < .01$) and distress intolerance ($r = .40, p < .001$). Moreover, trait levels of distress

intolerance were significantly positively related to chronic difficulties in emotion regulation ($r = .81, p < .001$), and the effect size ($r^2 = .66$) indicates that two thirds of the variance was shared between the two predictor variables. The variance inflation factor (VIF) was calculated to determine the extent of multicollinearity among the level-2 predictor variables. Due to the observed relations among all three of the level-2 predictor variables; each of the three were treated as the sole level-2 predictor in separate multi-level regression models.

Results

The baseline model

In order to determine the proportion of variance in the outcome variable at each level of analysis, the baseline model (i.e., unconditional model) was formulated with no predictors at either level of analysis. As shown in *Figure 1*, the total variance of procrastination behaviour was partitioned into within-person variance (σ^2) as the sum of squared deviations of daily measurements around individuals' average levels of procrastination behaviour (e_{ij}); and between-person variance (τ_0) as the sum of squared deviations of individuals' average levels of procrastination behaviour around the grand mean of procrastination behaviour (u_{0j}). The intraclass correlation (ICC) was calculated using the function shown in *Figure 1*. The ICC was .23, which indicates that only 23% of total variance in procrastination behaviour is at level-2 (i.e., between-person variance). As such, most of the variance (i.e., 77%) in procrastination behaviour is within-persons across days. Nonetheless, the mean of procrastination behaviour ($\gamma_{00} = 3.78, SE = .10$) significantly varied between participants ($\tau_0 = .58, p < .001$).

$$\text{Variance } (Y_{ij}) = \text{Variance } (e_{ij}) + \text{Variance } (u_{0j}) = \sigma^2 + \tau_0$$

$$\text{ICC} = \tau_0 / [\sigma^2 + \tau_0]$$

Figure 1. The baseline model depicting within- and between-person variance in procrastination behaviour

Test of hypotheses at the day level of analysis (level-1)³

As noted previously, my first hypothesis was that the daily average strength of temptations (across all temptations experienced in a day) would positively predict the extent of self-reported procrastination behaviour. Indeed, the experience of stronger temptations than usual (i.e., *person*-mean centered) significantly predicted higher levels of procrastination behaviour ($\beta_{1j} = .37, SE = .08, p < .001$). Second, I hypothesized that individuals were expected to procrastinate to a greater extent when they experienced higher levels of negative affect than usual (i.e., *person*-mean centered). As hypothesized, daily scores of negative affect significantly predicted higher levels of procrastination behaviour ($\beta_{2j} = .35, SE = .08, p < .001$).

Level-1 model:

$$Y_{ij} = \beta_{0j} + \beta_{1j} (\text{temptation strength}) + \beta_{2j} (\text{negative affect}) + e_{ij}$$

Figure 2. Level-1 regression model predicting daily self-reported levels of academic procrastination behaviour

Test of hypotheses at the individual-level of analysis (level-2)⁴

Trait levels of affect intensity, distress intolerance and emotion regulation difficulties were hypothesized to have a direct effect on individuals' average levels of procrastination behaviour (i.e., averaged across days within individuals). Contrary to the

³ One-tailed significance tests were used for all hypotheses, based on the apriori directional hypotheses.

⁴ One-tailed significance tests were used for all hypotheses, based on the apriori directional hypotheses.

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hypothesis, trait affect intensity was not shown to significantly predict individuals' average levels of daily procrastination behaviour ($\gamma_{01} = .43, SE = .23, p = .064$). Trait levels of distress intolerance positively predicted average levels of daily procrastination behaviour, however this effect was just below the threshold of statistical significance ($\gamma_{02} = .22, SE = .11, p = .05$). In contrast, and as hypothesized, trait levels of emotion regulation difficulties significantly predicted higher average levels of daily procrastination behaviour ($\gamma_{03} = .41, SE = .12, p < .001$).

Level-1 model:

$$Y_{ij} = \beta_{0j} + \beta_{1j} (\text{negative affect}) + \beta_{2j} (\text{temptation strength}) + e_{ij}$$

Level-2 model:

$$\beta_{0j} = \gamma_{00} + \gamma_{01} (AIM_j) + u_{0j}$$

Figure 3. Multilevel regression model (A): predicting daily procrastination behaviour (Y_{ij}) as a function of day-levels of negative affect (β_{1j}) and temptation strength (β_{2j}), and trait affect intensity (γ_{01}) as the person-level predictor variable

Level-1 model:

$$Y_{ij} = \beta_{0j} + \beta_{1j} (\text{negative affect}) + \beta_{2j} (\text{temptation strength}) + e_{ij}$$

Level-2 model:

$$\beta_{0j} = \gamma_{00} + \gamma_{02} (DTS_j) + u_{0j}$$

Figure 4. Multilevel regression model (B): predicting daily procrastination behaviour (Y_{ij}) as a function of day-levels of negative affect (β_{1j}) and temptation strength (β_{2j}), and trait distress intolerance (γ_{02}) as the person-level predictor variable

Level-1 model:

$$Y_{ij} = \beta_{0j} + \beta_{1j} (\text{negative affect}) + \beta_{2j} (\text{temptation strength}) + e_{ij}$$

Level-2 model:

$$\beta_{0j} = \gamma_{00} + \gamma_{03} (DERS_j) + u_{0j}$$

Figure 5. Multilevel regression model (C): predicting daily procrastination behaviour (Y_{ij}) as a function of day-levels of negative affect (β_{1j}) and temptation strength (β_{2j}), and trait levels of emotion regulation difficulties (γ_{03}) as the person-level predictor variable

Test of the hypothesized cross-level interaction effects

Finally, multilevel regression analyses were conducted to test for the significance of *cross-level interaction effects*, that is, whether relations at the day-level of analysis were moderated by predictor variables at the individual-level of analysis (Peugh, 2010). Specifically, I tested whether or not the level-1 regression coefficients, by which each of negative affect (β_{1j}) and temptation strength (β_{2j}) were related to procrastination, varied as a function of trait levels of affect intensity, distress intolerance and emotion regulation difficulties. For this purpose, level-1 random coefficients were treated as the outcomes of level-2 regression models in what is known as *slopes as outcomes* analysis (Peugh, 2010).

As shown in *Figure 6*, *Figure 7* and *Figure 8*, procrastination behaviour (Y_{ij}) for individual j on day i is modelled as a function of the average level of procrastination behaviour for individual j across days (β_{0j}), day-level measures of negative affect (β_{1j}) and temptation strength (β_{2j}) as well as the level-1 residual term (e_{ij}). At level-2 of the regression model, (γ_{00}) is the grand-mean of procrastination behaviour across all observations and (u_{0j}) is the level-2 residual term by which the mean of procrastination

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behaviour for each individual deviates from the grand mean. The slope coefficients for the level-1 predictor variables (β_{1j}, β_{2j}) were allowed to vary randomly and were treated as the level-2 outcome variables in three separate multilevel regression models. In each of the three multilevel regression models, trait levels of affect intensity (Model A; *Figure 6*), distress intolerance (Model B; *Figure 7*) or difficulties in emotion regulation (Model C; *Figure 8*) were included as the sole level-2 predictor variable. The significance of the coefficient of each level-2 predictor variable determines whether or not it is a significant moderator of the predicted level-1 relation, specifically, whether or not it explains significant variation in the predicted level-1 coefficient. For example, the coefficient that regresses procrastination behaviour on mood (β_{1j}) was modelled as a function of trait affect intensity; the statistical significance of the term (γ_{11}) determines whether or not trait affect intensity is a moderator of the relation between mood and procrastination behaviour.

Level-1 model:

$$Y_{ij} = \beta_{0j} + \beta_{1j} (\text{negative affect}) + \beta_{2j} (\text{temptation strength}) + e_{ij}$$

Level-2 models:

$$\beta_{0j} = \gamma_{00} + \gamma_{01} (AIM_j) + u_{0j}$$

$$\beta_{1j} = \gamma_{10} + \gamma_{11} (AIM_j) + u_{1j}$$

$$\beta_{2j} = \gamma_{20} + \gamma_{21} (AIM_j) + u_{2j}$$

Figure 6. Multilevel regression model (A): predicting daily procrastination behaviour (Y_{ij}) as a function of day-levels of negative affect (β_{1j}) and temptation strength (β_{2j}), and trait affect intensity as the person-level moderator (γ_{11}, γ_{21}) of level-1 relations

First, I tested whether the extent to which negative affect was related to procrastination behaviour varied among individuals, as such the regression coefficient by which negative affect is related to procrastination (β_{1j}) behaviour was allowed to vary

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randomly. Contrary to this hypothesis, the regression coefficient by which negative affect was related to procrastination behaviour (β_{1j}) did not vary significantly among individuals ($u_{1j} = .02, p = .806$). Second, I tested whether the relation between temptation strength and procrastination behaviour varied among individuals, as such the regression coefficient by which temptation strength is related to procrastination (β_{2j}) behaviour was allowed to vary randomly. However, this hypothesis was also not supported, the strength of the relation between temptation strength and procrastination behaviour did not vary significantly among participants ($u_{2j} = .08, p = .404$).

Level-1 model:

$$Y_{ij} = \beta_{0j} + \beta_{1j} (\text{negative affect}) + \beta_{2j} (\text{temptation strength}) + e_{ij}$$

Level-2 models:

$$\beta_{0j} = \gamma_{00} + \gamma_{02} (DTS_j) + u_{0j}$$

$$\beta_{1j} = \gamma_{10} + \gamma_{12} (DTS_j) + u_{1j}$$

$$\beta_{2j} = \gamma_{20} + \gamma_{22} (DTS_j) + u_{2j}$$

Figure 7. Multilevel regression model (B): predicting daily procrastination behaviour (Y_{ij}) as a function of day-levels of negative affect (β_{1j}) and temptation strength (β_{2j}), and trait distress intolerance as the person-level moderator (γ_{12}, γ_{22}) of level-1 relations

Level-1 model:

$$Y_{ij} = \beta_{0j} + \beta_{1j} (\text{negative affect}) + \beta_{2j} (\text{temptation strength}) + e_{ij}$$

Level-2 models:

$$\beta_{0j} = \gamma_{00} + \gamma_{03} (DERS_j) + u_{0j}$$

$$\beta_{1j} = \gamma_{10} + \gamma_{13} (DERS_j) + u_{1j}$$

$$\beta_{2j} = \gamma_{20} + \gamma_{23} (DERS_j) + u_{2j}$$

Figure 8. Multilevel regression model (C): predicting daily procrastination behaviour (Y_{ij}) as a function of day-levels of negative affect (β_{1j}) and temptation strength (β_{2j}), and trait emotion regulation difficulties as the person-level moderator (γ_{13}, γ_{23}) of level-1 relations.

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None of the hypothesized moderation effects were statistically significant. Trait levels of affect intensity did not moderate the day-level relation between daily negative affect and procrastination behaviour ($\gamma_{11} = .05, SE = .18, p = .77$), nor the relation between strength of temptations experienced and procrastination behaviour ($\gamma_{21} = -.14, SE = .21, p = .49$). Moreover, trait levels of distress intolerance did not moderate the day-level relation between daily negative affect experienced and procrastination behaviour ($\gamma_{12} = -.05, SE = .11, p = .70$), nor the relation between strength of temptations experienced and procrastination behaviour ($\gamma_{22} = .04, SE = .13, p = .77$). Furthermore, trait levels of emotion regulation difficulties did not moderate the day-level relation between daily negative affect experienced and procrastination behaviour ($\gamma_{13} = .04, SE = .16, p = .70$), nor the relation between strength of temptations experienced and procrastination behaviour ($\gamma_{23} = .04, SE = .15, p = .80$). Post-hoc exploratory analyses

In addition to testing the hypothesized main and interaction effects, exploratory analyses were conducted to test relations among level-1 and level-2 variables. As shown in *Table 5*, trait levels of affect intensity were not related to higher levels of procrastination behaviour as measured by the procrastination behaviour scale (PBS), perceived negative consequences of procrastination (PNCS), nor the extent of negative emotions experienced while delaying academic tasks (NES_{TD}). However, high levels of affect intensity were significantly positively related to the experience of negative emotions when initiating academic tasks (NES_{TI}).

As shown in *Table 3*, scores on the procrastination behaviour scale (PBS) of the MMAP were significantly positively related to scores on the perceived negative consequences scale (PNCS), $r = .43, p < .01$, and to the extent of negative emotions

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experienced when initiating academic tasks (NES_TI), $r = .59, p < .001$ and while delaying academic tasks (NES_TD), $r = .48, p < .01$). As shown in *Table 6*, scores on the procrastination behaviour scale were significantly positively related to daily self-reported academic procrastination behaviour ($r = .59, p < .001$), and negatively related to the extent of effort ($r = -.35, p < .01$) and progress ($r = -.33, p < .01$) made towards academic goals. This finding supports the ecological validity of the MMAP in predicting procrastination behaviour in everyday life.

Table 3.

The relations among trait levels of affect intensity (AIM), distress intolerance (DTS), emotion regulation difficulties (DERS), procrastination behaviour (PBS), perceived negative consequences of procrastination (PNCS), as well as negative emotions when initiating academic tasks (NES_TI) and while delaying academic tasks (NES_TD)

	AIM	DERS	DTS	PBS	PNCS	NES _{TI}	NES _{TD}
AIM	-	.33**	.40***	.11	-.04	.25*	.13
DERS		-	.81***	.11	.29**	.45***	.44***
DTS			-	.02	.16	.38***	.30**
PBS				-	.43***	.59***	.48***
PNCS					-	.56***	.56***
NES _{TI}						-	.73***
NES _{TD}							-

Table 4.

The relations among subscales of the MMAP and average levels of daily self-report measures of effort, progress and procrastination behaviour

	PBS	PNCS	NES _{TI}	NES _{TD}	M_{Effort}	M_{Progress}	$M_{\text{Procrastination}}$
PBS	-	.43 ^{***}	.59 ^{***}	.48 ^{***}	-.35 ^{**}	-.33 ^{**}	.59 ^{***}
PNCS		-	.56 ^{***}	.56 ^{***}	-.32 ^{**}	-.30 ^{**}	.40 ^{***}
NES _{TI}			-	.73 ^{***}	-.35 ^{***}	-.39 ^{**}	.50 ^{**}
NES _{TD}				-	-.35 ^{**}	-.31 ^{**}	.48 ^{**}
M_{Effort}					-	.87 ^{**}	-.21 [*]
M_{Progress}						-	-.28 ^{**}
$M_{\text{Procrastination}}$							-

Discussion

The current research study made use of daily diaries and personality assessment to examine academic procrastination behaviour in the everyday-life of university students. Specifically, I examined the role of affective states (moods), experiences (temptations) and dispositions (affect-related personality traits) in day-to-day self-reported academic procrastination, a prevalent form of self-regulation failure. At the within-persons level of analysis, I hypothesized that the experience of stronger temptations and negative moods would predict higher levels of self-reported procrastination behaviour. At the between-person level of analysis, I hypothesized that trait levels of affect intensity, distress intolerance and emotion regulation difficulties would positively predict average levels of academic procrastination. Finally, I hypothesized that each of the three affect-related dispositions would moderate the extent to which temptations and negative moods are related to procrastination. Multilevel regression analyses were conducted to test the

hypotheses of interest. Overall, I found that daily variation in negative affect and temptation strength significantly predicted the extent of academic procrastination behaviour. Contrary to what was hypothesized, none of the affect-related personality traits were directly or indirectly related to daily measures of self-reported academic procrastination. One exception was that trait levels of emotion regulation difficulties significantly predicted average levels of daily procrastination behaviour. These findings are discussed in the context of self-regulation literature in general and the procrastination literature in particular.

Day-level predictor variables and academic procrastination

Temptation and procrastination

First, as hypothesized, individuals engaged in academic procrastination behaviour to a greater extent on days in which they experienced stronger temptations. In theory, procrastination and temptation are closely related. Pychyl and Sirois (2016) emphasized that procrastination behaviour commonly manifests as *active avoidance*, such that we avoid aversive tasks (*avoidant* mood-repair behaviour) by the very act of approaching pleasurable alternatives (*approach* mood-repair behaviour). Moreover, this finding is in line with previous empirical findings that demonstrated a strong positive relation between experiences of temptation and procrastination behaviour (Dewitte & Schouwenburg, 2002; Sirois & Giguère, 2018; Schouwenburg & Groenewoud, 2001). Along the same lines, the experience-sampling study by Pychyl and colleagues (2000) showed that procrastinators reported engaging in activities that were rated as more pleasurable and less aversive than the aversive academic tasks they were procrastinating. Finally, the relation between temptation strength and procrastination mirrors other previous findings

on the relation between temptation strength and behavioural indicators of self-regulation failure such as enactment of temptations (Milyavskaya & Inzlicht, 2017; Hofmann et al., 2012a).

Based on previous research, there are two main mechanisms through which such a relation may unfold. First, the experience of temptation is known to be affectively and cognitively disturbing, such that it impedes the higher-order executive functions that are required for effective self-control (Hofmann & van Dillen, 2012; Kavanagh et al., 2005). That is, it may be that individuals were unable to persist on academic tasks when they experienced temptations. In support of this explanation, several experience-sampling studies on long-term goal pursuit have shown that the experience of temptation positively predicts disturbance in goal-directed behaviour and behavioural self-control (Hofmann et al., 2012a; Milyavskaya, et al., 2015; Milyavskaya & Inzlicht, 2017). The second pathway is based on the *value-based view* of behaviour choice (Berkman et al., 2017), which postulates that the emergence of tempting behavioural alternatives may lead to a shift in priorities from the focal goal (e.g., studying) towards the enactment of the temptation. That is, individuals may perceive instrumental behaviour (e.g., studying) as less of a priority in the presence of temptations, and as such they are less willing to exert the self-control needed to avoid procrastination. This hypothesized mechanism has been demonstrated empirically in the study by Sirois and Giguère (2018), in which the presence of social temptations was related to higher levels of procrastination behaviour through the devaluations of the perceived valence of instrumental behaviour.

Nonetheless, another equally likely explanation of this observed relation is that individuals reported stronger or more problematic experiences of temptation as a result of

their procrastination. Given that I collected data at the end of each day, this possible direction of causation cannot be ruled out. This postulation is supported by previous theoretical treatments of self-regulation failure. In particular, the view of the *justification-based accounts of self-regulation failure* asserts that individuals may engage in what may be seen as self-deception to reduce the cognitive dissonance experienced by the perception of one's on misbehaviour (De Witt, Jessie, Evers, De Ridder & Denise, 2014; see also Simpson & Pychyl, 2009 for the potential role of self-deception and cognitive dissonance in last-minute efforts). As such, it may be that individuals reported higher levels of temptation to justify their procrastination behaviour, in contrast to the reverse relation that was hypothesized.

Negative moods and procrastination

As hypothesized, within-person variation in daily negative moods was shown to positively predict day-level self-report measures of academic procrastination. Specifically, individuals procrastinated to a greater extent on days in which they experienced higher levels of negative affect than their usual. This finding is in accordance with Larsen's (2000) mood-regulation model in general, and the mood-repair model of procrastination (Sirois & Pychyl, 2016) in particular, which both postulate that the experience of negative affect motivates hedonic behaviour that provides relief of discomfort. Moreover, this finding supports earlier experimental studies that demonstrated the relation between mood-repair and procrastination in-lab (Tice et al., 2001), by providing evidence for the ecologically validity of relation between mood-repair and procrastination in everyday life (Sirois & Pychyl, 2016)

However, this finding contradicts that of the experience-sampling study of procrastination in everyday life by Pychyl and colleagues (2000), in which no significant relation between negative affective states and procrastination behaviour. One possible explanation for this discrepancy is the differences in the method used, specifically, the time interval over which negative affect and procrastination were measured. In this study, participants were asked to self-report the extent to which they experienced negative affect and the extent to which they procrastinated throughout the course of their day, at the end of the day. This method was intended to capture participants' levels of negative affect at the day-level of analysis. Nonetheless, one obvious disadvantage is that any bias in affective recall may confound one-time self-reports of negative affect at the end of the day (Diener et al., 1984; Schimmack, 2003; Schimmack & Diener, 1997). For example, individuals' momentary affective state at the time at which they completed the nightly mood questionnaires may bias their assessment of positive and negative affect they experienced throughout their day. In contrast, Pychyl and colleagues (2000) used momentary measures of negative affect, in which participants reported on negative affect they were experiencing at the moment they were signalled to complete the experience-sampling questionnaire, that is, over shorter time intervals. Similarly, the extent of procrastination behaviour (dependent variable) was also measured at the level of measurement occasion. This method has the advantage of minimizing the confounding effect of biases in recall because participants were asked to report on their momentary affective state and procrastination behaviour. This difference in the timeframe over which variables are measured is exceptionally critical given the fluidity of affective states (Schimmack, 2003; Schimmack & Diener, 1997; Larsen & Diener, 1985). Schimmack

(2003) assert that the method used to sample affect and the timeframe over which affect is measured in particular are exceptionally important for experience-sampling measuring affect (Schimmack, 2003; Schimmack & Diener, 1997). The difference over which negative affect is measured has also been shown to be an important dimension in experimental studies. For example, Bruynseel and colleagues (2009) concluded that self-reports of negative affect at the time participants had the chance to engage in mood-repair (i.e., operationalized in their study as buying lottery tickets) did not predict the extent of mood-repair behaviour, while self-reports of negative affect earlier that same day did predict the extent to which participants engaged in mood-repair

Moreover, the finding that negative affect predicted procrastination behaviour disagrees with the findings of Sirois and Giguère (2018), who found that the lack of task-related positive affect rather than abundance of task-related negative affect was related to procrastination behaviour. Notably, Sirois and Giguère measured negative emotions elicited by aversive tasks. In contrast, the negative mood states that were measured in this study are qualitatively different than task aversiveness. Despite sharing the same valence (i.e., both are bad feelings), affective experiences are known to differ in core experiential aspects and behavioural outcomes. For example, mood states may be stimulated by internal (e.g., thoughts) or external events (e.g., bad day), and are known to extend over long periods of time (Larsen, 2000; Gross, 2014). Moreover, emotions are known to be related to specific approach or avoidance behaviour, while mood states lack such one-to-one relations with specific action tendencies (Gross, 2015). Furthermore, it has been shown that different affective experiences, such as primed affective states (i.e., in-lab), mood states and short-lived emotional reactions (e.g., task aversiveness) influence

behaviour such as delay discounting in different ways (Augustine & Larsen, 2011; Larsen, 2000; Gross, 2014; Augustine et al., 2010). On the other hand, in line with the findings of Sirois & Giguère (2018) and other previous research studies (Blunt & Pychyl, 2000; Pychyl et al., 2000), the extent of negative emotions elicited by participants' self-reported academic tasks (i.e., task aversiveness) was positively strongly related to procrastination behaviour. Indeed, this is considered a defining feature of academic procrastination (Haghbin, 2015). In sum, this study provided further empirical evidence for the relation between the experience of negative affect and procrastination behaviour.

Person-level variables and academic procrastination

Contrary to the hypotheses, trait affect intensity was not significantly related to average levels of self-reported daily procrastination behaviour, nor was it related to the one-time measures of chronic academic procrastination behaviour. Moreover, trait levels of affect intensity did not moderate the relation between daily negative affect and procrastination, nor the relation between day-level measures of temptation strength and procrastination. In sum, affectively intense individuals did not report procrastinating more often than their counterparts with lower levels of affect intensity, neither through the hypothesized direct relation nor through the hypothesized indirect relation between trait affect intensity and procrastination.

One possible explanation for the absence of these hypothesized relations is that affect intensity may have a non-linear relation with procrastination behaviour. For example, previous research has shown that a quadratic relation exists between trait levels of neuroticism and procrastination in college students, such that those with high levels or low levels of neuroticism report higher procrastination, while individuals with average

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levels of neuroticism do not (McCown, Petzel, & Rupert, 1987). McCown and colleagues (1987) explained this relation by postulating that individuals with high levels of neuroticism may experience excessive levels of negative affect leads them to procrastinate more so than others, as a result of goal-directed behaviour being impeded by the abundance of negative affect (e.g., one worrying too much about their performance). On the other hand, those with lower levels of neuroticism were thought to procrastinate as a result of paralysis of goal-directed behaviour by lack of negative affect (e.g., lack of worry about one's performance). This postulation is in line with the cybernetic behavioural control theory (Carver & Scheier, 1982), which asserts that the experience of negative affect is often necessary to motivate corrective behaviour. Given the shared affective nature of both traits, neuroticism and affect intensity, it may also be the case that the relation between trait affect intensity and procrastination behaviour is non-linear. That is, it is possible that individuals with high levels of affect intensity and low levels of affect intensity procrastinate more often than those with average levels of affect intensity. Somewhat relatedly, clinical research asserts that extreme deviations upwards or downwards from average levels of trait affect intensity are linked with behavioural impairments. For example, extremely high levels of affect intensity characterize borderline personality disorder (Salsman, & Linehan, 2012), and extremely low levels of affect intensity characterize alexithymia (Lee & Guajardo, 2011).

Another possible explanation for the absence of this relation is that other variables may moderate or mediate the extent to which affect intensity is related to procrastination behaviour. High trait levels of affect intensity are characterized by intensified experience of affective stimuli (Diener & Larsen, 1987), rather than the experience of intense affect

in the absence of emotive stimuli. In other words, for individuals with high levels of trait affect intensity, the intense experience of affect is not self-generated, but rather an amplified reaction to emotive stimuli. As such, the extent to which academic goals (i.e., the stimuli) evoke negative affect in the first place (e.g., task aversiveness) may determine whether or not an affectively intense individual is experiencing the task as effortful or requiring self-control (Kool & Botvinick, 2013; Kool et al., 2010; Kotabe, Righetti & Hofmann, 2019). In support of this postulation, task-related and goal-related characteristics (e.g., positive and negative valence) have been shown to significantly predict making progress on long-term goals, the extent to which one experiences goal-derailing temptations and the extent to which long-term goals are successfully attained (Milyavskaya et al., 2015; Werner et al., 2016).

Moreover, a comprehensive review of research on long-term goal pursuit has emphasized that most variance in outcome variables related to long-term goal pursuit has been shown to be at the within-person, rather than between-person, level of analysis (Milyavskaya & Werner, 2018). That is, individuals commonly vary in goal-directed behaviour across time more so than individuals vary in goal-directed behaviour between each other (Milyavskaya & Werner, 2018). This notion is consistent with findings from this study, as the intra-class correlation coefficient indicated that most variance (77%) in self-reported academic procrastination was within-person across days. Accordingly, other within-person factors, in addition to intrapersonal variation in daily negative affect and temptations, may link affect-related personality trait and procrastination behaviour. Similarly, the fact that measures of task aversiveness were not taken into consideration could explain the absence of the hypothesized relation between trait distress tolerance and

daily procrastination behaviour. That is to say, the relation between trait distress tolerance and procrastination may be moderated or mediated by the extent of distress experienced when initiating academic task.

Another surprising finding was that distress tolerance did not moderate the day-level relation between negative affect and procrastination. That is, counter to the hypothesis and the postulated role of personality in mood-repair behaviour (Augustine et al., 2010; Augustine & Larsen, 2011), individuals who tolerate negative affect to a lesser extent than others did not procrastinate to a greater extent when they experienced negative affect. One possible explanation for this relation is that the relation between trait distress tolerance and procrastination behaviour may be qualified by the extent to which such individuals engage in emotion-focused rather than task-focused coping. That is, it may be that some individuals engage in task-focused coping in response to stress. In line with this reasoning, and ironically in relation to the research hypothesis, individuals have been shown to engage in goal-directed behaviour in response to the experience of distress (Wojdylo et al., 2017). Based on this same reasoning, trait levels of affect intensity may also intensify the motivation to act on the intention-action gap. For example, it may be that experiencing heightened levels of anxiety about an approaching deadline motivates the affectively intense individual to study rather than to procrastinate (Carver & Scheier, 1982; Carver, 2006). This emphasis of individual differences in coping tendencies in response to negative affect, rather than individual differences in experiential and perceptive aspects of negative affect, is reflected by the fact that trait levels of chronic difficulties in emotion regulation did positively predict the extent of daily procrastination, while trait levels of affect intensity and distress tolerance did not.

Limitations

One obvious limitation of the present research study is that causality may not be concluded based on the methodology used and the correlational nature of the regression analysis conducted. Specifically, one cannot imply that experience of negative affect led to higher levels of academic procrastination as the reverse is certainly possible. That is, it may be that individuals experienced higher levels of negative affect *as a result of* their needless delay of academic tasks. This is possible given that self-reported levels of *guilt* were factored in day-level measures of negative affect. For example, as noted earlier, it may be that individuals reported higher levels of temptation to justify their procrastination behaviour.

Future replications or extensions of the present study may address this limitation through utilizing alternative methods for data collection and analyses. One way to address this likely alternative direction of causality is by measuring negative affect and temptation experiences (predictor variables) at multiple measurement occasions throughout the day and measuring procrastination behaviour (outcome variable) at a single measurement occasion later in the day. Such isolation of the occasions in which the predictor and outcome variables are measured may provide empirical support for the hypothesized direction of causality through establishing temporal precedence of the hypothesized causal factors. Moreover, using alternative analytical procedures may reveal different patterns of relations among the variables of interest. Mediation analyses may examine the mechanisms through which trait levels of affect intensity and distress intolerance are related to academic procrastination behaviour. For instance, it may be that the relation between trait distress tolerance and procrastination behaviour is mediated by

third variables such as task aversiveness. Similarly, the relation between trait levels of affect intensity and procrastination behaviour may be mediated by the intensity of experienced negative affect. that is, the relation between dispositional affective reactivity and behavioural outcomes may be qualified by the abundance of negative affect.

Nonetheless, the moderation model tested in this study is considered appropriate based on the hypothesis that affect-related dispositions strengthen or weaken the relation between negative affect and mood-repair behaviour.

Another limitation of my thesis research is the method used to measure affective states. Specifically, the response format used in the daily mood questionnaire in this study is known to influence which aspects of affect were captured by the measure. It will be recalled that participants were asked to rate the extent to which they experienced affective states throughout their day using unipolar items that ranged from 0 (*not at all*) to 6 (*to a great extent*). On the one hand, Schimmack (2003) indicated that the use of unipolar items to measure affect is advantageous since it allows participants to distinguish very low levels of affect from the absence of affect altogether. On the other hand, Schimmack (2003) indicated that the use of intensity-scales such as the one used in this study is appropriate when respondents are asked to self-report on momentary experiences of affect. Given the extended timeframe over which participants had to report their affective states in this study (i.e., over the course of their day), it may have been more appropriate to assess the *amount of time an affective state was present* rather than the *intensity with which an affect was experienced* (Schimmack, 2003). That said, each approach has limitations, and my study results do add to the ongoing empirical

investigation of the relation of affect, temptations and individual differences in our understanding of procrastination.

Conclusion and directions for future studies

Given that many demands of daily life require making hedonic sacrifices, such as saving money, maintaining physical health and working towards long-term goals, the excessive prioritization of momentary hedonic wellbeing is problematic (Sirois & Pychyl, 2013; Tice & Bratslavsky, 2000; Larsen, 2000). For example, one may avoid the experience of withdrawal effects accompanied by abstaining from substance use at the cost of long-term physical health, or avoid the temporary emotional distress of leaving a toxic relationship at the expense of long-term psychological wellbeing. Less significantly and more commonly, one may avoid the short-term displeasure of minor hassles such as paying bills on time at the expense of accumulating interest, or preparing a nutritional meal at the expense of personal health. As such, identifying risk factors and protective factors for difficulties in emotion regulation holds great value for practical applications of psychological research.

In this study, at the level of personality, only chronic difficulties in emotion regulation significantly predicted trait levels of procrastination. Nonetheless the theoretical links between affect intensity, distress tolerance and self-regulation failure are extensive. Therefore, more empirical research is needed before ruling out the possibility that such affect-related traits may predispose us for higher levels of self-regulation failure. Moreover, future studies could identify other dispositional affect-related liabilities to better inform intervention programs targeting problematic behaviours such as procrastination. The unique ways in which we experience affect are considered defining

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features of our personality (Rusting & Larsen, 1997). In addition to the dispositional intensity with which we experience positive and negative affect, the dispositional frequency with which we experience affect is another dimension on which individuals are known to vary (Costa & McCrae, 1998; Wilt & Revelle, 2015; Rusting & Larsen, 1997; Larsen & Augustine, 2008). For example, trait neuroticism is strongly linked to the frequency with which individuals experience negative affect. Inversely, high trait levels of extraversion are characterized with more frequent experience of positive affect (Rusting & Larsen, 1997).

Finally, another avenue for future replications of this study or variants is differentiating between deactivating negative affect (i.e., dejection) such as lethargy and activating negative affect (i.e., agitation) such as anxiety. Previous research has suggested that the former mainly inhibits approach behaviour and motivates avoidance behaviour, while the latter may at times motivate corrective approach behaviour (Carver, 2003; Carver & Scheier, 1982). Drawing a distinction between the two types of negative affect may yield significant insight into how each influences self-regulation of behaviour and self-regulation failure such as procrastination. Taken together, both the findings from my study as well as the questions raised by these findings make it clear that there is much left to consider in relation to affect-related personality traits, emotion regulation and the mood-repair model of procrastination.

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List of Appendices

Appendix A

Notice for Recruitment

Study Title: Personality, Mood and Procrastination

Description: We are researchers studying how personality traits, mood states and experiences of temptation are related to procrastination in the day-to-day life of undergraduate students. This study involves participants filling out an online self-report questionnaire on academic goals and personality traits as well as daily online self-report questionnaires on procrastinatory behaviour, mood and experiences of temptation.

Duration and Locale:

Phase 1: one-time online self-report of personality traits and academic goals (60 minutes).

Phase 2: brief daily online questionnaires for a period of seven days (2 questionnaires per day x 15 minutes each x 10 days = 300 minutes).

Compensation: You will receive 3.00 % towards your course (PSYC 1001, 1002, 2001, 2002) if all two phases of the study are fully completed. In case of early withdrawal, partial participation credit will be determined by the phase at which you decide to withdraw. Participants will receive 0.5% course credit for completing Phase 1 of the study and 0.25% course credit for participating in each day of Phase 2 of the study (i.e., the daily self-report phase) for maximum of 10 days (maximum of 2.5% credits for Phase 2 of the study). For example, if a student fully completes Phase 1 of the study and provides daily self-reports for 3 days only of Phase 2 then they will be compensated with 1.25% course credit (0.5% for completing Phase 1 and 0.25% for each set of daily self-report questionnaires in Phase 2).

Appendix B

Informed Consent Form

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 has to provide sufficient information such that you have the opportunity to determine whether you wish to participate in the study.

Study Title: Personality, Mood and Procrastination.

Study Personnel: Saif Amali, (saifamali@cmail.carleton.ca).

Faculty Supervisor: Dr. Tim Pychyl, (Tim.Pychyl@carleton.ca, 613-520-2600 ext. 1403).

Should you have any ethical concerns about the study please contact Dr. Bernadette Campbell, (Chair, Carleton University Research Ethics Board-B, 613-520-2600, ext. 4085 or ethics@carleton.ca). For more information please contact the principal investigators of this project: Saif Amali (undergraduate student, saifamali@cmail.carleton.ca).

Purpose: This study will examine whether or not daily moods and temptations are related to procrastination, and whether these relations are moderated by individual differences in experiencing and regulating emotions.

Compensation: You will receive 3.00 % towards your course (PSYC 1001, 1002, 2001, 2002) if all two phases of the study are fully completed. In case of early withdrawal, partial participation credit will be determined by the phase at which you decide to withdraw. Participants will receive 0.5% course credit for completing Phase 1 of the study and 0.25% course credit for participating in each day of Phase 2 of the study (i.e., the daily self-report phase) for maximum of 10 days (maximum of 2.5% credits for Phase 2 of the study). For example, if a student fully completes Phase 1 of the study and provides daily self-reports for 3 days only of Phase 2 then they will be compensated with 1.25% course credit (0.5% for completing Phase 1 and 0.25% for each set of daily self-report questionnaires in Phase 2).”

Task Requirements: Participation in this study consists of two phases. First, participants will be asked to complete a few online questionnaires (60 minutes) reporting on academic goals, personality traits as well as other demographic information (e.g., sex, age, year of study). Second, participants will undergo the daily-diary phase of the study for a maximum period of 10 days; in which, participants will be asked to complete two brief daily self-report questionnaires (15 minutes each) reporting on daily procrastination, implemented progress on academic goals, mood states and experiences of temptations.

Potential Risk and Discomfort: We do not anticipate any psychological or physical risks to participants that exceed risks encountered in daily life.

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Confidentiality and Anonymity: The data collected in this study will be kept confidential. In potential publications of this research, only aggregated data (means and correlations) will be reported and not the data from individual participants. Electronic data files will be stored on a password-protected computer at Carleton University that only the researcher has access to. Your data will be stored and protected by Qualtrics on Toronto-based servers but may be disclosed via a court order or data breach.

Right to Withdraw: Your participation in this study is entirely voluntary. At any point during the study you have the right to not complete certain questions or to withdraw. If you decide to withdraw from the study at any point, your compensation will be prorated according to the phase at which you decide to withdraw as explained in the *compensation* section above. If you decide to withdraw, you have the right to request that your data be deleted within 21 days of the participation date.

By clicking “**I agree**”, you consent to participate in the research study as described above.

(CUREB-B Clearance # 109955)

Appendix C

Demographics Questionnaire

1. What is your age in years?
2. What gender do you identify yourself with?
 - Female
 - Male
 - Other (please specify): _____
 - Prefer not to answer
3. What year of your university degree are you currently in?
 - First year
 - Second year
 - Third year
 - Fourth year
 - Fifth year
 - Other (please specify): _____
4. Please indicate which options best represent your ethnic background: (Select all that apply)
 - White /European
 - Aboriginal (North American Indian, Métis or Inuit)
 - Arab (e.g., Saudi, Egyptian, Iraqi, Lebanese, Palestinian, Syrian etc.)
 - Black (e.g., African, African American, African Canadian, Caribbean)
 - East Asian (e.g., Chinese, Japanese, Korean, Polynesian)
 - Latin American
 - South Asian (e.g. Indian, Pakistani, Sri Lankan, Bangladeshi)
 - Southeast Asian (e.g. Burmese, Cambodian, Filipino, Indonesian, Laotian, Malaysian, Thai, Vietnamese)
 - Other (please specify): _____
 - Prefer not to answer

Appendix D

Daily Self-report Questionnaire

1. Please indicate how _____ have you been feeling since the beginning of your day using the scale below. [0] *not at all* – [6] *very strongly*

Motivated	Bored	Fatigued/Sluggish
Energized	Anxious/worried	Sleepy/Lethargic
Happy/Pleased	Frustrated	Mentally exhausted
Calm/Content	Emotionally distressed	
Relaxed	Guilty	

2. Please indicate the strength (i.e., intensity) with which you experienced the following desires today, using the scale below. [0] *not at all* – [6] *very strongly*

- **Media use** (e.g., watching TV/video, surfing the internet, gaming)
- **Spending** (e.g., purchasing clothes, accessories, foods, drinks)
- **Social contact** (e.g., spending time with family, friends, significant other)
- **Leisure** (e.g., personal hobbies, sports, leisure reading)
- **Other desires** (please indicate): _____

3. Please indicate the extent to which each of these desires conflicted with your academic goals today (e.g., making progress on academic tasks), using the scale below. [0] *not at all* – [6] *very strongly*

- **Media use** (e.g., watching TV/video, surfing the internet, gaming)
- **Spending** (e.g., purchasing clothes, accessories, foods, drinks)
- **Social contact** (e.g., spending time with family, friends, significant other)
- **Leisure** (e.g., personal hobbies, sports, leisure reading)
- **Other desires**

4. Please rate the extent of energy or effort you put into achieving your academic goals today, using the scale below. [0] *not at all* – [6] *to a great extent*

5. Please rate the extent of progress you have made on your academic goals today, using the scale below. [0] *not at all* – [6] *to a great extent*

6. Please rate the extent to which you feel you have procrastinated today, using the scale below. [0] *not at all* – [6] *to a great extent*

Appendix E

The Multidimensional Measure of Procrastination (MMAP; Haghbin, 2015)

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) or Writing assignment
- Assigned readings
- Writing Term paper
- Writing Essay
- Writing Thesis
- Lab report
- Illustration projects or drawing or Problem sets
- Questions on readings or discussions
- Presentation
- Practical projects (e.g., software or game development; programming)
- Group project
- Other:

Q2) On which task do you delay more? (Only choose ONE TASK)

- Exam preparation (studying for exams) or Writing assignment
- Assigned readings
- Writing Term paper
- Writing Essay
- Writing Thesis
- Lab report
- Illustration projects or drawing or Problem sets
- Questions on readings or discussions
- Presentation
- Practical projects (e.g., software or game development; programming)
- Group project
- Other

Procrastination Behaviour Scale (MMAP-PBS):

This questionnaire asks about needless delay in your academic life. 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.

0=*Never* 1=*Almost never* 2=*Occasionally* 3=*Often* 4=*Very often* 5=*Always*

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.

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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.

Negative Emotions Scale (MMA-P-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.

0=*Never* 1=*Almost never* 2=*Occasionally* 3=*Often* 4=*Very often* 5=*Always*

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.

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Perceived Negative Consequences Scale (MMA-PNCS)

Please choose the appropriate response for each item from the following options:

0=*Never* 1=*Almost never* 2=*Occasionally* 3=*Often* 4=*Very often* 5=*Always*

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.

Appendix F

The Affect Intensity Measure (AIM; Larsen, 1984)

Instructions: The following questions refer to emotional reactions to typical life-events. Please base your answers on how YOU react, not on how you think others react or how you think a person should react.

0=*Never* 1=*Almost never* 2=*Occasionally* 3=*Often* 4=*Very often* 5=*Always*

1. When I accomplish something difficult I feel delighted or elated.
2. When I feel happy it is a strong type of exuberance.
3. I enjoy being with other people very much.
4. I feel pretty bad when I tell a lie.
5. When I solve a small personal problem, I feel euphoric.
6. My emotions tend to be more intense than those of most people.
7. My happy moods are so strong that I feel like I'm in heaven.
8. I get overly enthusiastic.
9. If I complete a task I thought was impossible, I am ecstatic.
10. My heart races at the anticipation of some exciting event.
11. Sad movies deeply touch me.
12. When I'm happy it's a feeling of being untroubled and content rather than being zestful and aroused.
13. When I talk in front of a group for the first time my voice gets shaky and my heart races.
14. When something good happens, I'm usually much more jubilant than others.
15. My friends might say I'm emotional.
16. The memories I like the most are of those times when I felt content and peaceful rather than zestful and enthusiastic.
17. The sight of someone who is hurt badly affects me strongly.
18. When I'm feeling well it's easy for me to go from being in a good mood to being really joyful.
19. "Calm and cool" could easily describe me.
20. When I'm happy I feel like I'm bursting with joy.
21. Seeing a picture of some violent car accident in a newspaper makes me feel sick to my stomach.
22. When I'm happy I feel very energetic.
23. When I receive a reward I become overjoyed.
24. When I succeed at something, my reaction is calm and contentment.
25. When I do something wrong I have strong feelings of shame and guilt.
26. I can remain calm even on the most trying days.

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27. When things are going good I feel 'on top of the world'.
28. When I get angry it's easy for me to still be rational and not overreact.
29. When I know I have done something very well, I feel relaxed and content rather than excited and elated.
30. When I do feel anxiety it is normally very strong.
31. My negative moods are mild in intensity.
32. When I am excited over something I want to share my feelings with everyone.
33. When I feel happiness, it is a quiet type of contentment.
34. My friends would probably say I'm a tense or 'high-strung' person.
35. When I'm happy I bubble over with energy.
36. When I feel guilty, this emotion is quite strong.
37. I would characterize my happy moods as closer to contentment than joy.
38. When someone compliments me, I get so happy I could 'burst'.
39. When I am nervous I get shaky all over.
40. When I am happy the feeling is more like contentment and inner calm than one of exhilaration and excitement.

Appendix G

The Distress Tolerance Scale (DTS; Simons & Gaher, 2005)

1. Feeling distressed or upset is unbearable to me.
2. When I feel distressed or upset, all I can think about is how bad I feel.
3. I can't handle feeling distressed or upset.
4. My feelings of distress are so intense that they completely take over.
5. There's nothing worse than feeling distressed or upset.
6. I can tolerate being distressed or upset as well as most people.
7. My feelings of distress or being upset are not acceptable.
8. I'll do anything to avoid feeling distressed or upset.
9. Other people seem to be able to tolerate feeling distressed or upset better than I can.
10. Being distressed or upset is always a major deal for me.
11. I am ashamed of myself when I feel distressed or upset.
12. My feelings of distress or being upset scare me.
13. I'll do anything to stop feeling distressed or upset.
14. When I feel distressed or upset, I must do something about it immediately.
15. When I feel distressed or upset, I cannot help but concentrate on how bad the distress actually feels.

Appendix H

Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004)

Please indicate how often the following 36 statements apply to you using the scale below: 1 [*Almost never*], 2 [*Sometimes*], 3 [*About half the time*], 4 [*Most of the times*], 5 [*Almost always*].

1. I am clear about my feelings (R).
2. I pay attention to how I feel (R).
3. I experience my emotions as overwhelming and out of control.
4. I have no idea how I am feeling.
5. I have difficulty making sense out of my feelings.
6. I am attentive to my feelings (R).
7. I know exactly how I am feeling (R).
8. I care about what I am feeling (R).
9. I am confused about how I feel.
10. When I'm upset, I acknowledge my emotions (R).
11. When I'm upset, I become angry with myself for feeling that way.
12. When I'm upset, I become embarrassed for feeling that way.
13. When I'm upset, I have difficulty getting work done.
14. When I'm upset, I become out of control.
15. When I'm upset, I believe that I will remain that way for a long time.
16. When I'm upset, I believe that I'll end up feeling very depressed.
17. When I'm upset, I believe that my feelings are valid and important (R).
18. When I'm upset, I have difficulty focusing on other things.
19. When I'm upset, I feel out of control.
20. When I'm upset, I can still get things done (R).
21. When I'm upset, I feel ashamed with myself for feeling that way.
22. When I'm upset, I know that I can find a way to eventually feel better (R).
23. When I'm upset, I feel like I am weak.
24. When I'm upset, I feel like I can remain in control of my behaviours (R).
25. When I'm upset, I feel guilty for feeling that way.
26. When I'm upset, I have difficulty concentrating.
27. When I'm upset, I have difficulty controlling my behaviours.
28. When I'm upset, I believe that there is nothing I can do to make myself feel better.
29. When I'm upset, I become irritated with myself for feeling that way.
30. When I'm upset, I start to feel very bad about myself.

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31. When I'm upset, I believe that wallowing in it is all I can do.
32. When I'm upset, I lose control over my behaviours.
33. When I'm upset, I have difficulty thinking about anything else.
34. When I'm upset, I take time to figure out what I'm really feeling (R).
35. When I'm upset, it takes me a long time to feel better.
36. When I'm upset, my emotions feel overwhelming.