The determinants of successful goal pursuit

by

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Abstract

Goal pursuit is ubiquitous in everyday life, which has subsequently led to the proliferation of a multitude of theories and perspectives on what constitutes successful goal pursuit. While all of this work is indeed a testament to the centrality of goals in the context of motivational psychology, the problem, however, is that researchers often focus on only one particular theory while often ignoring other (possibly competing or overlapping) ideas. To address this concern, we conducted a prospective longitudinal study in order to determine which factors best predict goal progress over time.

Participants (n = 799) were asked to set three week-long goals, as well as completed an extensive battery of measures, including 14 individual difference measures assessed at the between-person level and seven goal-specific measures assessed at the within-person level. Participants then reported how much progress they made on each of their goals at the end of the week. In keeping with best measurement practices, we first examined the validity of all self-report measures used in the study. Results indicate that the majority (92%) of individual difference measures demonstrated good internal consistency, although only a subset (71%) provided some evidence during more rigorous tests of validity. Upon examining the potential for overlapping constructs, three latent factors emerged providing evidence of substantial jangle-fallacies within the goal pursuit literature. Finally, using Bayesian model comparison we examined the extent to which these constructs predicted goal progress. Results indicate that people were more likely to make progress on the goals that they are committed to, have plans for, or that are more autonomous compared to their other goals. Additionally, we found that people who had specific plans for pursuing their goals, were more intrinsically oriented, experienced
more competence in their daily life, experienced less frustration for their need for autonomy, and were able to re-engage in goals following failure made more progress on their goals *compared to other people*. The discussion focuses on implications of the present research on the field of self-regulation and goal pursuit, as well as measurement practices and theory development within social and personality psychology more broadly.
Acknowledgements

Graduate school has been nothing short of a wild ride. From the many tireless nights to all of the amazing adventures, I am very grateful to have experienced it all with some of the most fabulous mentors, colleagues, and friends.

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The determinants of successful goal pursuit

While psychology has waxed and waned through a variety of paradigm shifts since the time of its conception, one of the most stable and fundamental principles that traverses these changes is the concept of goal-oriented behaviour. Whether such pursuits are said to stem from our libidinal urges (e.g., Freud, 1920), psychological and physiological drives (e.g., Hull, 1943), behavioural reinforcement (e.g., Miller, 1951; Pavlov, 1927; Skinner, 1965; Watson, 1913), or basic needs (e.g., Deci & Ryan, 1985; Maslow, 1943; McClelland, 1987), people appear to be inherently oriented toward action (Bandura, 2001; Emmons, 1996; James, 1890; Lewin, 1935; Rogers, 1964; Tolman, 1922). Given the fundamental nature of the goal concept in daily life, it should be no surprise that there has been an extensive proliferation of theories and perspectives attempting to explain what constitutes successful goal pursuit (cf. Austin & Vancouver, 1996; Elliot & Fryer, 2008). While all of this work is indeed a testament to the centrality of goals in the context of motivation psychology, the problem, however, is that researchers often focus on only one particular theory while often ignoring other (possibly competing or overlapping) ideas. Since researchers have mostly stayed within their respective siloes, there have been few attempts at integrating all of these ideas, which leads us to the following question: what factors actually lead to better goal attainment?

Drawing from social and personality perspectives, the purpose of this research is to compare, contrast, and integrate a variety of prominent constructs that influence goal pursuit in order to determine which of these factors best predict goal progress over time.

Given the expansive nature of the literature on goal pursuit, the current manuscript will be structured in the following way. First, we will briefly review the
history and development of the goal construct, including the proposal of a more synthesized definition. The next two sections will provide an in-depth review of the various theories and concepts that influence goal pursuit. These sections will be divided into goal-specific characteristics and personality/individual differences (including self-regulatory traits, motivational processes, cognitive thought processes, and broader personality traits). From there we will delve into a discussion regarding measurement and assessment of these constructs, specifically focusing on the need for more robust measurement and design practices, as well as the prevalence of potentially overlapping constructs. Finally, we then discuss a prospective study where we examined the measurement properties of commonly used measures within the goal pursuit literature, as well as use model comparison in order to determine which factors best predict goal progress over time. Based on these findings, the discussion will then focus on the need to synthesize the literature into a more comprehensive and holistic model that integrates the many existing theories of goal pursuit, as well as provide concrete recommendations for improving research practices and theory development within the field of social and personality psychology more broadly.

**What is a Goal?**

Despite being a highly prevalent construct within psychology, there is no clear and consistent definition of what constitutes a “goal.” However, overcoming this pervasive issue appears to be quite difficult, as researchers have differing viewpoints on the necessary characteristics and determining what actions, behaviours, and/or events can be categorized as a goal. Existing definitions of the goal construct are quite broad, including (but not limited to) basic physiological processes (e.g., Austin & Vancouver,
1996), higher level conscious thought, volition, and intent (e.g., Latham & Locke, 1991), and unconscious processes that operate outside of our awareness (e.g., Bargh & Ferguson, 2000). Even though there is some overlap in definitions (e.g., many include “end state” or some other derivative term), there also seems to be a fundamental disagreement in what these terms actually mean. For example, regarding the term “end state,” some researchers believe that, “in some sense, the endpoint of every action, however minute, is a goal” (Beach, 1985, p. 124), whereas others argue that “not all action would appear to be goal oriented” (Pervin, 1989, p. 475).

This lack of communal understanding of the goal construct in psychology is not a new problem. In 1985, Heckhausen and Kuhl stated that “goal is a notoriously ill-defined term in motivation theory” (p. 137). Similarly, Beach (1985) stated that “defining what is meant by a goal is very difficult” (p. 124). More recently, Vansteenkiste and colleagues said that “…it remains unclear which elements (e.g., aims, reasons, feelings, attributions) represent the defining feature of the [achievement] goal construct and which elements are more peripheral” (Vansteenkiste, Lens, Elliot, Soenens, & Mouratidis, 2014, p. 156). While speaking in reference to the achievement goal literature, a subset of goal research that has identified its own similar, but independent construct crisis (see Hulleman, Schrager, Bodmann, & Harackiewicz, 2010), the general sentiment remains the same for the broader goal construct as well. Elliot and Fryer (2008) also said it quite blatantly: “consensual agreement on the definition and use of goal in the psychological literature does not exist” (p. 235). Finally, while speaking about the goal literature more broadly, Austin and Vancouver (1996) rightfully cautioned goal researchers by saying, “the sheer magnitude of this body of research is associated with a certain danger. Heterogeneous
perspectives can generate a large body of facts, an excess of vocabulary, and numerous microtheories…understanding this knowledge of goals across domains is as vital as understanding each domain in isolation” (p. 338). By all means this list of quotes is not all-inclusive, but we can see a general pattern of discrepancy that has spanned decades of research on goal pursuit. Based on a sampling of current definitions (see Table 1), there is indeed some overlap with the way researchers have conceptualized the goal construct. For example, as previously stated, nearly all definitions include the movement toward some sort of outcome, object, or end state – in other words, we appear to be moving toward *something*. However, the discrepancy lies in what that *something* actually is. Is it enough to say that some innate biological set points are motivated toward keeping us alive? Or does this only include higher level behaviours that are purposive and fueled by conscious intent? While the ebb and flow of defining the goal construct has provided us with this “large body of facts” and “numerous microtheories” (Austin & Vancouver, 1996), it appears as though we have reached a point where the continued lack of consistency has birthed a more discontinuous literature, which has the potential to lead to a stagnation within the field (Elliot & Fryer, 2008; Milyavskaya & Werner, 2018).

Before delving into the issues regarding the goal literature more broadly, it is important that we first establish a synthesized definition of the goal construct. We propose that a goal is a *cognitive representation of a desired end state that a person is committed to attain* (Milyavskaya & Werner, 2018). This definition is largely congruent with Elliot and Fryer (2008), albeit a bit more refined¹. Specifically, we focus on three

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¹ Elliot and Fryer (2008) also include the direction of the goal by way of approach and avoidance. However, the extent to which direction plays a significant role in the goal construct is currently up for debate, with evidence leaning toward the idea that it may not be as important as originally thought (for a more detailed discussion, see Werner, Milyavskaya, & Koestner, 2018).
key components: cognitive representation, desired end state, and commitment. With respect to cognitive representation, we refer to the use of a future-oriented image that helps guide an individual’s thoughts, decisions, and behaviour. These images exist as knowledge structures in memory, and therefore the accessibility of a goal can vary across time and situations (Fishbach & Ferguson, 2007). This stands in contrast to the idea that having a goal is the same as more general behaviour (akin to the idea that every action or behaviour, no matter how trivial, is a goal; e.g., Beach, 1985) or innate biological responses (e.g., physiological reflexes). Additionally, by focusing on future-oriented mental representations, we are specifically emphasizing the idea that goals are limited to sentient beings (Shah & Gardner, 2013), and therefore exclude more mechanistic functions (e.g., plants orienting towards sunlight; Elliot & Fryer, 2008; Milyavskaya & Werner, 2018).

Another important component of the goal construct is desired end state, meaning that there is some thing that an individual wants to move toward or attain. Desired end states may be specific (e.g., today I will eat a salad for lunch) or inherently abstract (e.g., I want to eat healthy) depending on the type of goal that is being pursued. In a more general sense, a desired end state represents an object that we wish to obtain in the future, and this purposive action provides energy to encourage action and sustain motivation. However, it is important to acknowledge that there are no limitations on the actual content of the desired end state, which could be anything. While there is some research indicating that certain goal contents may be more beneficial to well-being than others (Kasser & Ryan, 1993, 1996; Sheldon & Kasser, 1995; Sheldon, Ryan, Deci, & Kasser, 2004), ultimately the specific nature of the desired object or state will vary widely.
between individuals (e.g., person A is pursing the goal to exercise three times a week, whereas person B is focusing on reducing their takeout consumption) and among an individual’s own goals (e.g., person C is pursuing the goals to exercise more and to get an A on their upcoming exam).

Finally, we draw upon the construct of commitment in order to further distinguish between actionable goals and wishes, desires, dreams, and/or fantasies (Kasser & Ryan, 1993, 1996; Sheldon & Kasser, 1996; Sheldon, Ryan, Deci, & Kasser, 2004). Commitment implies that an individual is willing to invest time, effort, and resources into pursuing and achieving their goal (Campion & Lord, 1982; Mann, de Ridder, & Fujita, 2013). For example, a person may value the idea of eating healthy, but they may not necessarily make it a specific goal to eat more fruits and vegetables or reduce their takeout consumption. Similarly, a student may want to do well in their classes, but are not necessarily committed to studying more for their exams. While people often have good intentions, they often have trouble with turning their desires into action, whether it is failing to get started, not having enough time (e.g., prioritizing among multiple goals), or not knowing what actions to take or goals to pursue in the first place (Milyavskaya & Nadolny, 2016). By committing to a goal, an individual becomes determined in its pursuit (Gollwitzer & Brandstätter, 1997; Locke, Latham, & Erez, 1988), therefore motivating them to take action to reduce the discrepancy in their behaviour and move more toward their desired end state (Carver & Scheier, 1982; Mann et al., 2013).
Table 1. *A sampling of definitions of the goal construct in psychology.*

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<tr>
<th>Source</th>
<th>Definition</th>
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<td>McDougall (1926, p. 372, 375)</td>
<td>“desired object” or “desired end”</td>
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<tr>
<td>Little (1983, p. 276)</td>
<td>“A personal project will be regarded as a set of interrelated acts extending over time, which is intended to maintain or attain a set of affairs foreseen by the individual.”</td>
</tr>
<tr>
<td>Heckhausen and Kuhl (1985, p. 137-138)</td>
<td>“We define goal as the molar endstate whose attainment requires actions by the individual pursuing it”</td>
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<tr>
<td>Emmons (1986, p. 1059)</td>
<td>“…personal strivings, which represent what individuals are characteristically aiming to accomplish through their behavior or the purpose or purposes that a person is trying to carry out…”</td>
</tr>
<tr>
<td>Pervin (1989, p. 474)</td>
<td>“A goal may be defined as a mental image or other end point representation associated with affect toward which action may be directed”</td>
</tr>
<tr>
<td>Austin and Vancouver (1996, p. 338) Endorsed by Sheeran and Webb (2012)</td>
<td>“internal representations of desired states, which are broadly construed as outcomes, events, or processes”</td>
</tr>
<tr>
<td>Locke and Latham (2002 p. 705)</td>
<td>“the object or aim of an action”</td>
</tr>
<tr>
<td>Fishbach and Ferguson (2007, p. 3)</td>
<td>“a cognitive representation of a desired end-point that impacts evaluations, emotions and behaviors”</td>
</tr>
<tr>
<td>Elliot &amp; Fryer (2008); Elliot and Niesta (2009, p. 58)</td>
<td>“cognitive representation of a future object that an organism is committed to approach or avoid”</td>
</tr>
<tr>
<td>Kruglanski and Kopetz (2009, p. 29)</td>
<td>“subjectively desirable states of affairs that the individual intends to attain through action (Kruglanski, 1996)”</td>
</tr>
<tr>
<td>Moskowitz (2012, p. 1)</td>
<td>“A goal is an end state that the organism has not yet attained (and is focused toward attaining in the future) and that the organism is committed to approach or to avoid”</td>
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<tr>
<td>Fujita and MacGregor (2012, p. 85)</td>
<td>“Goals are mental representations of desired end states”</td>
</tr>
<tr>
<td>Custers, Eitam, and Bargh (2012, p. 233)</td>
<td>“Goals are generally defined as desired states one aims to attain, with states referring to outcomes or behaviors (Bargh, Gollwitzer, &amp; Oettingen, 2010; Fishbach &amp; Ferguson, 2007)”</td>
</tr>
<tr>
<td>Emmons (1996, p. 314)</td>
<td>“desired states that people seek to obtain, maintain or avoid”</td>
</tr>
<tr>
<td>Milyavskaya &amp; Werner (2018)</td>
<td>“a cognitive representation of a desired end state that a person is committed to attain”</td>
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Goal Characteristics

Now that we have discussed what we believe constitutes a goal, what are the factors that facilitate goal attainment? With respect to the goal itself, there are a variety of characteristics that can further influence how much progress an individual makes on their goals. Essentially, these characteristics represent dimensions on which goals may vary, and reports on these varying dimensions are often provided in response to a target goal (Austin & Vancouver, 1996). Such characteristics may include why we pursue a goal, how difficult it is perceived to be, and the plans (or lack thereof) that we make to help us succeed. Drawing from several theories in the goal pursuit literature, we describe some of the more prominent goal characteristics, including motivation (autonomous, controlled; Deci & Ryan, 2000; approach, avoidance; Carver, 2006; Elliot, Chirkov, Kim, & Sheldon, 2001), implementation intentions (Gollwitzer, 1999; Koestner, Lekes, Powers, & Chicoine, 2002), commitment (e.g., Locke et al, 1988), difficulty (Locke & Latham, 1990b, 2002a), and self-discrepancy (Higgins, 1987, 1989). Additional characteristics that have been discussed in previous work, but are not discussed here include goal-connectedness, construal level (e.g., abstract vs. concrete)\(^2\), and level of consciousness (Austin & Vancouver, 1996). While goals can be unconscious (e.g., Custers & Aarts, 2010) or linked to one another and therefore elicit goal conflict (e.g., A. W. Kruglanski et al., 2002), these characteristics are more dynamic in nature (unconscious goals operate at

\(^2\) Construal level theory (Trope & Liberman, 2010, 2011) is a bit different from goal-interconnectedness and level of consciousness in that these latter two constructs add a level of complexity to the process of goal pursuit that is far beyond the current scope of the present research. While construal (i.e., how abstract vs. concrete a goal is) is certainly an important characteristic in the context of personal goals, in the current study we had all participants set concrete week-long goals that they planned to attain within the specified time frame. In this regard, the level of construal should, at least in theory, be similar for all participants. Because of this, we do not go into further detail about this characteristic for now.
a completely different level of awareness and goal-connectedness focuses on how goals interact with one another). Thus, while these characteristics certainly warrant further investigation, there had to be some limits on what we could focus on in the current research, and so unfortunately these constructs are beyond the scope of the present research (and would be better understood once we develop a more solid foundation for the goal pursuit process).

**Motivation**

Motivation is arguably the most fundamental aspect of goal pursuit, as it serves as the driving force behind our actions. Motivation can be simply defined as the desire to do something, although in the context of goal pursuit the term is also used to refer to the reasons for why we pursue our goals. Historically, motivation has largely been discussed in terms of quantity, specifically focusing on the amount of motivation (which is often measured by simply asking “how motivated are you?” or other proxy behaviours like persistence on a task) an individual has when pursuing their goals (e.g., Davydenko & Peetz, 2019; Hafenbrack & Vohs, 2018; Shah & Higgins, 1997; Veltkamp, Aarts, & Custers, 2008; Wigfield, 1994; Wigfield & Eccles, 2000). The problem with this approach, however, is that motivation is not directly observable and so even if we use proxy behaviours such as persistence, the internal experience of the individual can drastically vary. For example, two students put in the same amount of time into preparing for an exam, but one is spending a lot of time studying because they find the material interesting and useful whereas the other is just trying to get an A to avoid upsetting their parents. While the quantity of motivation is certainly central to actionable goal pursuit, it is also important to consider the quality of motivation, as fundamentally different reasons
for pursuing a goal can subsequently lead to different striving processes and even affect overall attainment (see Milyavskaya & Werner, 2018 for an in-depth review; Koestner, Otis, Powers, Pelletier, & Gagnon, 2008; Milyavskaya, Inzlicht, Hope, & Koestner, 2015; Sheldon & Elliot, 1999; Sheldon & Houser-Marko, 2001; Sheldon, Ryan, Deci, & Kasser, 2004; Werner & Milyavskaya, 2017; Werner, Milyavskaya, Foxen-Craft, & Koestner, 2016; Werner, Milyavskaya, & Koestner, 2017). Two of the most prominent types of motivation that speak to this idea include autonomous and controlled motivation, as defined by self-determination theory (Deci & Ryan, 1985, 2000b; Ryan & Deci, 2000, 2017), and approach and avoidance motivation, as defined by the hierarchical model of approach-avoidance motivation (Elliot, 2006; Elliot & Church, 1997; Elliot & Thrash, 2002).

**Autonomous versus Controlled Motivation.** Self-determination theory is a macro-theory of human motivation that assumes that people are active organisms that strive toward growth and personal development (Deci & Ryan, 1985; Ryan & Deci, 2017). However, people are also vulnerable to pressure, coercion, and control by both internal and external forces that can undermine their sense of autonomy. In this regard, self-determination theory proposes that motivation falls along a continuum of relative autonomy, ranging from intrinsic to extrinsic motivation. On the more autonomous side, people are inherently motivated by intrinsic forces that stem from their own interests and values, which can be further classified into three different types of motivation. This includes intrinsic motivation, integrated regulation, and identified regulation, the latter two of which are autonomous forms of extrinsic motivation. Intrinsic motivation is the prototype of autonomous functioning, whereby an individual engages in some behaviour
or activity because it is inherently interesting, fun, and enjoyable, and as a result would be done even in the absence of reward. Behaviours that are intrinsically motivating do not need to be internalized because they naturally emerge from an individual’s sense of self, and therefore engagement is wholly volitional and self-determined. The only problem with intrinsic motivation is that it cannot always be maintained, especially as an individual gets older and has to face the prescriptions and proscriptions generated by society. Despite these potential societal regulations, an individual can still maintain their sense of autonomy when motivation is extrinsic in nature, as evident by integrated and identified regulation. In the most autonomous form of extrinsic motivation, integrated regulation refers to goals that are connected to an individual’s broader aspirations and life goals (e.g., “I will strive to eat more fruits and vegetables this week because I value being healthy”), whereas identified regulation emerges when an individual understands the value and importance of the goal (e.g., “even though it is often inconvenient, it is important to recycle because I care about the environment”). By finding the goal to be personally important or connecting it to one’s broader values, engagement is choiceful, self-determined, and volitional because the goal is generally aligned with an individual’s sense of self.

In contrast to its more autonomous forms, extrinsic motivation can also emerge in ways that result in feelings of pressure and coercion. Specifically, there are two types of extrinsic motivation that represent controlled motivation – introjected regulation and extrinsic regulation. Introjected regulation emerges when an individual engages in a goal because of the internal pressure they place on themselves, often in order to avoid feelings of guilt and shame or to obtain feelings of pride. While this type of motivation is
technically internal to the person, it is external to the self because it is merely an external contingency that the individual has internalized from the outside (e.g., society) and applies to himself, even in the absence of the external entity’s presence (e.g., “I will feel ashamed of myself if I don’t lose weight”). Finally, the least autonomous form of extrinsic motivation is external regulation, which is characterized by engaging in a goal for some separable outcome (e.g., reward, praise) or to satisfy some external demand (e.g., because they are told to). With external regulation, the individual’s thoughts, feelings, or behaviours are dictated by factors completely outside of the self, and as a result are a function of external pressure and control (e.g., “I want to get straight A’s this semester because my parents will pay me $100 if I do”).

In sum, motivation can stem from internal or external sources that represent the extent to which the goal or behaviour extends from an individual’s sense of self. To the extent that an individual is pursuing a goal for autonomous reasons, they are engaging in the goal because they genuinely want to, whereas more controlled reasons stem from the feeling that they have to do something they otherwise would not choose to do. In the context of goal pursuit, research finds that pursuing goals for more autonomous reasons leads to better goal progress (e.g., Koestner et al., 2002; Koestner et al., 2008; Milyavskaya et al., 2015; Sheldon & Elliot, 1998, 1999; Sheldon & Houser-Marko, 2001; Sheldon, Ryan, Deci, & Kasser, 2004; Werner et al., 2016; Werner & Milyavskaya, 2017; Werner, Milyavksya, & Koestner, 2018). Additionally, recent research has sought to understand the mechanisms between motivation and progress, finding that pursuing a goal for autonomous relative to controlled reasons is associated with experiencing fewer temptations (Milyavskaya et al., 2015) and greater subject ease (Werner et al., 2016),
both of which predict greater goal progress over time. People with more autonomous motivation for their goals are also more likely to utilize more adaptive strategies during goal pursuit, which also increases their chance of success. For example, people are more likely to spontaneously generate specific plans regarding where, when, and how to pursue their goals, which in turn leads to better goal progress over time (Koestner et al., 2008). Similarly, people are more likely to engage in situation selection (completely avoiding tempting experiences before they are encountered) or situation modification (change a situation so as to minimize the emotional impact of a temptation that is present; Leduc-Cummings, Milyavskaya, Werner, Kline, & Cole, in-preparation). While research has demonstrated a plethora of benefits associated with the pursuit of want-to goals, the results for have-to goals have been inconsistent across studies (Koestner et al., 2002; Milyavskaya et al., 2015).

**Approach versus Avoidance Motivation.** One of the most fundamental aspects of human behaviour is the concept of approach and avoidance motivation (Niesta & Elliot, 2009) – we move toward the things that we want and stay away from things that are unpleasant or aversive. The basic premise is that approach motivation is driven by an appetitive system resulting in a propensity toward positive stimuli, whereas avoidance motivation is more aversive, resulting in behavior that is directed away from negative stimuli (Elliot & Fryer, 2008; Elliot & Niesta, 2009). Due to their fundamental nature, approach and avoidance motivation have been conceptualized at a variety of levels, starting with our underlying neural processes (Crites & Cacioppo, 1996; Davidson, 1998; Gray, 1977, 1990), the personal goals that we pursue in our daily lives (Carver & Scheier, 1998; Elliot et al., 2001), all the way up to the broader level of personality and
temperament (Carver & White, 1994; Elliot & Thrash, 2002). Whereas autonomous and controlled motivation serve as the underlying reasons for pursuing our goals, approach and avoidance motivation are conceptualized in a slightly more nuanced way. Specifically, it has been proposed that approach and avoidance motivation provide the direction (or valence) of a goal, such that an approach goal is pursued in order to attain desired end-states, whereas avoidance goals are directed toward avoiding undesired outcomes (e.g., Elliot, Sheldon, & Church, 1997).

The distinction between approach and avoidance motivation is important because it has been proposed that the direction our goals take may play a fundamental role in the process of goal pursuit, which ultimately affects goal progress. For example, people are more likely to engage in positive self-evaluations (Coats, Janoff-Bulman, & Alpert, 1996), demonstrate greater commitment (Schlier, Engel, Fladung, Fritzsche, & Lincoln, 2017), and have greater self-esteem (Heimpel, Elliot, & Wood, 2006) when pursuing approach goals compared to avoidance goals. It has also been consistently shown that approach motivation is associated with more positive outcomes (e.g., subjective well-being, greater relationship satisfaction), whereas avoidance motivation is associated with negative outcomes (e.g., greater loneliness and anxiety; Elliot & Sheldon, 1997; Förster, Higgins, & Idson, 1998; Heimpel et al., 2006; Elliot, Sheldon, & Church, 1997). Most importantly for the present research, past research indicates that pursuing approach goals is associated with greater goal progress, whereas the pursuit of avoidance goals detracts from goal progress; both of these findings have been demonstrated across domains (e.g., education; Elliot, McGregor, & Gable, 1999; sports; Spray, John Wang, Biddle, & Chatzisarantis, 2006), as well as with personal goals more broadly (e.g. Elliot et al.,
1997). However, more recent research finds mixed evidence for the significance of approach and avoidance, as these constructs often fall by the wayside when accounting for autonomous and controlled motivation (e.g., Vansteenkiste et al., 2010; Werner & Milyavskaya, 2018).

**Self-Discrepancy: Ideal, Ought, and Actual Selves**

The entire notion of goal pursuit rests upon the idea that people are trying to attain some desired outcome in the future, indicating that there is a discrepancy between one’s current state and their future self. Throughout the process of goal pursuit, people strive to minimize this discrepancy as they work to attain their goal. According to self-discrepancy theory (Higgins, 1987), the nature of this discrepancy can represent different types of negative psychological situations and therefore differentially predict an individual’s level of emotional discomfort. The nature of the discrepancy is proposed to stem from different domains of the self, including actual, ideal, and ought selves. The actual self refers to how an individual sees themselves currently (e.g., what attributes do they currently have, their current standing in various behaviours, tasks, or goals). An individual and their actual (or current) sense of self is influenced by their self-guides, representing their ideal or ought self. The ideal self represents the attributes, wishes, or aspirations that the person desires or hopes to attain (i.e., the attributes that an individual personally believes represents their “best” self), whereas the ought self represents the different attributes, characteristics, or status that they think they should have (e.g., moral obligations, responsibilities, duties imposed by themselves or important others).

While people may differ in which of these selves are most prominent in their lives, the extent to which they experience a discrepancy between their actual versus ideal
or ought self can influence their emotional well-being. When there is a discrepancy between an individual’s actual and ideal selves, they are more likely to experience dejected-related emotions, such as disappointment, dissatisfaction, and sadness because they are not living up to their full potential (e.g., there is a lack of positive outcomes). When there is a discrepancy between an individual’s actual and ought selves, they are likely to experience more high arousal negative emotions, such as agitation, threat, or fear that stem from the presence of negative outcomes (Barnett, Moore, & Harp, 2017; Carver, Lawrence, & Scheier, 1999; Higgins, 1987). Additional studies have found that both actual-ideal and actual-ought discrepancies were positively related to experiences of hopelessness, depression, and suicide ideation in students (Cornette, Strauman, Abramson, & Busch, 2009), whereas a reduction in the actual-ideal discrepancy resulted in positive therapeutic changes (Berking, Grosse Holtforth, & Jacobi, 2003).

While the majority of the research on self-discrepancies has focused on psychological adjustment and emotional well-being, this research has important implications for goal pursuit. As previously mentioned, discrepancies are at the heart of goal pursuit (e.g., Carver & Scheier, 2002), and so in that regard, these discrepancies serve as an indicator that a person has yet to achieve their goals (Kelly, Mansell, & Wood, 2015). While some level of discrepancy is to be expected and is likely to be motivating during goal pursuit, experiencing chronic discrepancies can leave a person feeling shameful, guilty, or downright amotivated and therefore impede the progress that they make on their goals.
Implementation Intentions

Once a person decides which goals to pursue, it is now time to develop a plan regarding how to effectively achieve those goals. Simply intending to pursue a goal is typically not enough to increase the chances of success, as people need to develop a plan to help them achieve their goal, including taking into consideration unintended events that may arise (e.g., anticipating obstacles that can derail us from our path to achieving a desired goal). Implementation intentions (Gollwitzer, 1990; Gollwitzer & Oettingen, 2001; Gollwitzer & Sheeran, 2006) are a self-regulatory strategy that utilizes an “if-then” plan to specify the when, where, and how an individual will achieve their goal, as well as generate potential alternative pathways in anticipation of obstacles that may thwart their progress (e.g., If situation X occurs, then I will engage in Y behaviour in order to achieve my goal).

Implementation intentions are designed to help enhance goal progress through the automatization of the goal striving process. When formulating an implementation intention, the “if” component is tied to some cue in the environment that elicits a goal-relevant response, which is defined by the “then” component. Thus, in order to effectively set an implementation intention, you first need to identify both the goal-directed behaviour that you wish to pursue and the situational cue that will elicit that behaviour. For example, a person who is trying to lose weight may say, “If it is noon, then I will eat the healthy salad that I brought from home” or “If I get a craving for sweet foods, then I will eat the strawberries I packed for a snack.” Because the individual already has a prepared response, deciding what to eat for lunch or what to do when they get sudden craving to satisfy their sweet tooth does not require conscious attention and
instead facilitates a more automatic or habitual response (Gollwitzer, 1999). In other words, instead of having to agonize over the choice of choosing pizza or salad for lunch if they went to the cafeteria, the individual simply carries out the pre-determined behavior as they planned. This self-regulatory strategy can be especially helpful when faced with obstacles or temptations that interfere with our goals. Following the previous example, the person wanting to lose weight may be tempted to order pizza when asked to go to the cafeteria with co-workers. When faced with this temptation, the person can plan in advance by saying, “If my co-workers invite me to the cafeteria, then I will bring my salad with me and wait while they order.” By making the decision in advance, the person does not have to waste their time or energy deciding between the healthy and unhealthy options they may face when actually in the cafeteria, thereby minimizing the experience of temptation that requires self-control.

Research within the goal literature consistently finds that the use of implementation intentions facilitates goal progress across a variety of domains (e.g., environmental behaviours; Holland, Aarts, & Langendam, 2006; New Year resolutions; Koestner, Lekes, Powers, & Chicoine, 2002; health behaviours; Orbell, Hodgkins, & Sheeran, 1997). Gollwitzer & Brandstätter (1997) also found that people are more likely to achieve difficult goals if they furnish them with implementation intentions. When assigned the same difficult goal, people who were asked to generate implementation intentions were more likely to achieve the goal than those who did not use implementation intentions. Implementation intentions have also been shown to moderate the relation between goal self-concordance (i.e., pursuing goals for more autonomous relative to controlled reasons) and goal progress. Specifically, Koestner et al. (2002)
found that people were more likely to make progress on autonomous goals when furnished with implementation intentions. Similarly, Adriaanse, de Ridder, and de Wit (2009) showed that specifying personally-relevant cues was more effective than the standard situational (when, where, how) cues in increasing the consumption of healthy snacks and decreasing the consumption of unhealthy snacks among individuals who desired to eat more healthily. Consistent with these findings, a meta-analysis by Gollwitzer and Sheeran (2006) found that implementations had a medium-to-large effect on goal progress ($d = .65$).

However, despite being a seemingly simple technique, people seem to struggle with developing effective plans for pursuing their goals. In one study, 52% of people reported that they did not have implementation intentions for their health goals, while only 26% reported having more concrete plans (Milyavskaya & Nadolny, 2017). Also within the health domain, a randomized control trial found that implementation intentions had no effect on physical activity (de Vet, Oenema, Sheeran, & Brug, 2009). This is because a substantial portion of participants did not form specific enough implementation intentions related to physical activity, and over 30% incorrectly formatted their plans and therefore did not have any viable implementation intentions to aid in their pursuit (de Vet, Oenema, & Brug, 2011). Despite these limitations, this study was still able to replicate the quintessential finding that people who formed specific implementation intentions were more physically active two weeks later (de Vet et al., 2011).

**Difficulty**

Another central tenet of the goal construct is the concept of difficulty. While the notion of pursuing difficult goals may seem counterintuitive in the context of goal
attainment, the general idea is that setting personally challenging goals can increase 
motivation to achieve these goals. If a goal is perceived as being too easy, it may be 
viewed as being less important or boring and therefore people will be less likely to invest 
effort into its pursuit. Conversely, if a goal is perceived as being too difficult, people will 
feel overwhelmed and become de-motivated by the impending failure. Congruent with 
this idea, Atkinson (1958) found that task difficulty was related to performance in a 
curvilinear function, such that performance was worse when the task was too easy or too 
difficult, whereas optimal challenge led to peak performance. Based on this finding, it 
would seem that the key to goal difficulty is to strike a fine balance by setting difficult, 
yet realistic goals that propel you into action. Counter to Atkinson (1958), however, goal 
setting theory proposes that the more difficult goal, the better (Locke & Latham, 1990a, 
2002b). Locke (1968) indeed found that more difficult goals produced a higher level of 
performance than easier goals. Similarly, Locke and Latham (1990) found a positive, 
linear function between difficulty and performance, such that higher levels of difficulty 
resulted in greater effort and performance. To further demonstrate the magnitude of this 
effect, a series of meta-analyses found a moderate (d = .52) to large (d = .82) effect of 
goal difficulty on performance (Locke & Latham, 1990, 2002). This finding also holds 
regardless of whether an individual self-selects their goal or is assigned the goal (e.g., by 
a manager) (Dossett, Latham, & Mitchell, 1979; Latham, Mitchell, & Dossett, 1978; 
Latham, Steele, & Saari, 1982; Latham & Saari, 1979). Essentially, goal setting theory 
proposes that it is better to pursue difficult goals, so long as the individual feels 
committed and capable of achieving them.
While Atkinson (1958) and goal setting theory (Locke & Latham, 1990, 2002) appear to be at odds, it is important to note that none of the studies discussed so far examined actual goal progress and instead focused on task performance. In this regard, Locke (1968) made the following inference, “Although subjects with very hard goals reached their goals far less often than subjects with very easy goals, the former consistently performed at a higher level than the latter” (p. 162). Thus, even though people may exhibit better performance on a given task, difficulty may actually be having a negative impact on actual goal pursuit. Consistent with this idea, research focusing on personal goals consistently finds no significant relation between goal difficulty and goal progress (Koestner et al., 2002b; Senko & Harackiewicz, 2005; Sheldon & Kasser, 1998), even though goals were rated as being moderately high in difficulty (Koestner et al., 2002). A more recent study by Werner and colleagues (2016) even found that people actually made less progress on more difficult goals, and instead suggests that people make more progress on goals that they perceive to be subjectively easier. Similarly, research within the achievement goal literature finds that difficulty matters depending on the type of goals people set. Achievement goals (e.g., sport, education) are centered around demonstrating one’s competence and so the extent to which a goal is framed as performance-oriented versus mastery-oriented may evoke different responses in the face of difficulty. For example, Senko and Harackiewicz (2005) found that people who were assigned to a performance-approach goal perceived their goal to be more difficult than those who were assigned to a mastery goal, although difficulty did not mediate the relation between goal orientation and task performance.
Goal Content

Beyond the goals that we pursue in our daily lives, we also have broader values, aspirations, or life goals that we strive to uphold throughout our lifetime. These values are what we deem to be most important in life and therefore serve as guiding principles that can directly or indirectly influence our daily functioning. While there has been an extensive body of research attempting to understand and define what people value (e.g., Rogers, 1964; Rokeach, 1973; Schwartz, 1992, 2016; Schwartz & Bilsky, 1987), self-determination theory proposes that such values can be classified as being either intrinsic or extrinsic in nature (Kasser & Ryan, 1993b, 1996b). Intrinsic goals include aspiring to maintain positive, mutual, and close personal relationships, being involved with one’s own community, and personal growth. Conversely, extrinsic goals focus on financial success, being popular and/or famous, and maintaining an attractive image. Essentially, autonomous and controlled motivation represent the reasons why we are pursuing our goals, whereas intrinsic and extrinsic values represent the content, or what goals we are actually trying to pursue. While research finds that intrinsic and extrinsic values are universal, there are certainly individual differences with respect to the types of goals that people value and pursue in their daily life (i.e., some people endorse more intrinsic than extrinsic values and vice versa). As a result, there are fundamental and qualitatively different developmental outcomes that emerge depending on the type of goal that an individual predominately values. On one side, intrinsic goals are associated with satisfaction of the psychological needs for autonomy, competence, and relatedness, and therefore are more in line with our inherent, organismic desire for personal growth and optimal human functioning (Deci & Ryan, 2000b). In contrast, extrinsic values are not
associated with need satisfaction, which may lead an individual to strive for satisfaction outside of the self, namely through external rewards, acquiring material possessions, and seeking praise from others (e.g., Vansteenkiste, Matos, Lens, & Soenens, 2007). As a result, the attainment of intrinsic goals is positively associated with well-being, whereas the attainment of extrinsic goals does not contribute to well-being, but instead contributes to greater ill-being (e.g., anxiety, depression; Niemiec, Ryan, & Deci, 2009; Werner, 2015).

While the concept of intrinsic and extrinsic goals has largely been discussed in the context of broader values, research has also examined the extent to which goal contents can also manifest in personal goal pursuit. Past research finds that people made more progress on personal goals that help one achieve their more intrinsic values, which in turn enhanced well-being (Hope, Milyavskaya, Holding, & Koestner, 2016; Sheldon & Kasser, 1998). While intrinsic personal goals have positive benefits to progress and well-being, research finds that people pursue extrinsic personal goals because they think attaining them will make them happier. However, such forecasts seem to be an overestimation and ultimately attaining goals for money, fame, and image do not contribute to overall happiness and well-being (Sheldon, Gunz, Nichols, & Ferguson, 2010). In this regard, self-determination theory proposes that it is important for researchers to take into account both the “what” and the “why” of goal pursuit in order to maximize goal attainment (Deci & Ryan, 2000b; Sheldon et al., 2004b; Vansteenkiste, Lens, & Deci, 2006; Vansteenkiste, Simons, Lens, Soenens, & Matos, 2005).
Personality and Individual Differences

In additional to goal-specific characteristics, there are a variety of personal attributes and experiences that have the potential to influence goal pursuit and attainment. In this section, we review the literature through the lens of goal pursuit, highlighting key constructs that have either been found to directly relate to or have the potential to influence goal progress. While the majority of these constructs come directly from the goal literature (e.g., trait self-control, goal adjustment, regulatory focus), we also discuss secondary factors that we believe may have important implications for goal pursuit. Specifically, this section will focus on self-regulatory traits (regulatory focus, regulatory mode, trait self-control, goal adjustment, grit, conscientiousness), motivational processes (behavioural inhibition and activation, general motivation, basic needs, self-efficacy), and cognitive thought processes (rumination-reflection, mindfulness, implicit theories, perfectionism).

Trait Self-Control

While self-regulatory processes are often evaluated at the daily or momentary level (e.g., Hofmann, Baumeister, Förster, & Vohs, 2012; Milyavskaya & Inzlicht, 2017), there are also individual differences in the extent to which people are generally able to regulate their thoughts, feelings, and behaviours during the pursuit of their goals. In this regard, self-control can be defined as “the capacity to alter or override dominant response tendencies and to regulate behavior, thoughts, and emotions” (de Ridder et al., 2012, p. 77). In other words, self-control refers to the ability to inhibit any immediate impulses that may detract us from pursuing our long-term goals. While situational self-control can vary widely from moment-to-moment or day-to-day, dispositional self-control is
relatively stable across time and generalizes to other situations. People with greater dispositional self-control are better at controlling impulses than others, and overall have better adjustment (e.g., Tangney, Baumeister, & Boone, 2004). A recent meta-analysis found a small-to-medium effect size ($\rho = .28$) for measures of trait self-control predicting positive behavioral outcomes in a variety of life domains (de Ridder et al., 2012). In other words, this review provided evidence for the longstanding assumption that being able to successfully control one’s behavior is associated with a wide array of positive outcomes, whereas the lack of self-control often leads to undesirable responses.

Until recently, self-control has been treated as an effortful process whereby an individual has to actively resist temptations in their environment (Baumeister, Muraven, & Tice, 2000; Baumeister, Vohs, & Tice, 2007; Freeman & Muraven, 2010; Muraven, 2010). However, recent research indicates that this may not be the case – in fact, it appears as though _effortless_ goal pursuit may be the key to success. In a recent daily diary study examining habits and eating behaviors, it was found that people high in trait self-control were more likely to have weaker unhealthy snacking habits, which in turn predicted lower consumption of unhealthy snacks throughout the week. This suggests that people high in trait self-control are not necessarily better in regulating their behavior because they are better able to resist temptations, but rather they are more successful because they develop more adaptive habits (Adriaanse, Kroese, Gillebaart, & De Ridder, 2014). Additionally, more recent research finds that trait self-control is associated with the use of adaptive strategies to avoid temptation, including the use of implementation intentions (Werner & Milyavskaya, 2018) and situation selection and situation modification (Leduc-Cummings et al., 2018). Although a complete model has yet to be
tested, research also indicates that trait self-control is associated with the pursuit of more autonomous goals (Converse, Juarez, & Hennecke, 2018), which in turn predicts experiencing fewer temptations (Milyavskaya et al., 2015) and greater subject ease (Werner et al., 2016), both of which predict greater goal progress over time.

**Grit**

Similar to self-control, grit focuses on the tenacious pursuit of long-term goals. More specifically, grit is defined as the “perseverance and passion for long-term goals…. [and] entails working strenuously toward challenges, maintaining effort and persistence over years despite failure, adversity, and plateaus in progress” (Duckworth, Peterson, Matthews, & Kelly, 2007, pp. 1087-1088). While persistence has traditionally been studied as an outcome (e.g., Locke & Latham, 2002), grit is proposed to be a trait-level predictor of long-term success (Duckworth et al., 2007; Duckworth & Quinn, 2009). For example, research finds that grittier West Point cadets were less likely to drop out than their less gritty counterparts (Duckworth et al., 2007), students with higher levels of grit were more likely to graduate high school, men were more likely to stay married for longer than their less gritty peers, and gritty sales people were more likely to retain their job (Eskreis-Winkler, Shulman, Beal, & Duckworth, 2014). Grit is also associated with educational attainment and performance more broadly (Duckworth et al., 2007), as well as predicts teacher effectiveness (Duckworth, Quinn, & Seligman, 2009). Finally, Duckworth and colleagues found that grittier students were more likely to excel in the National Spelling Bee because they engaged in more deliberate practice, indicating that they were able to persevere in less rewarding activities in the pursuit of their long-term goal (Duckworth, Kirby, Tsukayama, Berstein, & Ericsson, 2011).
Grit purportedly differs from other self-regulatory traits because it emphasizes long-term pursuits, whereas other constructs, such as self-control, are often studied in shorter intervals (e.g., when facing a temptation in the moment). However, while grit has been proposed as a higher order personality trait that is unique (see Duckworth & Gross, 2014), a recent large scale meta-analysis finds only weak evidence in support of this proposition (Credé, Tynan, & Harms, 2017). There is also an abundance of research finding that grit highly correlates with other self-regulatory traits, particularly trait self-control and conscientiousness (Credé et al., 2017; Duckworth et al., 2007; Duckworth & Quinn, 2009; Saunders, Milyavskaya, Etz, Randles, & Inzlicht, 2017; Werner, Milyavskaya, Klimo, & Levine, 2018), further indicating that there is a high degree of conceptual overlap, or perhaps the designated measure or the designs that were utilized do not really do a good job representing the construct (e.g., the whole notion of grit being unique is predicated on the pursuit of goals over multiple years, however most research is, at best, a year-long).

Conscientiousness and Other Big Five Traits

Conscientiousness is a multi-faceted construct that describes individual differences in the propensity to be a responsible, organized, hardworking, self-controlled, and rule abiding (John & Srivastava, 1999; Roberts, Jackson, Fayard, Edmonds, & Meints, 2009; Roberts, Lejuez, Krueger, Richards, & Hill, 2014). An extensive body of research finds that exhibiting higher levels of conscientiousness is an important determinant of health, buffering against specific diseases (e.g., Alzheimer’s; Wilson, Schneider, Arnold, Bienias, & Bennett, 2007; Type I diabetes; Vollrath, Landolt, Gnehm, Laimbacher, & Sennhauser, 2007), substance abuse (Roberts & Bogg, 2004; Walton &
Roberts, 2004), poor physical health (Bogg & Roberts, 2004; Goodwin & Friedman, 2006; Moffitt et al., 2011), and even death (e.g., Friedman et al., 1995).

Conscientiousness has also been linked to a variety of behaviours and outcomes that occur in daily life, including performance in the workplace (George, Helson, & John, 2011; Hogan & Holland, 2003; Judge, Higgins, Thoresen, & Barrick, 1999), relationship satisfaction (Malouff, Thorsteinsson, Schutte, Bhullar, & Rooke, 2010), and contributes either directly or indirectly to well-being (DeNeve & Cooper, 1998; Hayes & Joseph, 2003; Schmutte & Ryff, 1997).

In addition to various life outcomes, conscientiousness also has the potential to play a critical role during goal pursuit. For example, industriousness, or the propensity to work hard, can be effective for self-regulation, especially when it comes to planning out the pursuit of one’s goals. Research finds that while conscientiousness did not influence the generation of implementation intentions, those high in conscientiousness were more likely to actually utilize their plans than individuals lower on this trait (Ajzen, Czasch, & Flood, 2009). In a similar vein, Barrick, Mount, and Strauss (1993) found that people with higher levels of conscientiousness demonstrated higher levels of commitment.

Consistent with industriousness, commitment implies that an individual is willing to invest effort in order to achieve their goal (Campion & Lord, 1982; Hollenbeck & Klein, 1987; Locke et al., 1981). The most obvious facet of conscientiousness that links to goal pursuit, however, is self-control. There is a plethora of research that finds a strong correlation (.70+) between conscientiousness and trait self-control (as well as grit), so perhaps it makes sense to couch all of these facets under the higher order construct of conscientiousness. This is currently the subject of a rather contentious debate within the
goal literature (e.g., Credé et al., 2017), which further exemplifies the need to refine the overlapping constructs in order to develop a clearer understanding of what factors actually predicts goal progress. In fact, when it comes to actual goal progress, research finds that there is a weak to low correlation between conscientiousness and goal progress, and when entered into a model including other personality traits, it does not significantly predict goal progress (Milyavskaya, Ianakieva, Foxen-Craft, Colantuoni, & Koestner, 2012).

Despite the obvious potential connection between conscientiousness and goal progress, research finds that other Big Five personality traits (John & Srivastava, 1999) can also influence goal pursuit. Neuroticism has been found to be negatively related to goal pursuit (Judge & Ilies, 2002; Little, Leccl, & Watkinson, 1992; Milyavskaya et al., 2012), whereas extraversion positively predicts goal progress (Milyavskaya et al., 2012). Within the achievement goal literature, Elliot and Thrash (2002) found that extraversion positively predicted the pursuit of mastery goals and neuroticism positively predicted performance-avoidance goals. However, both extraversion and neuroticism predicted performance-approach goals. Drawing inferences from the broader achievement literature, these findings are relatively consistent with research on personal goals, as avoidance-oriented goals are less likely to be attained (Elliot & Sheldon, 1997), whereas mastery goals facilitate autonomous motivation (Elliot & Harackiewicz, 1996) and are associated with a whole host of positive outcomes (e.g., Ames & Archer, 1988; Kaplan, Middleton, Urdan, & Midgley, 2002).
Goal Adjustment

While self-regulatory traits can help us to achieve our goals, unfortunately we cannot always be successful. Whether it stems from limited resources (cognitively, monetarily, or in time) or our own physical limitations, a core component of goal pursuit is knowing when it is actually more strategic to disengage (e.g., Dunne, Wrosch, & Miller, 2011; Miller & Wrosch, 2007; Shah, 2005; for an in-depth review, see Jostman & Koole, 2009). As a result, it is important to understand when best to persist and when it is time to disengage. This is not to say that you must immediately disengage when the going gets tough, however disengagement can be especially beneficial when faced with an unattainable goal. In this regard, goal adjustment is a personality construct that refers to the capacity to adaptively disengage from unattainable goals in order to re-engage in new, more fruitful pursuits (Wrosch, Scheier, & Miller, 2013). Research indicates that actively disengaging from an unattainable goal and subsequently re-engaging in some alternative pursuit confers benefits to subjective well-being (e.g., Wrosch, Scheier, Carver, & Schulz, 2003). Additionally, it has also been suggested that motivation plays a key role in disengagement – although it may be difficult to disengage from an unattainable goal, people with more autonomous goal motivation are more likely to persist and re-engage in a new goal (Ntoumanis, Healy, Sedikides, Smith, & Duda, 2014). The idea of goal disengagement may seem counterintuitive, especially when other goal-related constructs, such as grit, promote the idea that we should tenaciously pursue our goals at all costs. However, research shows that failing to disengage from an unattainable goal is negatively associated with well-being and is positively associated with experiencing more intrusive thoughts (van Randenborgh, Hüffmeier, LeMoult, & Joormann, 2010), whereas re-
engaging in a new goal following disengagement can actually enhance well-being (Wrosch et al., 2013).

While the majority of research on goal adjustment has focused on how disengagement and re-engagement influences well-being, understanding how these tendencies influence goal progress in a more general sense is quite pertinent. For example, how does a person who has a higher tendency to disengage from a goal respond to smaller obstacles that may forestall their progress? Are they more likely to persist because it is an important goal, or will they preliminarily disengage to avoid a “difficult” goal? These tendencies are even more important when considering that people typically pursue multiple goals, as they could easily give up their pursuit on a challenging goal in favour of something that is easier, albeit less satisfying. Alternatively, it may also be possible that disengaging from a truly unattainable goal will clear up mental space, energy, and time to pursue alternative goals that are even more meaningful. In other words, instead of wasting their time ruminating and struggling to pursue a goal when success is practically impossible, people can take this opportunity to seek out new or different goals that are more realistic. However, this idea stands in contrast to other perspectives in psychology, where the idea is that we should persist on our goals at all costs (e.g., grit).

**Regulatory Mode**

While goal adjustment focuses on the general tendency to disengage from unattainable goals in the pursuit of more realistic goals, regulatory mode serves as a complimentary construct by focusing on two important aspects of self-regulation: the assessment of alternative goals and resource allocation. These regulatory functions are
more aptly called *assessment*, which refers to critically evaluating goals and goal-related behaviour in relation to potential alternatives, and *locomotion*, which is concerned with shifting between goals and/or goal-related behaviours and investing the appropriate psychological resources needed for success (Kruglanski et al., 2002). In other words, people vary in their tendency to evaluate what goals they wish to pursue and deciding how to best accomplish them, as well as the extent to which they actually make an effort to pursue those goals. While these processes can indeed be interdependent, there may be certain situations that elicit locomotion, whereas others require more assessment.

Similarly, these tendencies can further classify people into the “doers” and “go-getters” (i.e., those who are more locomotion-oriented) versus those who are more “calculated” and “vigilant” (i.e., those who are more assessment-oriented) (Kruglanski, Pierro, & Higgins, 2007). Research shows that locomotion is positively associated with autonomous motivation, whereas assessment is associated with more controlled motivation (Pierro, Kruglanski, & Higgins, 2006). The explanation provided here is that locomotion taps into an individual’s propensity to be more actively engaged with a task, and therefore facilitates a sense of flow. Conversely, those high on assessment tend to focus more on societal norms and expectations, and therefore become preoccupied with comparing potential alternatives and calculating discrepancies between their current and desired end-state. Most importantly, however, people who are high on both tendencies (i.e., those who are able to evaluate goals as well as put them into action) were most likely to reach their goals (Pierro et al., 2006).
**Regulatory Focus**

Regulatory Focus Theory (Higgins, 1997, 1998, 2000) proposes that individual differences in goal pursuit can be attributed to two motivational orientations – promotion focus and prevention focus. Having a promotion-focused orientation means that the individual is more attuned with their own hopes, wishes, and aspirations (i.e., “ideals”), as well as achieving desirable outcomes. In contrast, people with a prevention-focused orientation tend to focus more on responsibilities and things that they feel they have to do (i.e., “oughts”), all in the name of avoiding negative outcomes. For example, a person who has the goal to develop a healthier lifestyle can pursue this goal either by focusing on exercising and eating more fruits and vegetables, or by refraining from bad habits like eating junk food and smoking. Essentially, both orientations seek to reduce the discrepancy between an individual’s current and ideal state, although the promotion orientation largely relies on approach motivation and the prevention orientation relies on avoidance motivation.

While they are heavily intertwined, Regulatory Focus Theory makes a distinction between promotion/prevention and approach/avoidance. Specifically, promotion and prevention orientations are said to be relatively stable and therefore are akin to a personality trait (Mooradian, Herbst, & Matzler, 2008), whereas approach and avoidance motivation are goal characteristics that guide our behaviour in a particular moment. In this regard, Molden, Lee, and Higgins (2008) propose the following:

“Although promotion concerns relate to the presence and absence of gains, and prevention concerns relate to the presence and absence of losses, it is important to note that the distinction between these concerns is not simply equivalent to the
distinction between motivation to approach desired (i.e., positive) end-states and to avoid undesired (i.e., negative) end-states….Instead, concerns with promotion or prevention describe separate and distinct contexts in which more general desires for approaching positives or avoiding negatives can arise” (p. 171).

According to this perspective, an individual’s goals could be characterized by approach or avoidance motivation, regardless of their regulatory focus (Molden et al., 2008). In other words, while approach or avoidance provide the direction of our goals, promotion and prevention orientations shape how we view the outcome in the first place. Promotion orientation is solely focused on gains, and so even when an individual is not successful, it is not perceived as a “loss” but instead as a “non-gain.” Similarly, prevention orientation is solely focused on losses, so even when an individual is successful, it is perceived as a “non-loss” instead of a “gain.” While there is a plethora of research indicating that the pursuit of approach goals is associated with more positive outcomes than avoidance goals, Regulatory Focus Theory proposes that the key to enhancing the chances of success is through regulatory fit. That is, in order to encourage behaviour change, goals and messages should be framed to match the individual’s motivation orientation (Cesario, Grant, & Higgins, 2004; Freitas & Higgins, 2002; Lee & Aaker, 2004; Lockwood, Jordan, & Kunda, 2002; Righetti, Finkenauer, & Rusbult, 2011). For example, individuals who are predominately prevention-focused are more likely to be more responsive to a message telling them to wear sunscreen to avoid cancer, whereas those who are more promotion-focused are likely to respond better to a message telling them to wear sunscreen to have more beautiful and healthy skin. Similarly, recent research finds that being promotion-focused is associated with the pursuit of more approach goals and
more autonomous goals, whereas being prevention-focused is associated with the pursuit of more avoidance goals and more controlled goals (Werner & Milyavskaya, in-preparation).

**Basic Psychological Needs**

The most fundamental principle of self-determination theory focuses on the basic psychological needs for autonomy, competence, and relatedness. Autonomy refers to experiencing a sense of choice and that the target behaviour is reflectively self-endorsed. Satisfaction of the need for autonomy provides a sense of freedom with respect to the goals and behaviours that an individual pursues. Competence refers to the feeling of being capable and effective in one’s environment. When an individual feels a sense of competence, they feel as though they can be a master in their own environment, as well as take on any challenges or goals that they pursue. Finally, relatedness refers to the experience of having caring, positive, and mutual relationships with important others. When an individual feels a sense of relatedness, they experience a positive connection and unconditional support from significant others. Much like humans need water, food, and shelter in order to survive, it has been proposed that autonomy, competence, and relatedness are fundamental and universal psychological needs that are necessary for optimal health and well-being (Deci & Ryan, 2000). As such, various negative outcomes are likely to emerge if these needs are thwarted, either together or individually, and in the extreme cases leading to psychopathology. In the context of the present research, the basic psychological needs also play an integral role in the setting and pursuit of personal goals by way of influencing one’s motivation.
In the context of personal goals, it is no surprise that the basic psychological needs play an integral role during their development and pursuit. To the extent that an individual is in an environment that satisfies their basic psychological needs, they are more likely to pursue goals that emanate from their sense of self and are aligned with what they genuinely want to do (Milyavskaya, Nadolny, & Koestner, 2014). Specifically, Milyavskaya and colleagues (2014) found that people are more likely to set or select more self-concordant goals in need satisfying domains. Similarly, research has demonstrated that having need supportive parents leads to the pursuit and internalization of self-concordant goals, whereas having more controlling parents leads to the pursuit of more controlled, or less concordant goals (Werner, 2015).

**Behavioural Inhibition (BIS) and Behavioral Activation (BAS) Systems**

At the core of human action lies the assumption that we are motivated to approach pleasure and avoid pain. The behavioral approach system (BAS) is an appetitive system that serves to activate or facilitate action and is often attuned to rewards and goal achievement. Using a stoplight analogy, this system would serve as the green light, or the “go” system. Because of this system’s affiliation with the dopaminergic reward system in the brain (via the ventral tegmental area of the midbrain in the anticipation of rewards, and the mesial pre-frontal cortex after the receipt of rewards), positive outcomes (e.g., positive affect) emerge when activated (Carver, 2005). Conversely, the red light, or “stop” system is the behavioral inhibition system (BIS). Activated in the face of threat or novelty, this avoidance system encourages an individual to withdraw in order to avoid punishment, thus resulting in negative affect (e.g., anxiety). Individuals lower in approach tendencies (i.e., have a less reactive BAS) are less likely to engage in impulsive
behaviors than those higher in approach (i.e., have a more reactive BAS; Carver, 2005; Gray, 1994). This is likely because temptations often have a high intrinsic value (e.g., Milyavskaya & Inzlicht, 2017) and so those with a more reactive BAS will respond in a way that will allow them to achieve that immediate reward, even at the sake of impeding progress on their more distal goal. However, the reverse is true for BIS – those higher in avoidance (i.e., a more reactive BIS) are less likely to engage in impulsive behaviors than individuals with lower avoidance tendencies (i.e., a less reactive BIS; Carver, 2005; Gray, 1994). This is likely because if an individual is faced with temptation, the individual with a more reactive BIS will be driven to avoid the negative consequences associated with such impulsive behavior that can impede their goal progress.

**Perceived Self-Efficacy**

How we think and feel about our own abilities shapes how we interact with our environment. Perceived self-efficacy refers to an individual’s beliefs about their capabilities to perform well in various life domains (Bandura, 1977, 1982, 1989, 1994, 2001; Schwarzer, 1992; Schwarzer & Jerusalem, 1995). Self-efficacy beliefs determine how people think, feel, and behave (Bandura, 1994), as well as facilitate goal setting, effort, and persistence (Schwarzer & Jerusalem, 1995). Such beliefs are especially important when an individual is faced with difficult or novel situations where a certain level of optimism is required to persist. While there is some evidence to suggest that self-efficacy may have negative implications for performance (Vancouver, Thompson, & Williams, 2001), an extensive body of research summarized in a series of meta-analyses indicate that perceived self-efficacy contributes to motivation and performance in a variety of domains (Gully, Incalcaterra, Joshi, & Beaubien, 2002; Holden, Moncher,

With respect to personal goals, there appears to be mixed evidence about the role self-efficacy beliefs may play during goal pursuit. While there is evidence to suggest that perceived self-efficacy for a particular domain influences performance (e.g., academic self-efficacy predicts the types of academic goals people set and their course performance; Zimmerman, Bandura, & Martinez-Pons, 1992), research on personal goals more broadly finds that it does not correlate with or uniquely predict the amount of progress an individual makes on their goals (Koestner et al., 2002). Similarly, Judge, Bono, Erez, amd Locke (2005) demonstrated that core self-evaluations (including general self-efficacy) positively predicted goal self-concordance and in turn goal progress. However, on its own, general self-efficacy was only weakly correlated with goal progress. These discrepant results seem to stem from the different ways in which researchers define the goal construct, as earlier research tended to largely focus on task performance (e.g., Bandura, 1994; Locke & Latham, 2002), whereas the evidence from more recent research focuses on idiosyncratic personal goals with ratings of subjective goal progress (e.g., Koestner et al., 2002; Milyavskaya et al., 2015; Werner et al., 2016).

**Mindfulness**

As demonstrated with other traits, such as conscientiousness, being in tune with one’s surroundings can have a positive impact on goal pursuit. While previous traits focus more on how people respond to certain situations, mindfulness is defined as the receptive attention and awareness of present events and experiences (Brown & Ryan, 2003). Awareness refers to the extent to which an individual is in touch with their own
inner and outer worlds, including thoughts, feelings, behaviours, sensations and their immediate external surroundings within a given moment (Brown, Ryan, & Creswell, 2007). Although it is a natural inclination for people to pay attention to their inner and outer experiences (e.g., Rogers, 1964), there are certainly individual differences in the extent to which people pay sharp attention to these experiences or simply engage in more automatic, habitual, or even mindless responses (Brown & Ryan, 2003). Past research finds that those higher in trait mindfulness report experiencing higher levels of well-being (Brown & Kasser, 2005; Brown & Ryan, 2003; Cash & Whittingham, 2010; Weinstein, Brown, & Ryan, 2009), engage in more positive behaviours (e.g., pro-environmental behaviours; Brown & Kasser, 2005), and are better able to regulate their emotions (Hill & Updegraff, 2012). There is also an extensive body of research examining mindfulness-based interventions, showing that mindfulness can reduce problematic eating behaviours (Alberts, Thewissen, & Raes, 2012; Alberts, Mulkens, Smeets, & Thewissen, 2010) and stress (Mendelson et al., 2010), while also increasing positive outcomes, such as mental health (Kimbrough, Magyari, Langenberg, Chesney, & Berman, 2009), job satisfaction, and quality of life (Fortney, Luchterhand, Zakletksaia, Zgierska, & Rakel, 2013).

While there has yet to be much research on the connection between mindfulness and goal pursuit, there are some important characteristics that would imply its usefulness, especially within the realm of self-regulation. Indeed, a certain degree of attention to one’s inner thoughts and behaviours, as well as external regulations, is required in order to select what goals to pursue. This is especially relevant for more autonomous goals, as the foundation of such pursuits stems from choice, personal interest, and reflective self-
endorsement. Consistent with this idea, Brown and Ryan (2003) found an association between mindfulness and autonomous self-regulation.

**Perfectionism**

Perfectionism is characterized by the tendency to strive toward perfection, while also avoiding the potential for error (Powers, Koestner, Zuroff, Milyavskaya, & Gorin, 2011). While traditionally thought of as a maladaptive construct, perfectionism has recently been studied as a multi-dimensional trait comprised of both maladaptive and adaptive components (e.g., Blankstein & Dunkley, 2002; Stoeber & Otto, 2006), defined as self-critical perfectionism and personal standards perfectionism, respectively. On one hand, self-critical perfectionism refers to the setting of high standards coupled with the use of harsh criticism of one’s own behaviour, the inability to derive pleasure from success, and constantly being worried about others’ expectations (Dunkley, Zuroff, & Blankstein, 2003). Self-critical perfectionism is the stereotypical form of perfectionism that would most readily come to mind for most people. On the other hand, people can set high goals and strive for high standards in their daily life without necessarily succumbing to the more critical aspects – this is referred to as personal standards perfectionism (Dunkley et al., 2003). Research finds that self-critical and personal standards perfectionism differentially predict mental health outcomes, such that self-critical perfectionism is associated with depression (Dunkley, Blankstein, Halsall, Williams, & Winkworth, 2000; Sherry, Richards, Sherry, & Stewart, 2014), high negative affect and low positive affect (Milyavskaya, Harvey, et al., 2014; Mongrain & Zuroff, 1995), distress (Dunkley et al., 2000; Sagar & Stoeber, 2009), and a whole host of pathological behaviours (e.g., eating disorders; Boone, Vansteenkiste, Soenens, Van der Kaap-Deeder,
& Verstuyf, 2014; Soenens et al., 2008); gambling; (Tabri, Werner, Milyavskaya, & Wohl, 2018), whereas personal standards perfectionism was unrelated to these symptoms and in some cases was even associated with increased positive affect (Milyavskaya et al., 2014) and feelings of pride following success (Stoeber et al., 2008).

Given the focus on standards and performance, there should be no surprise that perfectionism affects goal pursuit. In general, the findings are as expected – maladaptive forms of perfectionism (e.g., self-oriented, self-critical) impede performance, whereas more adaptive forms of perfectionism (e.g., personal standards) positively predict performance when controlling for maladaptive perfectionism. While there has been an exorbitant amount of research on perfectionism and goal pursuit in the achievement domain (e.g., Hanchon, 2010; Ommundsen, Roberts, Lemyre, & Miller, 2005; Powers et al., 2011; Stoeber, Stoll, Pescheck, & Otto, 2008; Stoeber, Uphill, & Hotham, 2009; Van Yperen, 2006; Vansteenkiste et al., 2010; Verner-Filion & Gaudreau, 2010), recent research has examined different types of perfectionism in the pursuit of personal goals more broadly. Consistent with previous findings, self-critical perfectionism impeded goal pursuit, whereas personal standards perfectionism was associated with greater goal progress (Powers et al., 2011). This result was further mediated by implementation intentions, such that personal standards perfectionism positively predicted the use of implementation intentions, and in turn goal progress, whereas this opposite pattern was found for self-critical perfectionism (Powers, Milyavskaya, & Koestner, 2012). In other words, while the use of implementation intentions can be an effective self-regulatory strategy, there appears to be a backfire effect when they are used by people with maladaptive perfectionistic tendencies (Powers, Koestner, & Topciu, 2005).
Implicit Theories

As we can see so far, personality plays an important role in how we view the world around us, especially when it comes to goal pursuit. In a similar fashion, implicit theories (or mindsets) are comprised of our beliefs about the nature of human attributes, specifically the extent to which they can change over time (Dweck, 1999, 2008; Dweck, Chiu, & Hong, 1995; Yeager & Dweck, 2012). People who believe that intelligence and talent are malleable, and therefore can grow with time and experience are said to have a growth mindset (i.e., people are entity theorists). This stands in contrast to a fixed mindset, where people assume that personal qualities are pre-determined traits that cannot be changed (i.e., people who are incremental theorists; Dweck, 1999). Research finds that having a growth (vs. fixed) mindset leads to a variety of positive outcomes, including increased resilience across challenging transitions (Yeager & Dweck, 2012) and higher achievement in school (e.g., Blackwell, Trzesniewski, & Dweck, 2007; Dar-Nimrod & Heine, 2011; Grant & Dweck, 2003). While most research on mindsets has been centralized in the education domain, research also shows that having a growth (vs. fixed) mindset has positive benefits in the social (Finkel, Burnette, & Scissors, 2007; Knee, 1998; Levy & Dweck, 1999), work (Heslin & VandeWalle, 2008), and health domains (Biddle, Wang, Chatzisarantis, & Spray, 2003; Tamir, John, Srivastava, & Gross, 2007).

Despite all of the evidence suggesting the positive impact of having a growth (vs. fixed) mindset, a recent set of meta-analyses found that the effects for both mindset as a trait and mindset interventions on academic achievement are not as strong as any of the aforementioned studies would suggest (Sisk, Burgoyne, Sun, Butler, & Macnamara, 2018). For the trait level meta-analysis, the average correlation between mindset and
academic achievement was very weak (.10), with over half of the studies having effect sizes that were not statistically significant from zero. Even more striking, the intervention meta-analysis found an overall effect size of $d = .08$ (.06 when only including real-world assessments in classrooms and excluding lab studies). While mindset theory has yet to percolate into the realm of goal pursuit, we initially would have expected that having a growth mindset would influence the types of goals that people pursue, the processes they use when striving toward their goals, and ultimately the amount of progress an individual makes on their goals. While these claims are purely speculation based on previous findings in the achievement literature (one that is tightly linked to, yet distinct from personal goal pursuit), in light of recent findings it would not be unexpected if mindset also does not influence goal progress.

Are All of these Constructs Really Unique? A Measurement Perspective on Goal Pursuit

While the proliferation of the many constructs related to goal pursuit is both exciting and encouraging for the field, it is also important to take stock of how these many constructs relate to one another. This is especially important given that one of the more prevalent issues within the literature on goal pursuit is that we often work in our respective siloes, focusing on a particular theory and/or set of constructs, while often ignoring overlapping or competing ideas. Of particular relevance to the present research is the notion of jingle-jangle fallacies (Block, 1995; Marsh, 1994; Marsh, Craven, Hinkley, & Debus, 2003), with the jingle fallacy referring to the use of the same label for constructs that are actually theoretically different (Thorndike, 1904) and the jangle fallacy referring to the assumption that constructs are theoretically different just because
they bear different names when they are actually the same (Kelley, 1927). From a measurement perspective, this would mean that two (or more) scales with similar names might actually be measuring different constructs (jingle fallacy) or that two (or more) scales with different names actually measure the same underlying construct (jangle fallacy).

While these problems are as old as the field of psychology itself (and certainly other sub-disciplines are no stranger to the jingle-jangle fallacy), this is of particular concern within the literature on self-regulation and goal pursuit. As an example of the jingle fallacy, a recent meta-analysis concluded that achievement goal researchers were using the same label (e.g., mastery, performance) for conceptually different constructs (e.g., normative, appearance-evaluative components of achievement goals Hulleman et al., 2010). An example of the jangle fallacy within the goal pursuit literature that has received a lot of attention in recent years is the distinction between trait self-control, conscientiousness, and grit. While research consistently finds that grit, trait self-control, and conscientiousness all correlate at around .70 or higher (Credé et al., 2017; Duckworth et al., 2007; Duckworth & Quinn, 2009; Saunders et al., 2017; Werner et al., 2018), a more recent study using commonality analysis found that it was indeed the shared component of trait self-control, grit, and conscientiousness that was most relevant for goal pursuit (Werner et al., 2018; see also Credé et al., 2017; Vazsonyi et al., 2019). Given the vast number of constructs related to goal pursuit, we believe that these examples only scratch the surface of the underlying construct validity problem within our subfield (e.g., there is also an on-going colloquial debate surrounding the uniqueness of promotion-prevention orientations and approach-avoidance motivation).
While the jingle-jangle fallacies pose a problem for the goal pursuit literature, it is also the case that the quality of any findings within psychology entirely depends on the quality of the instruments that are used. However, recent research indicates that the extent to which researchers actually examine the structural validity of their measures is quite sparse (Flake et al., 2017). Upon reviewing a representative sample of articles from social and personality psychology’s top-tier journal, the *Journal of Personality and Social Psychology*, Flake and colleagues (2017) found that reliability (e.g., Cronbach’s alpha) was often (for 78% of measures) the only psychometric information provided. Beyond alpha, the use of additional metrics was extremely low, even among author developed scales (i.e., they were not previously validated or established measures), with only 2.4% of scales having appropriate factor analysis information. Building on Flake and colleagues, Hussey and Hughes (2017) examined the psychometric properties of 15 commonly used self-report measures in social and personality psychology. They found that while the majority of measures provided sufficient evidence for reliability, only 60% demonstrated evidence for good validity when validity was assessed more comprehensively (e.g., factor structure, measurement invariance). As a result of these findings, as well as to keep with best measurement practices, in the present study we aimed to examine the structural validity of any previously validated self-report scales (all of which were trait measures). By doing so, we hope to not only inform the field of better measurement practices, but also help move the field toward developing a more refined understanding of goal pursuit over time.
Present Research

Given the overwhelming number of constructs related to goal pursuit, the purpose of this study was to examine which constructs best predict goal progress over time. In an attempt to adequately address this lofty question, we included measures of personality and individual differences that have important implications in goal pursuit (i.e., factors that may influence the extent to which goals differ between individuals), as well as goal-specific characteristics for each of the goals that were provided (i.e., factors that influence the extent to which an individual’s goals differ among each other). While we did not have any specific hypotheses, this study had two main objectives. First, we were interested in examining the structural validity of the many constructs (where applicable), as well as whether they are indeed unique or if some are measuring the same thing, but have different labels. For our second objective, we were also interested in examining the extent to which these constructs actually predict goal progress.

While there has been a previous attempt at integrating theories of goal pursuit (Webb & Sheeran, 2005), the present study provides several notable advancements. First and foremost, the previous studies only included 17 constructs that were assessed using a total of 53 items (i.e., all constructs were assessed using 2 to 4 items each). In the present study, we included 21 measures (14 at the between-person level and seven scales at the within-person level) representing a total of 50 constructs. As will be discussed in further detail below, we also aimed to use the full version (when possible) of scales or items that have been used and/or ideally validated in previous research on goal pursuit.

A second notable advantage of the current study is that we use a prospective longitudinal design to assess the amount of progress people made on their personal goals.
In their first study, Webb and Sheeran (2005) randomized participants to think about a past experience (within the past year) where they either failed at a difficult task versus successfully made it through to the end. Not only are such tasks subject to recall bias and therefore threaten internal validity, especially as distance from the event increases (Hassan, 2005), people also tend to have emotional biases (e.g., negativity bias or positivity bias) with respect to their ability to accurately recall past experiences (e.g., Matlin & Gawron, 1979; Rozin & Royzman, 2001). In the present study, we ask people to set goals that they can attain in the next week and subsequently follow-up within that time frame. By focusing on week-long goals, the aim was to reduce at least some of the bias people have when evaluating their goal progress retrospectively. While Webb and Sheeran (2005) included an objective indicator of success (i.e., exam grade) in their second study with a prospective design, they operationalized success and failure as a dichotomous outcome. The rationale provided was so that the results would be comparable to their previous study, however, this also may have produced biased results as a function of lost of information and power when the outcome was dichotomized (Royston, Altman, & Sauerbrei, 2006).

Finally, a third advantage of the current study is that we had participants set multiple goals, which allowed us to assess progress at both the between and within-person levels. At the between person level, the analysis takes an interpersonal approach comparing how much progress a person makes on their goals compared to other people (i.e., comparing Person A’s progress to Person B’s). When assessing more than one goal like we do in the present study, this statistically means that we are simply aggregating the variable of interest across all goals, thereby losing the richness that comes with
examining multiple goals. However, at the within-person level, the analysis focuses on the *intrapersonal* variability comparing how much progress a person makes on their goals compared to their other goals (i.e., because goals are nested within each person, we can compare progress among Goal X, Goal Y, and Goal Z for Person A). While the majority of past research on goal pursuit has focused on the between-person level, recent research indicates that 80-95% of the variance in goal progress is at the within-person level (Holding et al., 2017; Milyavskaya & Inzlicht, 2017; Milyavskaya et al., 2015; Werner & Milyavskaya, 2017; Werner et al., 2016; Werner et al., 2018). Taking this statistic into consideration, it seems to be the case that researchers have been focusing on the wrong level of analysis, and if we want to truly understand the goal pursuit process, more works needs to be done at the within-person level.

**Methods**

**Participants**

Participants were 799 undergraduate psychology students who received extra course credit for their participation. Given the large number of constructs that we aimed to assess, we strived to collect as many participants as possible over the course of three academic semesters (i.e., we did not conduct any a priori power analyses). Additionally, given the expansive nature of our initial questionnaire (see the procedure below), we conveniently recruited from our university subject pool in order to further maximize our sample size.

As part of the data screening process, we employed the following exclusion criteria: duplicate responses (when possible, the case that was most complete was retained), completing the initial survey in less than 15-minutes and/or completing the
follow-up survey in less than 5-minutes, and a series of attention checks (i.e., failing two of three). Of the participants who completed the initial (T1) survey, there were 17 duplicate responses and 2 incomplete responses, 72 participants completed the survey in less than 15 minutes (indicating that they did not actually pay attention to the survey as this time is unrealistic), 1 participant was identified as not paying attention by the research assistant, and 26 participants failed at least two out of three attention checks. For the attention check, we embedded three\(^3\) items adapted from Maniaci and Rogge (2014)'s Attentive Responding Scale randomly throughout the survey, with the idea being that the items represent statements that have (more or less) a correct response. These items included “I don’t like getting speeding tickets,” “I enjoy receiving telemarketers’ calls,” and “I’d rather be hated than loved.” Because these items were embedded into existing scales with pre-determined Likert scale responses, we identified a custom “problematic” score for each item. For example, the item “I enjoy receiving telemarketer’s calls” had a 1 (not at all like me) to 5 (just like me) Likert scale, and so participants who responded with a 4 (like me) or 5 (just like me) were marked as failing the attention check. A full breakdown of the attention checks, as well as the full data screening protocol can be found in the appendices. Of the 799 participants, 639 passed our data screening protocol and were successfully matched on T1 and T2 surveys, resulting in a useable retention rate of approximately 80%. Participants in the final sample were 71% female, 51% Caucasian, 20% Asian, and were on average 21 years old ($M = 20.56$, $SD = 4.95$). Because participants were asked to list three goals each, this

\(^3\) We also included a fourth item, “My main interests are coin collecting and interpretive dancing.” However, due to the more subjective nature of this item (e.g., people who actually like dancing may score positively), it was not considered in the current attention check analyses.
translates to 1917 goals at the within-person level. The goals were predominately academic (52.75%) or health (19.54%) oriented, with all other goal types (e.g., relationships, hobbies, financial) making up less than 10% of all goals (ranging between 0.68% and 8.63%).

**Study Procedure**

Participants were recruited to participate in a study about their experiences when pursuing their goals. During the initial survey (T1), participants were asked to set three goals that they planned to attain over the next week, rate a series of characteristics for each of their goals (e.g., commitment, motivation), as well as complete an extensive battery of individual difference measures assessing a variety of personality (e.g., big five, perfectionism) and goal-related constructs (e.g., trait self-control, goal adjustment). At the end of the week (i.e., 7 days later), participants were contacted via email to participate in a brief follow-up survey (T2). Participants were reminded of their goals and were asked to rate how much progress they made on each of them. In order to obtain the current sample size, participants were recruited over the course of three academic semesters. During the first semester of data collection (Winter 2016), participants completed the initial survey online resulting in a 63% retention rate at the follow-up survey. In order to increase retention, participants in the remaining semesters (Fall 2016, Winter 2017) completed the initial survey in-lab, which increased retention to 86% and 89%, respectively. Additionally, the number of participants to fail attention checks was

---

4 There were some slight demographics differences between the online and in-lab samples. The online sample was slightly older ($M_{\text{online}} = 21.46$, $SD_{\text{online}} = 6.34$, $M_{\text{lab}} = 20.12$, $SD_{\text{lab}} = 4.12$, $t (758) = 3.50$, $p < .001$), were predominately second year students ($M_{\text{online}} = 2.02$, $SD_{\text{online}} = 1.07$, $M_{\text{lab}} = 1.64$, $SD_{\text{lab}} = 0.93$, $t (769) = 3.50$, $p < .001$), and had a slightly lower GPA ($M_{\text{online}} = 8.12$, $SD_{\text{online}} = 1.94$, $M_{\text{lab}} = 8.50$, $SD_{\text{lab}} = 2.13$, $t (756) = -2.36$, $p = .019$). However, there were no differences between the online ($M = 4.88$, $SD = 0.08$) and in-lab ($M = 4.75$, $SD = 1.82$) samples in the amount of progress people made on their goals, $t (1909) = 1.41$, $p = .158$. 
reduced when the study switched to in-lab (of the 26 attention check failures, 18 were from the online only sample).

**Measurement Selection**

The primary purpose of this study was to examine the many factors that contribute to goal progress over time, and so the first author conducted a literature review to identify some of the most prevalent constructs within the field. We strived to include as many constructs as possible, while at the same time trying to avoid overburdening participants and so we designed the initial survey to take 60 minutes or less. In total, participants completed 15 individual difference measures (14 of which are used in the present analyses) and seven goal-specific measures. A full list of all measures can be found in Table 2. For the individual difference measures, we opted to use the full measure for each construct whenever possible. Because we were conducting a longitudinal study and assessing multiple goals (and thus any goal-specific measures needed to be completed three times by each participant), many of these goal-specific measures consisted of single face-valid items. While this limits our ability to examine the validity of these items in the same rigorous way as the individual difference measures, we made sure to use items that have been used in past research.

**Goal Setting Task.** Consistent with previous research, participants were asked to list three personal goals that they planned to pursue over the following week, using the following instructions (e.g., Koestner et al., 2008): “Personal goals are projects and concerns that people think about, plan for, carry out, and sometimes (though not always) complete or succeed at. They may be more or less difficult to implement; require only a few or a complex sequence of steps; represent different areas of a person’s life; and be
more or less time consuming, attractive, or urgent. Please think of your three most important personal goals that you plan to pursue over this coming week.” Examples of goals listed by participants include “finish a school assignment,” “go to the gym at least twice,” and “eat healthy.”

**Goal Progress.** At the end of the week, participants were asked to indicate how much progress they made on each of their goals (e.g., Koestner et al., 2008; Milyavskaya et al., 2015; Werner et al., 2016; Werner & Milyavskaya, 2017). For each goal, participants rated three items (“I have made a lot of progress toward this goal,” “I feel like I am on track with my goal plan,” and “I feel like I have achieved this goal”), which were then averaged to create a measure of subjective goal progress. All ratings were made on a seven-point Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*).
Table 2. Complete list of constructs and corresponding measures.

<table>
<thead>
<tr>
<th>Construct</th>
<th>Sub-Constructs</th>
<th>Scale</th>
<th>Citation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>T1: Individual Difference Measures (Between-Person)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basic Psychological Needs</td>
<td>Autonomy satisfaction</td>
<td>Basic Psychological Need Satisfaction and Frustration Scale</td>
<td>Chen et al. (2015)</td>
</tr>
<tr>
<td></td>
<td>Competence satisfaction</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Relatedness satisfaction</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Autonomy frustration</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Competence frustration</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Relatedness frustration</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Openness</td>
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<tr>
<td></td>
<td>Conscientiousness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Big Five Personality</td>
<td>Extraversion</td>
<td>Big Five Inventory</td>
<td>John &amp; Srivastava (1999)</td>
</tr>
<tr>
<td></td>
<td>Agreeableness</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Neuroticism</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Behavioural Inhibition (Approach) and Activation (Avoidance)</td>
<td>BAS – Drive</td>
<td>BIS/BAS Scales</td>
<td>Carver and White (1994)</td>
</tr>
<tr>
<td></td>
<td>BAS – Fun Seeking</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>BAS – Reward Responsiveness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Motivation</td>
<td>Intrinsic</td>
<td>Global Motivation Scale</td>
<td>Pelletier and Dion (2007)</td>
</tr>
<tr>
<td></td>
<td>Integrated</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Identified</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Introjected</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Extrinsic</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Amotivated</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Goal Adjustment</td>
<td>Disengagement</td>
<td>Goal Adjustment Scale</td>
<td>Wrosch, Scheier, Miller, Schulz, and Carver (2003)</td>
</tr>
<tr>
<td></td>
<td>Re-engagement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implicit Theories</td>
<td>Fixed mindset</td>
<td>Mindset Questionnaire</td>
<td>Dweck (1999)</td>
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<td></td>
<td>Growth mindset</td>
<td></td>
<td></td>
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<tr>
<td>Perfectionism</td>
<td>Personal standards</td>
<td>Adapted from DEQ-SC6, revised-APS, FMPS-SC</td>
<td>Blatt, D’Afflitti, and Qinlan (1976); Frost et al. (1990); Slaney et al. (2001)</td>
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<tr>
<td></td>
<td>Self-critical</td>
<td></td>
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<tr>
<td>Regulatory Focus</td>
<td>Promotion orientation</td>
<td>General Regulatory Focus Measure</td>
<td>Lockwood, Jordan, &amp; Kunda (2002)</td>
</tr>
<tr>
<td></td>
<td>Prevention orientation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regulatory Mode</td>
<td>Assessment</td>
<td>Regulatory Mode Questionnaire</td>
<td>Kruglanski et al. (2000)</td>
</tr>
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<td></td>
<td>Locomotion</td>
<td></td>
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<tr>
<td>Rumination-Reflection</td>
<td>Rumination</td>
<td>Rumination-Reflection Questionnaire</td>
<td>Trapnell &amp; Campbell (1999)</td>
</tr>
<tr>
<td></td>
<td>Reflection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grit</td>
<td>Consistency of interest</td>
<td>Short Grit Scale</td>
<td>Duckworth &amp; Quinn (2009)</td>
</tr>
<tr>
<td></td>
<td>Perseverance of effort</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 2. *List of constructs and corresponding measures – continued*

<table>
<thead>
<tr>
<th>Construct</th>
<th>Sub-Constructs</th>
<th>Scale</th>
<th>Citation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>T1: Goal-Specific Measures (Within-Person)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commitment</td>
<td>--</td>
<td>Face-valid item</td>
<td>e.g., Milyavskaya et al. (2015)</td>
</tr>
<tr>
<td>Difficulty</td>
<td>--</td>
<td>Face-valid item</td>
<td>e.g., Werner et al. (2016)</td>
</tr>
<tr>
<td>Implementation Intentions</td>
<td>--</td>
<td>Face-valid item</td>
<td>e.g., Werner, Sjástad, Milyavskaya, &amp; Hofmann (in-prep)</td>
</tr>
<tr>
<td>Motivation (Reasons)</td>
<td>Intrinsic</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Integrated</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Identified</td>
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<tr>
<td></td>
<td>Introjected</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Extrinsic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motivation (Aims)</td>
<td>Approach</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Avoidance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Content</td>
<td>Intrinsic</td>
<td>Adapted from the</td>
<td>Sheldon &amp; Kasser (1995)</td>
</tr>
<tr>
<td></td>
<td>Extrinsic</td>
<td>Aspirations Index</td>
<td></td>
</tr>
<tr>
<td>Self-Disccrepancy</td>
<td>Ideal</td>
<td>Adapted from the</td>
<td>Higgins, Shah, and Friedman (1997)</td>
</tr>
<tr>
<td></td>
<td>Ought</td>
<td>Self-Discrepancy Measurement</td>
<td></td>
</tr>
<tr>
<td><strong>T2: Goal-Specific Outcome Measures (Within-Person)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Progress</td>
<td>--</td>
<td>--</td>
<td>Koestner et al. (2002)</td>
</tr>
</tbody>
</table>

*Note.* For the between-person measures, the citations refer to the source of the scale validation. However, since almost all of the within-person measures are a single face-valid item (or a few items) that were designed for longitudinal research, the citations refer to examples where these items have been used in previous studies.
Results

Analytic Strategy

For the present study, we adopted an exploratory approach to examine two main objectives: (1) to determine the measurement properties for all individual difference measures and the potential for overlap between constructs, and (2) determine the factors that best predict goal progress over time. With respect to our first objective, we focused on assessing the structural validity and internal consistency for each of the individual difference measures, as well as examined the potential for overlapping constructs (i.e., examining the potential for jangle fallacies within the goal pursuit literature). For our second objective, we then used Bayesian model comparison in order to determine which constructs (including latent variables for the overlapping constructs identified in our first objective) predicted goal progress over time.

Data Preparation

Because we collected data in three different waves, we made a few modifications that affected some of the subsequent analyses. Namely, we adjusted three scales that were used in the first wave (that was collected online only). We initially used the Ten Item Personality Inventory (Gosling, Rentfrow, & Swann, 2003) as a measure of the Big Five, but after switching to having the initial session in-lab, we decided to use a more complete measure and therefore included the Big Five Inventory (John & Srivastava, 1999). For perfectionism, we initially used the Frost Multi-Dimensional Perfectionism Scale (Frost, Marten, Lahart, & Rosenblate, 1990), however recent research has developed a more optimal scale patchworking together the best components of the most commonly used measures within that field (e.g., Levine, Werner, Capaldi, & Milyavskaya, 2017). Thus,
we included this new measure in subsequent samples. Finally, we initially used the Global Motivation Scale by Guay, Mageau, and Vallerand (2003), which includes many different sub-facets of intrinsic motivation alongside the traditional motivation continuum put forth by self-determination theory (e.g., Deci & Ryan, 2000; Ryan & Deci, 2000). Since we were interested in the more classic types of motivation used within self-determination theory, we switched to the Global Motivation Scale by Pelletier and Dion (2007), which only focuses on the main six types of motivation orientations. Because of these modifications between the first and subsequent samples, we decided to remove the responses for each of the three original scales from the first sample and instead only focus on the modified scales in the present analyses (i.e., the data was treated as missing for those in the first sample). The sample size for each measure can be found in Table 3.

Aside from the aforementioned modification, we initially aimed to incorporate the original measures when possible, including the original response scale. Because of this, most of the measures were on different response scales ranging from 1 to 4 all the way to 1 to 9. For the first phase of the analysis (i.e., examining structural validity of each individual measure via confirmatory factor analysis), we used the original response scale. However, when running the exploratory factor analyses at the construct level (i.e., on the aggregate scores) and for subsequent model testing, we conducted a linear transformation so that all measures were on the same response scale. The majority of scales were on a 1 to 5 Likert scale and so this is what we used as a reference point. To conduct the linear transformation from broader response scales (e.g., 1-6 or 1-9), we used the following calculation: $(5-1)(x_1 - 1)/(x_2 - 1) + 1$ where $x_1$ represents the original score and $x_2$ represents the upper limit of the original response scale (e.g., for a scale that was originally 1-6, the
following equation would be the transformation for an original response of 2: \((5-1)*(2-1)/(6-1)+1 = 1.8\).

**Measurement Properties of All Individual Difference Scales**

Similar to Hussey and Hughes (2018), we followed recent recommendations on best measurement practices (Flake, Pek, & Hehman, 2017; Flake & Fried, 2019; Revelle & Condon, 2018) in order to calculate the descriptive statistics and various metrics of structural validity for each of the 14 individual difference measures. As shown in Table 3, we first calculated the descriptive statistics (mean, standard deviation, median, skewness, kurtosis) for each scale (or subscales), as well as both Cronbach’s alpha (\(\alpha\)) and MacDonald’s omega (\(\omega\)). These analyses were conducted using JASP v.0.9.0.1 (JASP Team, 2019). In Table 4, we then report the results of confirmatory factor analyses for each of the individual measures, including various indicators as evidence of structural validity. These analyses were conducted using MPlus v.8.2 (Muthén & Muthén, 2018).

**Internal Consistency.** Before examining the uniqueness of potentially similar constructs, we first examined the basic structural properties of all scales as they were proposed at the time of their conception. Consistent with recommendations of best measurement practices, we first examined the descriptive statistics, as well as both Cronbach’s \(\alpha\) and MacDonald’s \(\omega\) as measures of internal consistency. Cronbach’s \(\alpha\) is a measure of reliability that describes the extent to which the items within a given scale represent the same construct (Cronbach, 1951; Tavakol & Dennick, 2011), which can also be used to assess the amount of measurement error within a given scale (i.e., the higher the \(\alpha\), the less measurement error a scale has)\(^5\). However, even though \(\alpha\) is among

\[^5\text{Measurement error = 1 – } \alpha^2\]
the most prevalently reported and most conveniently available measurement statistic (Flake et al., 2017), it has been subjected to a lot of criticism (Flake et al., 2017; Green, Lissitz, & Mulaik, 1977; Schmitt, 1996; Sijtsma, 2009; Yanyun Yang & Green, 2011) and is often misused within the literature in psychology and the social sciences more broadly (Cho & Kim, 2015; Flake et al., 2017; Schmitt, 1996; Sijtsma, 2009; Green & Yang, 2009). Common sources of misuse stem from \( \alpha \) being grounded in the tau equivalent model, which assumes that each item contributes equally to the underlying factor. Thus, if a factor analysis reveals that multiple factors underlie the items on the scale of interest, or even if a scale has too few items, the assumption of tau-equivalence has been violated and therefore underestimates reliability (Deng & Chan, 2017; Sijtsma, 2009). Taking these issues into consideration, we also report MacDonald’s \( \omega \), which is a practical alternative to estimating measurement reliability without having the constraints of needing tau-equivalence (Deng & Chan, 2017). Consistent with standard reporting practices, we employed a threshold of \( \geq .70 \) for both \( \alpha \) and \( \omega \) (e.g., Hussey & Hughes, 2018).

As indicated in Table 3, both \( \alpha \) and \( \omega \) were functionally equivalent with 36 of 38 constructs meeting the minimum threshold of .70. The two constructs that did not meet this criterion – the Behavioural Activation – Fun Seeking subscale (4 items) of the BIS/BAS scales and the Intrinsic Motivation subscale (3 items) of the Global Motivation Scale – had \( \alpha \) and \( \omega \) values of .67-.69. For the Behavioural Activation – Fun Seeking subscale, examining the individual items revealed that removing any of the four items would lower both \( \alpha \) (.56-.65) and \( \omega \) (.56-.65). Similar results were found for the Intrinsic Motivation subscale, as examining the individual items revealed that removing any of the
three items would lower both $\alpha (.59-.63)$ and $\omega (.59-.63)$. In both of these cases, we opted to retain the subscales as they were originally intended.
Table 3. *Descriptive statistics and reliability information for all 14 measures.*

<table>
<thead>
<tr>
<th>Scale</th>
<th>Total n</th>
<th>Items</th>
<th>Scale α</th>
<th>ω</th>
<th>M</th>
<th>SD</th>
<th>Median</th>
<th>Skew</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Psych. Need Satisfaction and Frustration Scale</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Autonomy Satisfaction</td>
<td>777</td>
<td>4</td>
<td>.800</td>
<td>.803</td>
<td>3.81</td>
<td>0.73</td>
<td>4.00</td>
<td>-0.52</td>
<td>0.39</td>
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<tr>
<td>Competence Satisfaction</td>
<td>777</td>
<td>4</td>
<td>.864</td>
<td>.865</td>
<td>3.81</td>
<td>0.76</td>
<td>4.00</td>
<td>-0.74</td>
<td>1.19</td>
</tr>
<tr>
<td>Relatedness Satisfaction</td>
<td>777</td>
<td>4</td>
<td>.865</td>
<td>.869</td>
<td>4.09</td>
<td>0.75</td>
<td>4.00</td>
<td>-0.83</td>
<td>0.78</td>
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<tr>
<td>Autonomy Frustration</td>
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<td>4</td>
<td>.820</td>
<td>.821</td>
<td>2.85</td>
<td>0.92</td>
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<td>0.14</td>
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<tr>
<td>Competence Frustration</td>
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<td>4</td>
<td>.867</td>
<td>.868</td>
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<td>1.02</td>
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<td>4</td>
<td>.830</td>
<td>.831</td>
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<td>0.90</td>
<td>2.00</td>
<td>0.78</td>
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<td>Big Five Inventory</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Openness</td>
<td>528</td>
<td>10</td>
<td>.762</td>
<td>.771</td>
<td>3.54</td>
<td>0.61</td>
<td>3.50</td>
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<td>-0.19</td>
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<tr>
<td>Conscientiousness</td>
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<td>.767</td>
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<td>0.62</td>
<td>3.44</td>
<td>0.00</td>
<td>-0.16</td>
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<tr>
<td>Extraversion</td>
<td>528</td>
<td>8</td>
<td>.837</td>
<td>.841</td>
<td>3.17</td>
<td>0.81</td>
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<td>Agreeableness</td>
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<td>.758</td>
<td>.759</td>
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<td>Neuroticism</td>
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<td>8</td>
<td>.850</td>
<td>.852</td>
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<td>Behavioural Inhibition System</td>
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<td>.801</td>
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<td>.879</td>
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<td>.676</td>
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<td>1.11</td>
<td>5.00</td>
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<td>0.16</td>
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<td>Integrated</td>
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<td>.759</td>
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<td>1.17</td>
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<td>-0.36</td>
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<tr>
<td>Identified</td>
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<td>.766</td>
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<td>.721</td>
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<td>-0.26</td>
</tr>
<tr>
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<td>528</td>
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<td>3.00</td>
<td>0.54</td>
<td>-0.34</td>
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Table 3. Descriptive statistics and reliability information for all 14 measures – continued.

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<th>Scale</th>
<th>Total n</th>
<th>Items</th>
<th>Scale</th>
<th>α</th>
<th>ω</th>
<th>M</th>
<th>SD</th>
<th>Median</th>
<th>Skew</th>
<th>Kurtosis</th>
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<tbody>
<tr>
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<td>10</td>
<td>4</td>
<td>1-5</td>
<td>.732</td>
<td>.736</td>
<td>2.65</td>
<td>0.79</td>
<td>2.50</td>
<td>0.11</td>
<td>-0.41</td>
</tr>
<tr>
<td>Disengagement</td>
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<td>1-5</td>
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<td>1-7</td>
<td>.732</td>
<td>.736</td>
<td>2.65</td>
<td>0.79</td>
<td>2.50</td>
<td>0.11</td>
<td>-0.41</td>
</tr>
<tr>
<td>Fixed vs. Growth Mindset Questionnaire</td>
<td>16</td>
<td>8</td>
<td>1-6</td>
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<td>.890</td>
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<td>1.00</td>
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<td>.896</td>
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<td>0.89</td>
<td>4.13</td>
<td>-0.07</td>
<td>0.17</td>
</tr>
<tr>
<td>Growth Mindset</td>
<td>771</td>
<td>8</td>
<td>1-6</td>
<td>.895</td>
<td>.896</td>
<td>4.13</td>
<td>0.89</td>
<td>4.13</td>
<td>-0.07</td>
<td>0.17</td>
</tr>
<tr>
<td>Mindfulness Attention and Awareness Scale</td>
<td>774</td>
<td>15</td>
<td>1-7</td>
<td>.732</td>
<td>.736</td>
<td>2.65</td>
<td>0.79</td>
<td>2.50</td>
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<td>-0.41</td>
</tr>
<tr>
<td>Fixed vs. Growth Mindset Questionnaire</td>
<td>16</td>
<td>8</td>
<td>1-6</td>
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<td>.890</td>
<td>2.95</td>
<td>1.00</td>
<td>2.88</td>
<td>0.23</td>
<td>-0.20</td>
</tr>
<tr>
<td>Fixed Mindset</td>
<td>770</td>
<td>8</td>
<td>1-6</td>
<td>.895</td>
<td>.896</td>
<td>4.13</td>
<td>0.89</td>
<td>4.13</td>
<td>-0.07</td>
<td>0.17</td>
</tr>
<tr>
<td>Growth Mindset</td>
<td>771</td>
<td>8</td>
<td>1-6</td>
<td>.895</td>
<td>.896</td>
<td>4.13</td>
<td>0.89</td>
<td>4.13</td>
<td>-0.07</td>
<td>0.17</td>
</tr>
<tr>
<td>Perfectionism Questionnaire</td>
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<td>1-7</td>
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<td>.911</td>
<td>5.26</td>
<td>1.12</td>
<td>5.34</td>
<td>-0.59</td>
<td>0.21</td>
</tr>
<tr>
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<td>1-7</td>
<td>.909</td>
<td>.911</td>
<td>5.26</td>
<td>1.12</td>
<td>5.34</td>
<td>-0.59</td>
<td>0.21</td>
</tr>
<tr>
<td>Self-Critical Perfectionism</td>
<td>526</td>
<td>15</td>
<td>1-7</td>
<td>.911</td>
<td>.912</td>
<td>4.29</td>
<td>1.19</td>
<td>4.30</td>
<td>-0.01</td>
<td>-0.51</td>
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<tr>
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<td>.871</td>
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<td>1.12</td>
<td>7.44</td>
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<tr>
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<td>1-9</td>
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<td>.871</td>
<td>7.34</td>
<td>1.12</td>
<td>7.44</td>
<td>-0.68</td>
<td>0.30</td>
</tr>
<tr>
<td>Prevention Orientation</td>
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<td>9</td>
<td>1-9</td>
<td>.871</td>
<td>.871</td>
<td>7.34</td>
<td>1.12</td>
<td>7.44</td>
<td>-0.68</td>
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<tr>
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<td>0.64</td>
<td>4.08</td>
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<td>0.10</td>
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<tr>
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<td>1-6</td>
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<td>.743</td>
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<td>0.64</td>
<td>4.08</td>
<td>-0.07</td>
<td>0.10</td>
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<tr>
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<td>1-6</td>
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<td>.743</td>
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<td>0.64</td>
<td>4.08</td>
<td>-0.07</td>
<td>0.10</td>
</tr>
<tr>
<td>Rumination-Reflection Questionnaire</td>
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<td>.896</td>
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<td>3.67</td>
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<td>Rumination</td>
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<td>1-5</td>
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<td>.889</td>
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<td>0.72</td>
<td>3.25</td>
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<td>0.03</td>
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<td>12</td>
<td>1-5</td>
<td>.888</td>
<td>.889</td>
<td>3.33</td>
<td>0.72</td>
<td>3.25</td>
<td>0.01</td>
<td>0.03</td>
</tr>
<tr>
<td>Short Grit Scale</td>
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<td>1-5</td>
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<td>.716</td>
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<tr>
<td>Consistency of Interest</td>
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<td>1-5</td>
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<td>.716</td>
<td>2.67</td>
<td>0.75</td>
<td>2.75</td>
<td>0.20</td>
<td>-0.13</td>
</tr>
<tr>
<td>Perseverance of Effort</td>
<td>774</td>
<td>4</td>
<td>1-5</td>
<td>.713</td>
<td>.716</td>
<td>2.67</td>
<td>0.75</td>
<td>2.75</td>
<td>0.20</td>
<td>-0.13</td>
</tr>
</tbody>
</table>

Note. Cronbach’s alpha is standardized. Scales that have a total n between 526-528 had a different version of this scale in the first (online) sample. For all analyses presented herein, we only use the measures that are included in this table.
Table 4. *Structural validity of 14 individual difference measures.*

<table>
<thead>
<tr>
<th>Scale</th>
<th>$\chi^2$</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
<th>90% CI Lower</th>
<th>90% CI Upper</th>
<th>SRMR</th>
<th>Fit</th>
</tr>
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<tbody>
<tr>
<td>Basic Psych. Need Satisfaction and Frustration Scale</td>
<td>626.945</td>
<td>0.959</td>
<td>0.952</td>
<td>0.046</td>
<td>0.042</td>
<td>0.050</td>
<td>0.038</td>
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<td>Big Five Inventory</td>
<td>3318.391</td>
<td>0.675</td>
<td>0.655</td>
<td>0.072</td>
<td>0.069</td>
<td>0.074</td>
<td>0.087</td>
<td>Mixed</td>
</tr>
<tr>
<td>BIS/BAS Scale</td>
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<td>0.840</td>
<td>0.068</td>
<td>0.063</td>
<td>0.073</td>
<td>0.071</td>
<td>Mixed</td>
</tr>
<tr>
<td>Brief Self-Control Scale</td>
<td>677.438</td>
<td>0.749</td>
<td>0.699</td>
<td>0.110</td>
<td>0.103</td>
<td>0.118</td>
<td>0.069</td>
<td>Mixed</td>
</tr>
<tr>
<td>General Self-Efficacy</td>
<td>268.089</td>
<td>0.922</td>
<td>0.900</td>
<td>0.093</td>
<td>0.083</td>
<td>0.103</td>
<td>0.042</td>
<td>Mixed</td>
</tr>
<tr>
<td>Global Motivation Scale</td>
<td>734.001</td>
<td>0.838</td>
<td>0.794</td>
<td>0.098</td>
<td>0.092</td>
<td>0.105</td>
<td>0.071</td>
<td>Mixed</td>
</tr>
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<td>0.899</td>
<td>0.867</td>
<td>0.098</td>
<td>0.088</td>
<td>0.109</td>
<td>0.068</td>
<td>Mixed</td>
</tr>
<tr>
<td>Mindfulness Attention and Awareness Scale</td>
<td>537.736</td>
<td>0.883</td>
<td>0.864</td>
<td>0.080</td>
<td>0.074</td>
<td>0.087</td>
<td>0.047</td>
<td>Mixed</td>
</tr>
<tr>
<td>Fixed vs. Growth Mindset Questionnaire</td>
<td>2530.805</td>
<td>0.699</td>
<td>0.650</td>
<td>0.175</td>
<td>0.169</td>
<td>0.181</td>
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</tr>
<tr>
<td>Perfectionism</td>
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<td>0.604</td>
<td>0.555</td>
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<td>0.140</td>
<td>0.149</td>
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<td>Regulatory Focus Questionnaire</td>
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<td>0.773</td>
<td>0.101</td>
<td>0.096</td>
<td>0.107</td>
<td>0.106</td>
<td>Poor</td>
</tr>
<tr>
<td>Regulatory Mode Questionnaire</td>
<td>3419.230</td>
<td>0.495</td>
<td>0.464</td>
<td>0.097</td>
<td>0.094</td>
<td>0.100</td>
<td>0.111</td>
<td>Poor</td>
</tr>
<tr>
<td>Rumination-Reflection Questionnaire</td>
<td>1821.286</td>
<td>0.809</td>
<td>0.790</td>
<td>0.090</td>
<td>0.086</td>
<td>0.094</td>
<td>0.073</td>
<td>Mixed</td>
</tr>
<tr>
<td>Short Grit Scale</td>
<td>106.608</td>
<td>0.920</td>
<td>0.875</td>
<td>0.080</td>
<td>0.066</td>
<td>0.095</td>
<td>0.048</td>
<td>Mixed</td>
</tr>
</tbody>
</table>

*Note.* Good fit is characterized by meeting the criteria for all indices, Mixed fit is characterized by meeting at least one of the criteria, and Poor fit is characterized by not meeting either of the aforementioned criteria.
**Structural Validity.** Since reliability is a necessary, but not sufficient measure of validity (Flake et al., 2017), we next evaluated evidence for the structural validity of all 14 individual difference measures using CFA. As suggested by Kline (2011), several fit indices were used to evaluate model fit, including the comparative fit index (CFI), Tucker Lewis Index (TLI), root mean squared error (RMSEA), chi-square, and the standardized root mean square residual (SRMR). More specifically, RMSEA (along with its 90% confidence interval) is an index of “badness-of-fit” (Kline, 2011, p. 204) based on the non-centrality parameter (i.e., the higher the score, the worse the model performed). Both CFI and TLI are measures that compare the fit of the proposed model with the fit of the null model, but CFI is less sensitive to sample size (although both measures are often highly correlated; Kenny, 2015). Chi-square measures the overall model fit as a function of calculating the discrepancy between the sample and fitted covariance matrices. While chi-square can serve as a general measure of “good fit,” this index is almost always statistically significant in large samples (e.g., n > 400; Kenny; 2015). As such, even though we still report this index to gain a more complete measurement profile for each scale, it was not included in any decisions related to how much evidence was in favour or against the structural validity of each scale. Finally, SRMR calculates the square root of the difference between the residuals of the sample covariance matrix and the hypothesized model. Drawing from the recommendations of Kline (2011) and Hooper, Coughlan, and Mullen (2008), we employed the following thresholds: CFI > .90, TLI > .95, RMSEA < .08, and SRMR < .08. Scales that satisfied all four criteria (CFI, TLI, RMSEA, and SRMR) were labeled as having “good” fit, scales that satisfied the criteria for at least one index were labeled as having “mixed” fit, and scales that did not any
criteria were labeled as having “poor” fit. As shown in Table 4, results from the CFA analyses indicate that the majority of measures (9 of 14) had “mixed” evidence regarding model fit, with only one measure having sufficient evidence indicating “good” fit. Four measures did not meet any of the criteria and were thus classified as having “poor” fit.

**Examining the Jingle-Jangle of Goal Pursuit**

In order to identify clusters of constructs that have the potential for significant overlap, we conducted an exploratory factor analysis (EFA) on the aggregate scores for all constructs (the 14 measures breakdown into 38 constructs in total). To ensure that we identified reputable clusters of constructs, we used a split-half approach where we randomly divided the entire sample into two subsamples (n₁ = 400, n₂ = 399). We then ran a separate EFA on each subsample using principle axis factoring with a direct oblimin rotation to account for potential correlations between factors. Because we were interested in using EFA to identify potentially overlapping constructs, below we only describe clusters where constructs from different scales loaded onto the same factor. Additionally, we only retained constructs within a cluster that demonstrated a loading of .60 or higher and that replicated in both samples. Because there may be other reasons why aggregated scale scores load together on a single factor (e.g., items having similar wording), we employed a more stringent loading cut-off (rather than the field recommendation or “rule of thumb” of .40) in order to identify constructs that are more highly similar.

Results in Table 5 show that three clusters (factors) of overlapping constructs emerged across both samples. Results for the complete EFAs in both subsamples can be

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6 It has been argued that having decisions regarding model fit should be made with at least two criteria, specifically including SRMR and at least one from CFI, TLI, and/or RMSEA (Bentler, 2007; Hu & Bentler, 1999). However, this argument has not been fully supported within the literature (Fan & Sivo, 2005; Marsh, Hau, & Wen, 2004).
found in the appendices. From a theoretical standpoint, the first factor is comprised of a set of variables related to more negative cognitive thought processes (e.g., rumination, being overly cautious or critical when making decisions, trying to avoid mistakes). The second factor contains variables related to more positive self-regulation or “go-getter” type traits (e.g., being able to overcome temptations to attain one’s goals, perseverance). The third factor is comprised of two variables related to openness to experiences (e.g., being open to new experiences, engaging in reflection about one’s own actions). Taking into account these overlapping constructs, in subsequent analyses we created a latent variable for each of these clusters.
Table 5. Results from an aggregated EFA demonstrating overlapping constructs

<table>
<thead>
<tr>
<th>Construct</th>
<th>Sample 1</th>
<th>Sample 2</th>
</tr>
</thead>
<tbody>
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<td><strong>Factor 1: Negative Thought Processes</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIS</td>
<td>.74</td>
<td>.82</td>
</tr>
<tr>
<td>Rumination</td>
<td>.75</td>
<td>.77</td>
</tr>
<tr>
<td>Neuroticism</td>
<td>.74</td>
<td>.69</td>
</tr>
<tr>
<td>Self-Critical Perfectionism</td>
<td>.79</td>
<td>.59</td>
</tr>
<tr>
<td>Prevention Orientation</td>
<td>.69</td>
<td>.64</td>
</tr>
<tr>
<td>Assessment</td>
<td>.63</td>
<td>.58</td>
</tr>
<tr>
<td>Eigenvalues</td>
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<td>% variance</td>
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<td>20.51%</td>
</tr>
<tr>
<td><strong>Factor 2: Positive Self-Regulation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>.76</td>
<td>.83</td>
</tr>
<tr>
<td>Trait Self-Control</td>
<td>.62</td>
<td>.76</td>
</tr>
<tr>
<td>Grit – Perseverance of Effort</td>
<td>.60</td>
<td>.64</td>
</tr>
<tr>
<td>Locomotion</td>
<td>.60</td>
<td>.60</td>
</tr>
<tr>
<td>Eigenvalues</td>
<td>5.25</td>
<td>5.54</td>
</tr>
<tr>
<td>% variance</td>
<td>13.82%</td>
<td>14.57%</td>
</tr>
<tr>
<td><strong>Factor 3: Openness to Experiences</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Openness</td>
<td>.74</td>
<td>.69</td>
</tr>
<tr>
<td>Reflection</td>
<td>.68</td>
<td>.70</td>
</tr>
<tr>
<td>Eigenvalues</td>
<td>1.40</td>
<td>1.38</td>
</tr>
<tr>
<td>% variance</td>
<td>3.68%</td>
<td>3.64%</td>
</tr>
</tbody>
</table>

*Note.* While the assessment construct in Factor 1 is below our suggested cut-off of .60, because it met the cut-off in the first sample and theoretically fits with the other constructs, we retained the construct even though it fell just below our suggested criteria in the replication sample.
Examining the Factors that Best Predict Goal Progress: Variable Selection Using Bayesian Model Comparison

For this final phase of the analysis, we were interested in examining the extent to which the many individual difference and goal-specific constructs actually predict goal progress. To achieve this objective, we conducted three sets of analyses using Bayesian model comparison. First, we examined the goal-specific constructs at the within-person level. Then, we examined both the goal-specific constructs and the individual difference measures at the between-person level.

Goal-Specific Characteristics: Within-Person Analyses. Since each participant listed three goals, we used Mplus version 8.2 (Muthén & Muthén, 2018) to conduct multilevel analyses with goals nested within-person. Multilevel analyses allow us to account for the correlation among observations within a cluster (in this case, goals are clustered or “nested” within a person), and the intraclass correlation (ICC) represents the proportion of total variance that is attributed to the between-person level (i.e., attributed to differences between individuals), with the remaining variance being attributed to the within-person level (i.e., attributed to differences among an individual’s own goals) and error. In order to obtain the ICCs for all goal-specific characteristics and goal progress (i.e., all variables assessed for each goal at the within-person level), we tested a series of unconditional (i.e., intercept-only) models. All items were treated as continuous, and full information maximum likelihood (FIML) estimation were used to handle missing data (Enders & Bandalos, 2001). Descriptive statistics (mean, standard deviations, and ICCs) can be found in Table 6 and the correlations among all goal-specific characteristics in Table 7. Consistent with previous research, results indicate that the majority of the
variance for goal progress is at the within-person level (80%), highlighting the importance of examining goal-specific predictors of successful goal progress (see Milyavskaya & Werner, 2018). Similarly, the variance for all other goal characteristics range between 48-80% at the within-person level.

In an attempt to refine the number of goal characteristics and only retain those that best predict goal progress, we conducted a series of multilevel models where we selectively removed constructs that did not predict goal progress. Then, we used Bayesian model comparison in order to determine whether the removal of a given construct improved the overall model. Drawing from (Wagenmakers, 2007), we used the following formula to calculate a Bayes factor (BF$_{01}$) for each comparison between models

\[ BF_{01} \approx \frac{\text{Pr}_{\text{BIC}}(D \mid H_0)}{\text{Pr}_{\text{BIC}}(D \mid H_1)} = \exp(\frac{\Delta \text{BIC}_{10}}{2}), \]

where \( \Delta \text{BIC}_{10} = \text{BIC}_{H_1} - \text{BIC}_{H_0} \). This BIC approximation of the Bayes factor represents the ratio of the prior predictive probabilities Wagenmakers (2007), or the probability of contrasting the likelihood of the data under both the more complex and refined models. When comparing Models 1 and 0 (where H1 is the original model and H0 is the more parsimonious model), \( 3 < BF_{01} < 10 \) represents “moderate” evidence in favour of the more parsimonious model and \( BF_{01} \geq 10 \) represents “strong” evidence (Jeffreys, 1961; Lee & Wagenmakers, 2013). For example, a BF$_{01}$ of 100 indicates that the simpler model predicts the observed data 100 times better than the original model.

For the initial model, we examined whether all 14 constructs predicted goal progress at both the between and within-person levels, while also controlling for the correlations among all constructs (see Figure 1a). At each subsequent model, we removed
one construct at a time from the within-person model\textsuperscript{7}, which was determined by identifying the lowest coefficient at the within-person level and constraining it to 0. We repeated this process until the model comparison results did not provide sufficient evidence in favour of the more parsimonious model (i.e., there was not strong enough evidence in favour of the more parsimonious model). More concretely, the final model was reached once removing a variable resulted in $BF_{01} < 10$. As indicated in Table 8 and in Figure 1b, we were able to remove 6 of 14 goal characteristics, leaving 8 constructs to be considered in the final model to be merged with the individual difference measures (commitment, difficulty, implementation intentions, integrated motivation, intrinsic motivation, extrinsic goal content, ideal self, ought self). The results for this model are represented in Figure 2.

\footnote{While the current series of analyses focused on the within-person portion of the model, we also modeled the between-person portion to control for the variance at both levels. In the event that a construct was “removed” from the within-person model, it was retained at the between-person level (see subsequent analyses on model comparison at the between-person level for the goal-specific characteristics).}
Table 6. Descriptive statistics and intraclass correlations (ICCs) for all goal-specific variables

<table>
<thead>
<tr>
<th>Construct</th>
<th>(^a)Total n</th>
<th>Scale</th>
<th>Mean</th>
<th>SD</th>
<th>ICC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commitment</td>
<td>2366</td>
<td>1-7</td>
<td>5.92</td>
<td>1.07</td>
<td>.361</td>
</tr>
<tr>
<td>Difficulty</td>
<td>2362</td>
<td>1-7</td>
<td>4.29</td>
<td>1.86</td>
<td>.294</td>
</tr>
<tr>
<td>Implementation Intentions</td>
<td>2362</td>
<td>1-7</td>
<td>5.07</td>
<td>1.53</td>
<td>.388</td>
</tr>
<tr>
<td>Extrinsic Motivation</td>
<td>2365</td>
<td>1-7</td>
<td>2.88</td>
<td>1.97</td>
<td>.296</td>
</tr>
<tr>
<td>Introjected Motivation</td>
<td>2365</td>
<td>1-7</td>
<td>4.19</td>
<td>2.05</td>
<td>.385</td>
</tr>
<tr>
<td>Identified Motivation</td>
<td>2362</td>
<td>1-7</td>
<td>5.57</td>
<td>1.57</td>
<td>.300</td>
</tr>
<tr>
<td>Integrated Motivation</td>
<td>2364</td>
<td>1-7</td>
<td>4.27</td>
<td>2.02</td>
<td>.376</td>
</tr>
<tr>
<td>Intrinsic Motivation</td>
<td>2364</td>
<td>1-7</td>
<td>3.98</td>
<td>2.17</td>
<td>.273</td>
</tr>
<tr>
<td>Approach Motivation</td>
<td>2363</td>
<td>1-7</td>
<td>5.74</td>
<td>1.62</td>
<td>.278</td>
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<tr>
<td>Avoidance Motivation</td>
<td>2364</td>
<td>1-7</td>
<td>5.12</td>
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</tr>
<tr>
<td>Intrinsic Goal Content</td>
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<td>1-7</td>
<td>4.14</td>
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<td>.455</td>
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<tr>
<td>Extrinsic Goal Content</td>
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<td>1-7</td>
<td>3.34</td>
<td>1.54</td>
<td>.523</td>
</tr>
<tr>
<td>Ideal Self</td>
<td>2366</td>
<td>-6 to 6</td>
<td>-0.63</td>
<td>1.63</td>
<td>.297</td>
</tr>
<tr>
<td>Ought Self</td>
<td>2365</td>
<td>-6 to 6</td>
<td>-0.19</td>
<td>1.34</td>
<td>.200</td>
</tr>
<tr>
<td>Progress</td>
<td>1911</td>
<td>1-7</td>
<td>4.79</td>
<td>1.82</td>
<td>.197</td>
</tr>
</tbody>
</table>

Note. ICC represents the proportion of variance that is at the between-person level, with 1 – ICC representing the proportion of variance at the within-person variance + error. Ideal and ought self were initially on a 1-7 scale, but a composite was computed by subtracting the actual score from both the ideal self and the ought self (i.e., to represent the extent to which the goal is discrepant with the self).

\(^a\)n = the number of goals
Table 7. Correlations among goal-specific characteristics at the within-person level.

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<thead>
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<th>1</th>
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<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
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<tbody>
<tr>
<td>1. Commitment</td>
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<tr>
<td>2. Difficulty</td>
<td>-.14</td>
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<tr>
<td>3. Implementation Intentions</td>
<td>.52</td>
<td>.09</td>
<td></td>
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<tr>
<td>4. Extrinsic Motivation</td>
<td>-.10</td>
<td>.06</td>
<td>.04</td>
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<td></td>
</tr>
<tr>
<td>5. Introjected Motivation</td>
<td>.06</td>
<td>.17</td>
<td>.15</td>
<td>.52</td>
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<tr>
<td>6. Identified Motivation</td>
<td>.59</td>
<td>.19</td>
<td>.45</td>
<td>-.04</td>
<td>.16</td>
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<tr>
<td>7. Integrated Motivation</td>
<td>.29</td>
<td>.19</td>
<td>.38</td>
<td>.02</td>
<td>.05</td>
<td>.62</td>
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</tr>
<tr>
<td>8. Intrinsic Motivation</td>
<td>.29</td>
<td>.19</td>
<td>.33</td>
<td>-.00</td>
<td>-.11</td>
<td>.54</td>
<td>.76</td>
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<tr>
<td>9. Approach Motivation</td>
<td>.50</td>
<td>.15</td>
<td>.47</td>
<td>.02</td>
<td>.25</td>
<td>.64</td>
<td>.49</td>
<td>.41</td>
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</tr>
<tr>
<td>10. Avoidance Motivation</td>
<td>.13</td>
<td>.18</td>
<td>.18</td>
<td>.26</td>
<td>.69</td>
<td>.26</td>
<td>.03</td>
<td>-.08</td>
<td>.41</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>11. Intrinsic Goal Content</td>
<td>.16</td>
<td>.27</td>
<td>.31</td>
<td>.07</td>
<td>.05</td>
<td>.52</td>
<td>.67</td>
<td>.73</td>
<td>.31</td>
<td>.01</td>
<td></td>
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</tr>
<tr>
<td>12. Extrinsic Goal Content</td>
<td>-.01</td>
<td>.28</td>
<td>.17</td>
<td>.20</td>
<td>.16</td>
<td>.34</td>
<td>.56</td>
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<td>.25</td>
<td>.10</td>
<td>.76</td>
<td></td>
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<td></td>
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<tr>
<td>13. Ideal Self</td>
<td>-.13</td>
<td>.21</td>
<td>-.01</td>
<td>-.03</td>
<td>-.06</td>
<td>.38</td>
<td>.32</td>
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<td>-.04</td>
<td>.39</td>
<td>.35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Ought Self</td>
<td>-.20</td>
<td>.08</td>
<td>-.11</td>
<td>.07</td>
<td>.20</td>
<td>.10</td>
<td>-.02</td>
<td>-.06</td>
<td>-.04</td>
<td>.16</td>
<td>.08</td>
<td>.16</td>
<td>.56</td>
<td></td>
</tr>
</tbody>
</table>

*Note. r ≥ .14 are p < .05, whereas r ≥ .21 are p < .001.*
Figure 1. Initial versus final within-person model with goal-specific characteristics predicting goal progress.
Table 8. Results of Bayesian model comparison for within-person analyses: Goal-specific characteristics predicting goal progress.

<table>
<thead>
<tr>
<th>Model</th>
<th>Parameters</th>
<th>BIC</th>
<th>ΔBIC_{M1 - Mi}</th>
<th>BF_{01}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 0</td>
<td>14: All variables</td>
<td>126550.814</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Model 1</td>
<td>13: Introjected*0</td>
<td>126543.091</td>
<td>7.723</td>
<td>47</td>
</tr>
<tr>
<td>Model 2</td>
<td>12: Extrinsic*0</td>
<td>126535.522</td>
<td>7.569</td>
<td>44</td>
</tr>
<tr>
<td>Model 3</td>
<td>11: Intrinsic content*0</td>
<td>126527.856</td>
<td>7.666</td>
<td>46</td>
</tr>
<tr>
<td>Model 4</td>
<td>10: Identified*0</td>
<td>126521.315</td>
<td>6.541</td>
<td>26</td>
</tr>
<tr>
<td>Model 5</td>
<td>9: Avoidance*0</td>
<td>126516.716</td>
<td>4.599</td>
<td>10</td>
</tr>
<tr>
<td>Model 6</td>
<td>8: Approach*0</td>
<td>126512.077</td>
<td>4.639</td>
<td>10</td>
</tr>
<tr>
<td>Model 7</td>
<td>7: Intrinsic*0</td>
<td>126508.555</td>
<td>3.522</td>
<td>6</td>
</tr>
</tbody>
</table>

*Note.* For the parameters, the models are nested and so only the one variable that was removed is listed (e.g., Model 3 has both introjected and extrinsic motivation parameters fixed to 0, but since introjected was in the previous model, it is listed for Model 2 not Model 3).
Figure 2. Results of the final within-person model with goal-specific characteristics predicting goal progress.
**Goal-Specific Characteristics: Between-Person Analyses.** Following the same procedure that we used for the within-person analyses, we examined whether all 14 goal-specific characteristics predicted goal progress at the between-person level, while also controlling for the correlations among all constructs (see Figure 3a). At each subsequent model, we removed one construct at a time from the between-person model\(^8\), which was determined by identifying the lowest coefficient and constraining it to 0. We repeated this process until the model comparison results did not provide sufficient evidence in favour of the more parsimonious model (i.e., removing a variable resulted in BF\(_{01} < 10\)). As indicated in Table 9 and Figure 3b, we were able to remove 9 of 14 constructs, leaving 5 goal-specific characteristics to be considered in the final model at the between-person level (commitment, difficulty, implementation intentions, identified motivation, intrinsic motivation).

The results of the simplified model are presented in Figure 4. Results indicate that commitment, the use of implementation intentions, and intrinsic motivation positively predict goal progress, whereas difficulty and identified motivation negatively predict goal progress. The confidence intervals for all of the remaining predictors do not include zero.

---

\(^8\) While the current series of analyses focused on the between-person portion of the model, we also modeled the within-person portion of the model that was obtained in the previous analyses. Removing variables from the between-person portion of the model did not affect the within-person portion.
Figure 3. Initial versus final between-person model with goal-specific characteristics predicting goal progress.
Table 9. Results of Bayesian model comparison for between-person analyses: Goal-specific characteristics predicting goal progress.

| Model   | Parameters                  | BIC    | ΔBIC_{|M1 - Mi|} | BF_{01} |
|---------|-----------------------------|--------|-----------------|--------|
| Model 0 | 14: All variables           | 126512.077 | --              | --     |
| Model 1 | 13: Avoidance*0             | 126504.305 | 7.772           | 49     |
| Model 2 | 12: Approach*0              | 126496.564 | 7.741           | 48     |
| Model 3 | 11: Extrinsic content*0     | 126488.827 | --              | --     |
| Model 4 | 10: Intrinsic content*0     | 126481.058 | 7.769           | 49     |
| Model 5 | 9: Introjected*0            | 126473.361 | 7.697           | 49     |
| Model 6 | 8: Ideal*0                  | 126465.611 | 7.750           | 48     |
| Model 7 | 7: Integrated*0             | 126458.203 | 7.408           | 41     |
| Model 8 | 6: Extrinsic*0              | 126452.726 | 5.477           | 15     |
| Model 9 | 5: Ought*0                  | 126446.254 | 6.472           | 25     |
| Model 10| 4: Difficulty*0             | 126442.338 | 3.916           | 7      |

Note. For the parameters, the models are nested and so only the one variable that was removed is listed (e.g., Model 3 has both introjected and extrinsic motivation parameters fixed to 0, but since introjected was in the previous model, it is listed for Model 2 not Model 3).
Figure 4. Results of the final between-person model with goal-specific characteristics predicting goal progress

Note. 95% confidence intervals are reported in brackets under the standardized coefficient.
Individual Difference Measures: Between-Person Analyses. Consistent with the previous analysis, we next used Bayesian model comparison using the individual differences measures. Because the majority of the variance in goal progress is at the within-person level, we conducted a series of multi-level models with progress entered at both the between and within-person levels, and all of the individual difference measures at the between-person level. While in the previous models we entered all constructs as predictors, here we created latent variables based on the results examining the overlap among constructs (i.e., for positive self-regulation, negative thought processes\(^9\)), as well as any factors that stood out based on the original scales (i.e., the BAS subscale of the BIS/BAS scales and autonomous orientation from the Global Motivation Scale). Thus, for the initial model, we had four latent variables and 22 individual differences constructs (see Figure 5a). Table 10 includes the correlations among all variables in the initial model\(^10\). As indicated in Table 11 and in Figure 5b, we were able to remove 20 of the 26 individual difference measures, leaving six constructs to be considered in the final model.

The results of the simplified model are presented in Figure 6. This model indicates that satisfaction of the need for autonomy, positive self-regulation, and extrinsic motivation positively predict goal progress, whereas frustration of the need for autonomy negatively predicts goal progress. Satisfaction of the need for competence and re-engagement were also included in the final model, however their confidence intervals include zero.

---

\(^9\) We initially included both Openness to Experience and Mindset as latent variables as well, however, MPlus does not allow latent variables with only two indicators and so for the purposes of this analysis we entered the constructs separately.

\(^10\) Correlations among all constructs from the individual difference measures (e.g., not including latent variables) are presented in Table 15 (see Appendix E).
Table 10. Correlations among individual difference measures in the initial predictor model.

<table>
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<th>23</th>
<th>24</th>
<th>25</th>
<th>26</th>
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</thead>
<tbody>
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<td>1. Negative Thoughts</td>
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<tr>
<td>2. Positive Self-Regulation</td>
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Note. $r_{.10}$ are $p < .05$ and $r_{.13}$ are $p < .001$. 
Figure 5. Initial versus final between-person model with individual differences predicting goal progress.
Table 11. Results of Bayesian model comparison for between-person analyses: Individual differences predicting goal progress.

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Table 11. Results of Bayesian model comparison for between-person analyses: Individual differences predicting goal progress – continued.

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*Note. For the parameters, the models are nested and so only the one variable that was removed is listed (e.g., Model 3 has both agreeableness and disengagement parameters fixed to 0, but since agreeableness was in the previous model, it is listed for Model 2 not Model 3).*
Figure 6. Results of the final between-person model with individual differences predicting goal progress.

Note. 95% confidence intervals are reported in brackets under the standardized coefficient.
Predicting Goal Progress: The Final Model. For the final set of analyses, we aimed to combine the results of the previous models in order to examine which of the remaining factors best predict goal progress. To achieve this objective, we constructed a multi-level model with the remaining eight goal-specific characteristics at the within-person level, five goal-specific characteristics at the between-person level, and the remaining six individual difference predictors at the between-person level (see Figure 7a). Then, using Bayesian model comparison we repeated the same process as before, except this time we used est/SE to decide which construct to fit to 0. This served as a standardized measure allowing us to compare the magnitude of each construct across both levels of analysis. As indicated in Table 12 and in Figure 7b, we were able to remove six of the six of the 11 constructs at the between-person level, with all of the goal-specific characteristics at the within-person level remaining. This final model demonstrated mixed evidence, such that CFI = 0.87, TLI = 0.73, RMSEA = .06, SRMRwithin = .07, and SRMRbetween = .18. Results further indicate that this final model explains 51% of the variance in goal progress at the between-person level, $R^2 = .51, p < .001$, and 9% at the within-person level, $R^2 = .09, p < .001$.

The results of the final model indicate that commitment, implementation intentions, and integrated motivation positively predict goal progress at the within-person level, whereas difficulty, intrinsic motivation, extrinsic goal content, greater actual-ideal discrepancy, and greater actual-ought discrepancy negatively predict goal progress at the within-person level. At the between-person level, results indicate that implementation intentions, intrinsic motivation, competence satisfaction, and re-engagement positively predict goal progress, whereas autonomy frustration negatively predicts goal progress.
Figure 7. Initial versus final combined model with individual differences and goal characteristics predicting goal progress.
Table 12. Results of Bayesian model comparison for the final combined model with individual differences and goal characteristics predicting goal progress.

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</tbody>
</table>

*Note.* For the parameters, the models are nested and so only the one variable that was removed is listed (e.g., Model 3 has both difficulty and autonomy satisfaction parameters fixed to 0, but since difficulty was in the previous model, it is listed for Model 2 not Model 3).
Figure 8. Results of the final model with individual differences and goal characteristics predicting goal progress.

Note. 95% confidence intervals are reported in brackets under the standardized coefficient. Constructs shaded in grey are individual difference measures.
Discussion

The purpose of the present research was to compare, contrast, and integrate a variety of prominent theories and constructs that influence goal pursuit in order to determine which factors best predict goal progress over time. Specifically, our objectives were twofold: (1) to determine the measurement properties for a variety of relevant individual difference scales and the potential for overlap among similar constructs, and (2) determine both the person- and goal-specific factors that best predict goal progress over time.

Consistent with best measurement practices (Flake & Fried, 2019; Flake et al., 2017; Revelle & Condon, 2018), we first examined the structural validity of 14 measures that are commonly used within the literature on goal pursuit. We found that while the majority of measures (92%) demonstrated good internal consistency, only one measure (7%) demonstrated good evidence in favour of the proposed factor structure, with the remaining scales demonstrating mixed (64%) or poor (29%) fit. These findings are consistent with the seemingly widespread problem of hidden invalidity, where psychological measures are presented as valid based on the simplest (and most commonly reported) measurement statistic (i.e., Cronbach’s α), but fail more robust indicators of validity (Hussey & Hughes, 2018).

In addition to examining the structural validity of the individual difference measures, we were also interested in expanding previous research by examining the prevalence of the jangle fallacy within the literature on goal pursuit. As expected, the results indicated that there was indeed substantial overlap among ostensibly different constructs, specifically loading onto three factors – negative thought processes (i.e., BIS,
rumination, neuroticism, self-critical perfectionism, prevention orientation, assessment), positive self-regulation (i.e., conscientiousness, trait self-control, grit, locomotion), and openness to experience (i.e., openness, reflection). While our primary interest was in identifying potentially overlapping clusters, the results also provided some evidence in favour of existing constructs as being independent, including mindsets (fixed, growth), autonomous orientation (i.e., general tendency toward more autonomous motivation at the trait level), and behavioural activation (i.e., trait level approach tendencies). There was also moderate evidence in favour of need satisfaction, need frustration, and goal adjustment (disengagement, re-engagement) being their own latent constructs.

Once we were able to establish a list of tenable constructs, we then tested a final model in order to determine which of these constructs best predicted the amount of progress an individual made on their goals. Given the vast number of constructs that we had even after creating overlapping clusters, this was broken down into three phases in order to generate the final model: using model comparison to examine the most prevalent (1) goal-specific predictors at the within-person level, (2) goal-specific predictors at the between-person level, and (3) individual difference (trait) level predictors at the between-person level. These analyses produced a final model including eight goal-specific predictors at the within-person level, five goal-specific characteristics at the between-person level, and six individual difference measures at the between-person level, meaning that we were able to cut down by approximately 43-77% of predictors at each level. Results of this final model indicate that people are more likely to attain the goals that they are committed to, have specific plans for, view as being connected to their broader sense of self and longer-term values (i.e., having greater integrated motivation), compared to
*their other goals.* Conversely, people were less likely to make progress on goals that were difficult, interesting and enjoyable (i.e., having greater intrinsic motivation), extrinsically (materialistically) oriented, and were more discrepant with either their ought or ideal selves, *compared to their other goals.* Additionally, we found that people who develop specific plans for pursuing their goals, are more intrinsically oriented, experience more competence in their daily life, experience less frustration for their need for autonomy, and are able to re-engage in goals following failure are more likely to attain their goals *compared to other people.*

While there is no shortage of implications for the literature on goal pursuit, the present research also has practical implications for measurement practices (specifically with respect to the operationalization of constructs, or construct validity) and theory development within social and personality psychology more broadly. In the subsequent sections, we describe the implications of the present work for research on goal pursuit and self-regulation, specifically highlighting practical recommendations regarding the different ways we can measure and assess goals over time. Further extending these recommendations, we then discuss the implications the present research has on the need for developing better measurement practices within both the current literature and the field of social and personality psychology more broadly. From there we transition into the need for more unified and refined theory development in order to better understand goal attainment, and subsequently close with a discussion of the limitations of the current research and directions for future research.
Implications for Research on Goal Pursuit and Self-Regulation

Based on the present study, there is a clear need for methodological, statistical, and theoretical reform within the literature on goal pursuit. While the current findings do not provide many answers, they do open up new avenues in terms of recommendations for the field, especially considering that such a comprehensive study has yet to be done before. First, our analyses highlight the need to shift our focus from between-person to within-person designs in order to make comparisons among an individual’s own goals. Consistent with a plethora of recent research on goal pursuit (e.g., Holding et al., 2017; Milyavskaya & Inzlicht, 2017; Milyavskaya et al., 2015; Werner & Milyavskaya, 2017; Werner et al., 2016; Werner et al., 2018), the present findings indicate that only 20% of the variance in goal progress was at the between-person (i.e., trait) level, of which the final model was able explain approximately 51%. Even though we appear to be doing a pretty good job at explaining individual differences in goal progress, we are really only accounting for 9% of the variance in total goal progress (across both the between and within-person levels), which is especially problematic considering how many constructs were assessed. This information should be both deeply concerning and inherently optimistic for researchers who study goal pursuit. On one hand, these findings indicate that we actually know very little about how to help people achieve their goals. Despite decades of research, we can at best explain 5-20% of what is going on during goal pursuit, therefore suggesting that we have been focusing on the wrong level of analysis. More optimistically, this also means that there is a whole wealth of information that has yet to be explored, and so if we want to truly understand goal attainment, more work needs to be done at the within-person level (Milyavskaya & Werner, 2018; Werner et al.,
While past research has in some cases assessed multiple goals from each person (a method that is necessary since within-person analyses focus entirely on making comparisons between goals), a lot of crucial information gets lost by aggregating across all of the goals (e.g., Emmons & King, 1988; Little, 1983; Sheldon & Elliot, 1999). Fortunately, with more advanced methods and statistical techniques, the ability to more thoroughly analyze goals at the within-person level is more accessible than ever (Milyavskaya & Werner, 2018), therefore providing researchers with the necessary tools to better study goal pursuit.

Despite our call to focus more on within-person designs and analyses, it should also be reiterated that when calculating the proportion of between-person variance (i.e., the 5-20%) in goal progress, the residual variance includes both the amount of within-person variance and error. While it is pretty clear that we need to expand beyond the between-person level (i.e., the dependency due to mean differences in goal progress is consistently small), we cannot be perfectly certain how much of the residual variance is due to within-person differences or error. In the present study, we found that the sub-set of goal characteristics we assessed only explained 8% of the within-person variance in goal progress. The most obvious answer is that we did not assess all of the “right” characteristics and missed some of the more important factors that influence the amount of progress an individual makes on their goals. Most notably, in the present study we purposefully did not take into consideration self-regulatory factors that influence goal-related decision-making in the moment. For example, there is a growing body of research examining the extent to which momentary temptations and desires can detract from the progress people make on important personal goals (e.g., wanting to eat healthy, but a co-
worker brings in cupcakes for a birthday; Berkman, 2018; Berkman, Hutcherson, Livingston, Kahn, & Inzlicht, 2017; Hofmann et al., 2012; Lopez, Hofmann, Wagner, Kelley, & Heatherton, 2014; Milyavskaya et al., 2015; Milyavskaya & Inzlicht, 2017). While there is no arguing that such factors play a critical role during goal pursuit, such processes require a different level of analysis (i.e., it is best to examine decision making and the amount of conflict that is experienced in-the-moment rather than at a broader retrospective level) and so it was not feasible with the present design. That said, future research would greatly benefit from examining goal pursuit in-the-moment, because it may be the case the goal characteristics not only fluctuate between goals, but that they fluctuate over time (e.g., the motivation for a particular goal may shift throughout a day, week, etc. and therefore shift an individual’s attention toward or away from the goal itself; Inzlicht & Schmeichel, 2012; Inzlicht, Schmeichel, & Macrae, 2014; Milyavskaya & Inzlicht, 2017).

While it is most certainly possible that there are missing characteristics that could help to explain additional variance, it is also possible that goal progress is influenced by something other than the individual or the goals themselves. One such possibility could be that there are characteristics of particular domains that influence the types of goals people set, as well as the amount of progress they make on their goals. For example, the quality of one’s social environment and the type of support they receive may play a key role in the types of goals people set and pursue (e.g., Bolger, Zuckerman, & Kessler, 2000; Fitzsimons, Finkel, & vanDellen, 2015; Koestner, Powers, Carbonneau, Milyavskaya, & Chua, 2012; Milyavskaya, Nadolny, et al., 2014; Shah, 2003; Werner, 2015). Drawing from the self-determination theory perspective, recent research finds that
people set more self-concordant goals and subsequently make more progress on those goals in the domains where their basic psychological needs for autonomy, competence, and relatedness are satisfied (Milyavskaya et al., 2014). Another important factor that was not considered in the present research is the role of personal relationships and important close others during goal pursuit. Humans are innately social creatures and so having important others tied into our self-regulatory systems is bound to occur. For example, transactive goal dynamics theory (Fitzsimons et al., 2015) proposes that both partners within a dyad interdependently pursue self-oriented, partner-oriented, and system-oriented goals and that the outcomes are so tightly intertwined that the two individuals operate within a single self-regulating system. More simply stated, partners often have shared goals and therefore shared self-regulatory resources that can impact goal progress over time.

Another important consideration is that there are more comprehensive goal dynamics that influence goal pursuit over time. For the present research, we primarily focused on the extent to which individual constructs directly predicted goal progress over time. However, as existing models suggest (e.g., the rubicon model of action phases, the self-concordance model), goal pursuit is a process and so it may be the case that some factors do not directly predict goal progress, but instead may have an indirect influence through some underlying mechanism. Such dynamics may be especially relevant for the role of individual difference measures throughout goal pursuit. While individual traits may not always or inherently facilitate goal progress, they may influence the types of goals people set in the first place, their level of commitment, whether or not they develop specific plans, etc.
As a classic example within the self-regulation literature, there is extensive evidence showing that trait self-control predicts a whole host of important life outcomes, including maintaining a healthy diet, greater marital satisfaction, better income and savings, lower rates of criminal behaviour, better mental health, academic achievement, and increased work performance, to name a few (e.g., Moffitt et al., 2011; Tangney et al., 2004). Consistent with these findings, we found that positive self-regulation (including trait self-control and other related concepts) positively predicted goal progress at the between-person level (specifically within the between-person model). However, this relation got washed out of the model once we took into consideration the goal-specific characteristics at the within-person level (specifically within the final model), which suggests that there is potential for some underlying mechanism or process. While not empirically tested within the present study, this suggestion is consistent with recent research finding that trait self-control is associated with making specific plans (or implementation intentions) to help achieve a goal (Werner et al., in-preparation), the use of self-regulatory strategies (e.g., situation selection, attentional deployment; De Vet et al., 2014; Hennecke, Czikmantori, & Brandstätter, 2018; Nielsen, Gwozdz, & De Ridder, 2019), and increases in more autonomous motivation over time (Holding, Hope, Verner-Filion, & Koestner, 2019). Taken together, these findings further highlight the need to develop a more holistic model of goal pursuit. Although there are existing models that attempt to explain some individual aspects of goal pursuit (e.g., Gollwitzer, 1990; Neal, Ballard, & Vancouver, 2017; Kotabe & Hofmann, 2015; Wilkowski & Ferguson, 2016), there has yet to be a single model that addresses the process of goal pursuit from start to
finish, including the individual difference aspects that influence goal pursuit before it even begins (e.g., impact of the social environment and personality on goal setting).

**Our Findings are Only as Good as our Measures: Implications for Measurement Practices in Social and Personality Psychology**

One of the most challenging aspects of studying social and personality psychology is that most of the constructs, processes, and/or phenomena that we assess are not directly observable. As a result, we as scientists need to rely on our own theories and judgement in order to determine what a construct is and how it is subsequently measured. Because of this inherent subjectivity, as well as the amount of time, resources, and training that it takes to do it properly, developing measures and instruments to accurately represent a construct of interest is certainly no easy task. This is likely why so many researchers use “on the fly” measurement (Flake & Fried, 2019; Flake et al., 2017), sacrificing precision in favour of saving time and other resources, and quite frankly because it is easy. However, our findings are only as good as our measures and so not taking the time to develop proper measures raises serious threat to construct validity (Brewer & Crano, 2014; Shadish, Cook, & Campbell, 2001). Thus, not only should researchers be spending more time and resources on developing proper theories, it is imperative that we focus more on developing properly validated measures to actually test said theories.

As we noted before, this issue of appropriately translating theories into constructs is of particular concern within the literature on goal pursuit. Not only can we not agree upon what a “goal” actually is, but there are several documented incidences of jingle-jangle fallacies, and so it is no surprise that similar findings emerged in the present study.
Most notably, we found a positive self-regulation cluster comprised of conscientiousness, self-control, the perseverance facet of grit, and locomotion. This cluster is of no surprise at all, as past research consistently finds that these constructs correlate at around .70 or higher (e.g., Credé et al., 2017; Duckworth et al., 2007; Duckworth & Quinn, 2009; Saunders et al., 2017; Werner et al., 2018), suggesting that they are likely redundant constructs that have an underlying core component (e.g., Credé et al., 2017; Werner et al., 2018). Similarly, the negative thoughts cluster is comprised of behavioural inhibition (BIS), rumination, neuroticism, self-critical perfectionism, prevention orientation, and assessment. While these constructs have yet to be scrutinized in the same manner as trait self-control, grit, and conscientiousness, there are indicators suggesting that such a cluster makes a lot of theoretical sense. For example, a variety of neuroticism scales were found to be positively correlated with the rumination subscale of the rumination-reflection questionnaire at around .60 or greater (Trapnell & Campbell, 1999). Similarly, Teasdale and Green (2004) found that the effect of rumination in the context of autobiographical memory was entirely explained by neuroticism, which at the very least calls into question the incremental validity of these constructs. While the present research largely focused on structural validity, future research can further address this issue by employing even more stringent tests of validity, such as assessments of convergent and divergent validity (Campbell & Fisk, 1989).

While the present research attempts to examine the validity of a wide range of constructs within the goal pursuit literature, drawing the conclusion that “everything’s bad” (or at least, things are not “good” as indicated in Table 4) is not yet entirely warranted. In fact, there are three equally plausible possibilities that may explain the
present findings: (1) our theories are good, but our measurements are bad, (2) our theories are bad, but our measurements are good, or (3) both our theories and measurements are bad. The first scenario (theories good, measurements bad) would advocate that our constructs are (for the most part) appropriately defined and the issue instead lies with the way in which these constructs are operationalized in our measures. Such an issue is not foreign to the self-regulation literature, as the Brief Self-control Scale (Tangney et al., 1997) was developed in response to having poorly designed measurements to assess self-control; however, despite its improvements, the operationalization of this scale is still called into question (e.g., does it actually measure self-control or just one’s general ability to pursue goals?). In other words, if our constructs truly are meant to be distinct, the solution is that we need is to develop more refined measures that actually assess our constructs of interest. The second scenario (theories bad, measurement good) would indicate that, even though our theories are flawed, the way in which they are operationalized is correct. For example, the Grit Scale (both short and long form; Duckworth et al., 2007; Duckworth & Quinn, 2009), Big Five Inventory (Denissen, Geenen, van Aken, Gosling, & Potter, 2008; John & Srivastava, 1999), and Brief Self-Control Scale (Tangney et al., 2004) have all gone through appropriate, independent validation procedures (e.g., they were definitely not made up “on the fly”). In other words, if our measures truly are the most accurate representation of our constructs of interest, the solution is that we need to go back to the drawing board and re-visit our theories because of rampant jangle-fallacies. The likely problem, however, is the third scenario in that we are not really that great at either theory or measurement. This ties back in to the idea that there is a lot of subjectivity in developing both theories and
measures, and so it is imperative that we start to adopt better measurement practices (e.g., Flake & Fried, 2019), as well as further refine and better conceptualize our theories and constructs.

**Theories as Toothbrushes or Bridges? Implications for Theory Development in Psychology**

As we have seen thus far, there has been a steadily increasing interest in the topic of goal pursuit in recent decades, spawning many interesting and nuanced ideas about how to help people achieve their goals. However, such interest comes with a cost. To reiterate the cautionary tale of Austin and Vancouver (1996): “the sheer magnitude of this body of research is associated with a certain danger. Heterogeneous perspectives can generate a large body of facts, an excess of vocabulary, and numerous microtheories” (p. 338), and if not handled properly, have the potential to seriously derail the science of goal pursuit. That said, this problem far transcends our subfield, and actually may be at the crux of the looming theory “crisis” in psychology more broadly. While many scientists would agree that some type of crisis, problem, or revolution is currently at the forefront of psychological science, the conversation has been centered on poor methodological and statistical practices (e.g., Flake et al., 2017; Francis, 2012, 2014; Gelman, 2013; Head, Holman, Lanfear, Kahn, & Jennions, 2015; Nuijten, Hartgerink, van Assen, Epskamp, & Wicherts, 2016). However, it has been argued that such an issue runs far deeper than methods alone, “and is ultimately rooted in theory or lack thereof” (Muthukrishna & Henrich, 2019, p. 221).

At first glance, you might wonder how the field of goal pursuit has a “theory problem” given that we have an abundance of well-established theories and a surprisingly
rich literature supporting these ideas (i.e., a lot of these ideas are not just a “flash in the pan” but have been extensively built up over time). But that is precisely the problem. We have too much theory. This issue was best described by Walter Mischel (2008) as the toothbrush problem: “Psychologists treat other peoples’ theories like toothbrushes — no self-respecting person wants to use anyone else’s.” By working in our own siloes and relentlessly pursuing our own pet theories while at the same time ignoring (and in some cases even disparaging) similar or competing ideas, we have broken the fundamental rule of science. In order to have a proper theory, it must not only be tested but also falsifiable (LeBel, Berger, Campbell, & Loving, 2017; Popper, 1959). However, rather than embracing ideas that challenge our theories and using them to better refine our understanding of goal pursuit through testing competing ideas (which, again, is a fundamental aspect of all scientific inquiry), such ideas and challenges are often perceived as a threat to one’s own scientific legacy (e.g., Mischel, 2008). As a result, the present research shows that we are ultimately no closer to understanding how goals work than Austin and Vancouver were 20 years ago (clearly we did not heed their advice!).

In order to move forward as a subfield, we propose that researchers stop treating theories like toothbrushes and instead treat them as bridges in order to develop a more cumulative science. To achieve this objective, we propose a series of steps that the field could take in order to further refine our theories and subsequently maximize the impact and transparency of our work. First and foremost, there needs to be a field-wide consensus on what constitutes a “theory.” Particularly in psychology, there is a constant push toward backing one’s ideas with theory or using different theoretical frameworks to justify a set of results. However, as Muthukrishna and Henrich (2019) correctly point out,
there seems to be a fine line for what gets labelled as a theory, at least in the social sciences and definitely in psychology (as evidenced by the *toothbrush problem*). As such, there needs to be a clearer distinction between theoretical frameworks, theories, research questions, hypotheses, constructs, and data. This lack of understanding of the basic scientific method has also contributed to the aforementioned measurement problem. By not fully understanding or appreciating the need to properly translate our research questions into corresponding hypotheses, our hypotheses into constructs, and constructs into their most appropriate operationalization, we substantially increase the likelihood of human error and biases at each step that ultimately hinder our own research. Ultimately, these concepts are at the very core of the work we do as psychological scientists and so it is imperative that such distinctions be more deeply ingrained into our scientific training.

Moving beyond basic training in scientific principles, it is important that the field (both within the goal literature and in psychology in general) take stock in the many theories and constructs that exist. We as researchers need to take a long and hard look at the constructs that we have created, and most importantly, set aside our own personal legacy and ask ourselves, “*Is this construct, idea, or theory really new? If so, can it build on an existing theory or set of ideas?*” If the answer to both of these questions is yes, then researchers should not be pressured or feel obliged to create something “new” for the sake of having their own “theory.” This leads to the next point, which is that the field needs to abandon the current toxic incentive structure that praises novelty over conducting sound research. Stated best by Walter Mischel (2008), “if getting and keeping your job and status in a field requires achieving “originality” by not building on anyone else’s work, it may directly undermine another goal shared by many in psychological
science: building an academic community that works collectively, albeit competitively, to make psychology an increasingly cumulative basic science.” At the end of the day, the primary focus of any researcher’s work should be moving toward a better and ideally more complete understanding of whatever phenomenon they study at a given time. However, this aspect gets quickly lost when putting effort into them is not only ignored, but actively dismissed, and so shifting the incentive structure in a way that encourages best practices and proper scientific thinking can help scientists reconnect with the core principles and purpose in conducting scientific research.

Bridging back to the current state of the literature on goal pursuit, the obvious next question is: *should we be taking a break from theory development?* The answer to this question is both yes and no. On one hand, we should stop generating new theories and constructs because we have a lot of work to do with the ones that already exist, as indicated by the present research. Over the last few decades, the literature on goal pursuit has grown exponentially wide (horizontally), and so it is now time to focus on integrating these ideas so that we can actually more forward (vertically) as a field. This is especially important now more than ever, considering that Austin and Vancouver (1996) made a similar call for theory integration and rightfully cautioned us about the perils of focusing too much on individual constructs, yet very little progress has actually been made in understanding the process of goal pursuit.

On the other hand, instead of generating new theories and ideas we should work more cumulatively and collaboratively in order to develop a more holistic model of goal pursuit. Most of the existing theories and constructs often focus only on one aspect of the goal pursuit process in isolation (e.g., goal setting, goal striving, goal attainment/failure),
and so one of the most fruitful directions moving forward can be to start piecing together how different constructs play a role in this process. One starting point may be the rubicon model of action phases (Gollwitzer, 1990; Heckhausen & Gollwitzer, 1986, 1987) which lays the foundation for how wishes and desires can be turned into more concrete goals (goal setting), the need to generate specific plans in order to help one achieve their goals, the determined and persistent pursuit of one’s goals, and the evaluation of goal outcomes. However, this model is far from complete and could be furnished with some of the constructs described in the present research (e.g., the rubicon model does not take into consideration an individual’s motivation for a particular goal).

**Limitations and Future Directions**

In the present research, we take an important first step in order to address important theoretical and measurement-related issues within the literature on goal pursuit. However, this research is still in its infancy, which is evident by the fact that we conducted a single exploratory study. While the present research provides important insights into how theories of goal pursuit may operate when considered together (rather than in isolation), it is imperative that this work is followed up with a pre-registered conceptual or direct replication. It should also be noted that there is a certain level of subjectivity in the types of analyses that were used in the present research (e.g., in determining the cut-off criterion for making certain decisions). To further examine the robustness of the present findings, future research can explore using alternative but related methods of analysis (i.e., do the findings hold up under different analytical techniques, especially when comparing traditional methods using null hypothesis significance testing versus Bayesian analyses). Similarly, it is worth mentioning that even
though we assessed the structural validity of the individual difference measures, the
measures were retained in the model comparison phase even if their structural validity
was deemed poor. In this sense, we cannot be entirely certain whether the performance of
these theoretical constructs was due to issues related to theory (i.e., they simply weren’t
among the best predictors) or measurement (i.e., poor measurement generated noise in
the analysis). For these reasons, we did not interpret the finds of the final model any
further, as future research is needed to better improve the measurement of these
constructs.

That said, the most prevalent limitation of the present study is the selection of
measures and constructs that were included. While we tried to be as comprehensive as
possible, we were ultimately limited by time and feasibility, and so we had to make some
executive decisions regarding which constructs, perspectives, and paradigms to include
versus not. In this regard, we primarily focused on the social and personality perspective,
however other subfields (e.g., cognitive psychology) may also provide important insights
into goal attainment. When conducting such intensive studies moving forward, especially
longitudinal designs to examine goal pursuit over time, it would be worth considering
employing a planned missing data design. With planned missing data designs, missing
data are strategically used to improve the validity of the data through the use of either
multiform designs (e.g., Graham, Hofer, & Piccinin, 1994) or two-method measurement
(e.g., Graham, Taylor, Olchowski, & Cumsille, 2006). Multiform designs could be
especially useful in the context of the present research, as such designs allow researchers
to increase the number of measures being assessed without increasing participant burden
(Rhemtulla & Little, 2012). Rather than having participants respond to the complete
version of all measures of interest, participants are randomly assigned to receive only a subset of items from each measure (e.g., in a three-form design, survey items are divided into four sets with one common set that is completed by everyone and three partial sets that are randomly distributed among participants; (Graham, Hofer, & MacKinnon, 1996; Graham et al., 2006; Rhemtulla & Little, 2012). Similarly, it may also be beneficial to conduct a conceptual replication of the present study incorporating such a design (but keeping the same measures) as a way to reduce participant burden (and potentially reducing the amount of noise in the data that may be introduced through respondent fatigue; e.g., Lavrakas, 2008).

Also related to the intensive design of the present study, we had to rely on a convenience sample of student participants in order to maximize both the number of constructs that we could assess and the sample size we could recruit. As a result, the types of goals participants provided were representative of the student demographic, with the majority of goals being academically (53%) or health (20%) oriented. Future research would benefit by recruiting non-student participants in order to examine whether the present findings replicate across demographics and across different types of goals (e.g., health, career, financial, personal growth/hobbies).

One of the primary benefits of the present study is that we took an idiographic approach by having people report on their own personal goals, however, this also leads us to one of our primary limitations – the lack of an objective measure for goal progress. Because everyone identifies and reports on a variety of their own personal goals (meaning that everyone has a different set of goals), there is no systematic way to objectively assess how much progress makes on those goals. While having participants
provide their own personal goals provides a more realistic view into the dynamics surrounding those goals, future research would benefit from recruiting participants who are pursuing the same or similar goals in order to gain an objective (i.e., non-self-report) measure of goal progress. Two of the most obvious options for such objective measures include: (1) recruiting students who are all pursuing the goal to attain a certain semester GPA with the objective measure being grades from the university registrar, and (2) recruiting participants who are pursuing the goal to lose weight and actually weighing them to assess their change in weight over time. However, this also comes with its own trade-offs, as such a method would require studying only one or two goals at a time, therefore losing the capability of examining goal pursuit at the within-person level (which we have already argued is fundamental to studying goal pursuit).

Finally, it is also important that future work consider the different time-scales of goals (e.g., short-term, long-term, broader goals that require active maintenance). In the present study we only examined week-long goals. Although we would classify these goals as short-term, research on personal goal pursuit has assessed a wide array of goals, ranging from asking about progress daily (Wilkowski & Ferguson, 2016), weekly (Werner & Milyavskaya, 2017), by semester (Sheldon & Kasser, 2001), or yearly (Duckworth et al., 2007), often without any justification for why those frequencies were selected. As such, it would be interesting to know whether goals operate differently as a function of their timeframe. Similarly, it has been postulated that goals operate within a network, and so it would be interesting for future research to examine the extent to which short-term goals influence more long-term goals (and vice versa).
Conclusion

Overall, we set out with the mission of trying to understand the vast literature on goal pursuit in order to understand which factors best help people achieve their goals. In an attempt to be as comprehensive as possible, we assessed 53 unique constructs of only 12 were retained in the final model. From both a methodological and theoretical approach, there appears to be a lot of redundant and perhaps even superfluous constructs that are not operationalized appropriately, as indicated by the discrepancy between the evidence for reliability and structural validity, as well as the number of constructs that did not meaningfully contribute to goal progress over time. Thus, not only do these findings highlight the field’s need to work toward a more integrative model of goal pursuit (e.g., in order to reduce the prevalence of the jangle-fallacy), but also to adopt better measurement practices in order to ensure that we are appropriately measuring our constructs of interest. This calls into question whether researchers should temporarily suspend new theory development in order to take stock of the constructs that already exist (much like we attempted to do in the present study). Ultimately, the quality of our findings is only as good as the quality of our measurements and so at the very least we need to pay particular attention to how we operationalize our research questions, theories, and constructs moving forward.
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Appendix A: Initial Survey (T1)
Goal Setting Task

Personal goals are projects and concerns that people think about, plan for, carry out, and sometimes (though not always) complete or succeed at. They may be more or less difficult; require only a few or many steps; represent different areas of a person’s life; and be more or less time consuming, attractive, or urgent.

Please think of your three most important personal goals that you plan to pursue over this coming week and write them below.

Short-Term Goal #1: ______________________________________________________________

Short-Term Goal #2: ________________________________________________________________

Short-Term Goal #3: ________________________________________________________________

Now, please identify one long-term goal (i.e., your most important personal hopes, plans, and goals for the next 5-10 years) that is associated with each short-term personal goal that you previously listed.

Please keep in mind that one long-term goal can be related to one or more of the short-term goals. Should that be the case, please write that same long-term goal for each of its corresponding short-term goals.

Short-Term Goal #1: <insert text>
Corresponding Long-Term Goal: ____________________________________________________

Short-Term Goal #2: <insert text>
Corresponding Long-Term Goal: ____________________________________________________

Short-Term Goal #3: <insert text>
Corresponding Long-Term Goal: ____________________________________________________

In the following pages, we will ask you some questions about these goals.
Short-Term Goal Characteristics

For the following questions, think about your [FIRST/SECOND/THIRD] short-term goal:
<insert text>

Think about the reasons that you are pursuing this goal. For each reason below, give a rating of 1 to 7 on how much you are pursuing your goal for that reason.

Scale: 1 (not at all for this reason) to 7 (completely for this reason)

**Autonomous and Controlled Motivation**

1. Because somebody else (parent, professor, friend, etc.) wants you to, or because you’ll get something from someone if you do
2. Because you would feel ashamed, guilty, or anxious if you didn’t – you feel that you should try to accomplish this goal
3. Because you really believe that it is an important goal to have
4. Because of the fun and enjoyment which the goal will provide you – the primary reason is simply your interest in the experience itself.
5. Because it represents who you are and reflects what you value most in life

**Approach and Avoidance Motivation**

6. To avoid negative consequences of not pursuing this goal
7. To get closer to something you want

**Goal Characteristics**

Please indicate the extent to which you agree with each statement.

Scale: 1 (strongly disagree) to 7 (strongly agree)

**Skills and Resources**

1. I feel that I have the skills and resources necessary to attain this goal

**Commitment**

2. I feel committed toward this goal
3. It would be difficult to reach this goal
4. I have made specific plans for how, when and where to reach this goal
**Self-Discrepancy**

5. To what extent would you IDEALLY LIKE TO pursue this goal? (i.e., is it one of your ultimate goals for yourself?)
6. To what extent do you believe you OUGHT TO pursue this goal? (i.e., do you believe you should or ought to pursue this goal?)
7. To what extent will you ACTUALLY pursue this goal? (i.e., is this a goal that you can actually plan to pursue?)

**Goal Content**

To what extent does each of your personal goals help you to achieve the following possible futures?

**Scale:** 1 (not at all) to 7 (very much)

1. Self-acceptance and personal growth: being happy and having a very meaningful life
2. Intimacy and friendship: having many close and caring relationships with others
3. Societal contribution: working to help make the world a better place
4. Financial success: having a job that pays very well and having a lot of nice possessions
5. Fame and recognition: being known and admired by many people
6. Physical appearance: looking good and being attractive to others

**Support**

Will any of the following people be supporting or helping you with this goal?

**Scale:** 1 (not at all) to 7 (completely)

1. Parent/guardian
2. Friend
3. Professor
4. Other (sibling, other family member, partner, etc.). Write who: [text box]

**Goal Conflict**

Does being successful in this goal have a helpful or harmful effect (or no effect at all) on the following goals?

**Scale:** -2 (very harmful effect), -1 (somewhat harmful effect), 0 (no effect), 1 (somewhat helpful effect), 2 (very helpful effect)

1. Short-Term Goal [1/2/3]: <insert text>
2. Short-Term Goal [1/2/3]: <insert text>
3. Long-Term Goal [1/2/3]: <insert text>
4. Long-Term Goal [1/2/3]: <insert text>
5. Long-Term Goal [1/2/3]: <insert text>
Long-Term Goal Characteristics

Please answer the following questions for your [FIRST/SECOND/THIRD] long-term goal:
<insert text>

**Motivation**

Think about the reasons that you are pursuing this goal. For each reason below, give a rating of 1 to 7 on how much you are pursuing your goal for that reason.

**Scale:** 1 (not at all for this reason) to 7 (completely for this reason)

**Autonomous and Controlled Motivation**

1. Because somebody else (parent, professor, friend, etc.) wants you to, or because you’ll get something from someone if you do
2. Because you would feel ashamed, guilty, or anxious if you didn’t – you feel that you should try to accomplish this goal
3. Because you really believe that it is an important goal to have
4. Because of the fun and enjoyment which the goal will provide you – the primary reason is simply your interest in the experience itself.
5. Because it represents who you are and reflects what you value most in life

**Approach and Avoidance Motivation**

6. To avoid negative consequences of not pursuing this goal
7. To get closer to something you want

**Aspirational Content**

To what extent does each of your personal goals help you to achieve the following possible futures?

**Scale:** 1 (not at all) to 7 (very much)

1. Self-acceptance and personal growth: being happy and having a very meaningful life
2. Intimacy and friendship: having many close and caring relationships with others
3. Societal contribution: working to help make the world a better place
4. Financial success: having a job that pays very well and having a lot of nice possessions
5. Fame and recognition: being known and admired by many people
6. Physical appearance: looking good and being attractive to others

**Goal Conflict**

Scale: -2 (very harmful effect), -1 (somewhat harmful effect), 0 (no effect), 1 (somewhat helpful effect), 2 (very helpful effect)

1. Does being successful in your FIRST long-term goal have a helpful or harmful effect (or no effect at all) on your SECOND long-term goal?
2. Does being successful in your FIRST long-term goal have a helpful or harmful effect (or no effect at all) on your THIRD long-term goal?
3. Does being successful in your SECOND long-term goal have a helpful or harmful effect (or no effect at all) on your THIRD long-term goal?
Individual Difference Measures

Aspirations Index

(Kasser & Ryan, 1999)

The questions below ask you about aspirations you may have for the future. For each item, fill in a number that indicates how important it is to you that the aspiration be attained in the future.

Scale: 1 (strongly disagree) to 9 (strongly agree)

1. I will choose what I do, instead of being pushed along by life.
2. I will feel that there are people who really love me, and whom I love.
3. I will assist people who need it, asking nothing in return.
4. I will be recognized by lots of different people.
5. I will successfully hide the signs of aging.
6. I will be financially successful.
7. At the end of my life, I will look back on my life as meaningful and complete.
8. I will have good friends whom I can count on.
9. I will work for the benefit of society.
10. My name will be known by many people.
11. I will have people comment often about how attractive I look.
12. I will have a job that pays very well.
13. I will gain increasing insight into why I do the things I do.
14. I will share my life with someone I love.
15. I will work to make the world a better place.
16. I will be admired by many people.
17. I will keep up with fashions in hair and clothing.
18. I will have many expensive possessions.
19. I will know and accept who I really am.
20. I will have committed, intimate relationships.
21. I will help others improve their lives.
22. I will be famous.
23. I will achieve the “look” I am after.
24. I will be rich.
25. I will continue to grow and learn new things.
26. I will have deep, enduring relationships.
27. I will help people in need.
28. My name will appear frequently in the media.
29. My image will be one others find appealing.
30. I will have enough money to buy everything I want.
Goal Adjustment Scale

(Wrosch, Scheier, Miller, Schulz, & Carver, 2003)

During their lives people cannot always attain what they want and are sometimes forced to stop pursuing the goals they have set. We are interested in understanding how you usually react when this happens to you. Please indicate the extent to which you agree or disagree with each of the following statements, as it usually applies to you.

If I have to stop pursuing an important goal in my life…

Scale: 1 (strongly disagree) to 5 (strongly agree)

1. It’s easy for me to reduce my effort towards this goal
2. I convince myself that I have other meaningful goals to pursue
3. I stay committed to the goal for a long time; I can’t let it go
4. I start working on other new goals
5. I think about other new goals to pursue
6. I find it difficult to stop trying to achieve the goal
7. I seek other meaningful goals
8. It’s easy for me to stop thinking about the goal and let it go
9. I tell myself that I have a number of other new goals to draw upon
10. I put effort toward other meaningful goals
Regulatory Focus Questionnaire

(Lockwood et al., 2002)

Below are 18 statements that you may agree or disagree with. Using a scale of 1 – 9, with 1 meaning “not at all true of me,” and 9 meaning “very true of me,” select your agreement with each item by clicking on the appropriate response bubble for that statement.

1. In general, I am focused on preventing negative events in my life
2. I am anxious that I will fall short of my responsibilities and obligations
3. I frequently imagine how I will achieve my hopes and aspirations
4. I often think about the person I am afraid I might become in the future
5. I often think about the person I would ideally like to be in the future
6. I typically focus on the success I hope to achieve in the future
7. I often worry that I will fail to accomplish my goals
8. I often think about how I will achieve success
9. I often imagine myself experiencing bad things that I fear might happen to me
10. I frequently think about how I can prevent failures in my life
11. I am more oriented toward preventing losses than I am toward achieving gains
12. A major goal I have right now is to achieve my ambitions
13. A major goal I have right now is to avoid becoming a failure
14. I see myself as someone who is primarily striving to reach my “ideal self” – to fulfill my hopes, wishes, and aspirations
15. I see myself as someone who is primarily striving to become the self I “ought” to be – to fulfill my duties, responsibilities, and obligations
16. In general, I am focused on achieving positive outcomes in my life
17. I often imagine myself experiencing good things that I hope will happen to me
18. Overall, I am more oriented toward achieving success than preventing failure
Basic Psychological Need Satisfaction and Frustration Scale

(Chen et al., 2015)

Below, we ask you about the kind of experiences you actually have in your life. Please read each of the following items carefully. You can choose from 1 to 5 to indicate the degree to which the statement is true for you at this point in your life.

Scale: 1 (not true at all) to 5 (completely true)

1. I feel a sense of choice and freedom in the things I undertake
2. I feel that my decisions reflect what I really want
3. I feel my choices express who I really am
4. I feel I have been doing what really interests me
5. Most of the things I do feel like “I have to”
6. I feel forced to do many things I wouldn’t choose to do
7. I feel pressured to do too many things
8. My daily activities feel like a chain of obligations
9. I feel that the people I care about also care about me
10. I feel connected with people who care for me, and for whom I care
11. I feel close and connected with other people who are important to me
12. I experience a warm feeling with the people I spend time with
13. I feel excluded from the group I want to belong to
14. I feel that people who are important to me are cold and distant towards me
15. I have the impression that people I spend time with dislike me
16. I feel the relationships I have are just superficial
17. I feel confident that I can do things well
18. I feel capable at what I do
19. I feel competent to achieve my goals
20. I feel I can successfully complete difficult tasks
21. I have serious doubts about whether I can do things well
22. I feel disappointed with many of my performance
23. I feel insecure about my abilities
24. I feel like a failure because of the mistakes I make
**Trait Self-Control**

(Tangney, Baumeister, & Boone, 2004)

Using the scale below, please rate the extent to which each statement is like you or not.

**Scale:** 1 (not at all like me) to 5 (just like me)

1. I am good at resisting temptation
2. I have a hard time breaking bad habits
3. I am lazy
4. I say inappropriate things
5. I do certain things that are bad for me, if they are fun
6. I refuse things that are bad for me
7. I wish I had more self-discipline
8. People would say that I have iron self-discipline
9. Pleasure and fun sometimes keep me from getting work done
10. I have trouble concentrating
11. I am able to work effectively toward long-term goals
12. Sometimes I can’t stop myself from doing something, even if I know it’s wrong
13. I often act without thinking through all alternatives
BIS/BAS Scales

(Carver & White, 1994)

Each item of this questionnaire is a statement that a person may either agree with or disagree with. For each item, indicate how much you agree or disagree with what the item says. Please respond to all the items; do not leave any blank. Choose only one response to each statement. Please be as accurate and honest as you can be. Respond to each item as if it were the only item. That is, don't worry about being "consistent" in your responses. Choose from the following four response options:

**Scale:** 1 (very true for me) to 4 (very false for me)

1. A person's family is the most important thing in life
2. Even if something bad is about to happen to me, I rarely experience fear or nervousness
3. I go out of my way to get things I want
4. When I'm doing well at something I love to keep at it
5. I'm always willing to try something new if I think it will be fun
6. How I dress is important to me
7. When I get something I want, I feel excited and energized
8. Criticism or scolding hurts me quite a bit
9. When I want something I usually go all-out to get it
10. I will often do things for no other reason than that they might be fun
11. It's hard for me to find the time to do things such as get a haircut
12. If I see a chance to get something I want I move on it right away
13. I feel pretty worried or upset when I think or know somebody is angry at me
14. When I see an opportunity for something I like I get excited right away
15. I often act on the spur of the moment
16. If I think something unpleasant is going to happen I usually get pretty "worked up"
17. I often wonder why people act the way they do
18. When good things happen to me, it affects me strongly
19. I feel worried when I think I have done poorly at something important
20. I crave excitement and new sensations
21. When I go after something I use a "no holds barred" approach
22. I have very few fears compared to my friends
23. It would excite me to win a contest
24. I worry about making mistakes
Global Motivation

Please indicate to what extent each of the following statements corresponds generally to the reasons why you do different things.

In general, I do things…

1. ...because I do not want to disappoint certain people
2. …in order to help myself become the person I aim to be
3. … because they represent who I am
4. …even though I do not see the benefit in what I am doing
5. …because I want other people to see me in a positive way
6. …because I chose them as a way to reach my goals
7. …for the pleasure of learning something new
8. …because otherwise I would feel guilty for not doing them
9. …because they are in line with my main beliefs
10. …even though it does not make a difference whether I do them or not
11. …for the pleasant feelings I get while I am doing them
12. …to show others what I am capable of
13. …because I force myself to do them
14. …because of the satisfaction I feel in trying to excel in what I do
15. …even though I do not have a good reason for doing them
16. …because I choose to make a commitment to what is important for me
17. …because I would be upset with myself if I did not do them
18. …because they reflect what I value most in life
Regulatory Mode Questionnaire

(Kruglanski et al., 2000)

Read each of the following statements and decide how much you agree with each according to your beliefs and experiences. Please respond according to the following scale:

**Scale:** 1 (strongly disagree) to 6 (strongly agree)

1. I don’t mind doing things even if they involve extra effort.
2. I never evaluate my social interactions with others after they occur.
3. I am a “workaholic.”
4. I feel excited just before I am about to reach a goal.
5. I enjoy actively doing things, more than just watching and observing.
6. I spend a great deal of time taking inventory of my positive and negative characteristics.
7. I like evaluating other people’s plans.
8. I am a “doer.”
9. I often compare myself with other people.
10. I don’t spend much time thinking about ways others could improve themselves.
11. I often critique work done by myself and others.
12. I believe one should never engage in leisure activities.
13. When I finish one project, I often wait awhile before getting started on a new one.
14. I have never been late for work or for an appointment.
15. I often feel that I am being evaluated by others.
16. When I decide to do something, I can’t wait to get started.
17. I always make the right decision.
18. I never find faults with someone I like.
19. I am a critical person.
20. I am very self-critical and self-conscious about what I am saying.
21. By the time I accomplish a task, I already have the next one in mind.
22. I often think that other people’s choices and decisions are wrong.
23. I have never hurt another person’s feelings.
24. I am a “low energy” person.
25. Most of the time my thoughts are occupied with the task that I wish to accomplish.
26. I feel that there is no such thing as an honest mistake.
27. I rarely analyze the conversations I have had with others after they occur.
28. When I get started on something, I usually persevere until I finish.
29. I am a “go-getter.”
30. When I meet a new person I usually evaluate how well he or she is doing on various dimensions (e.g., looks, achievements, social status, clothes).
The General Self Efficacy Scale

(Jerusalem & Schwarzer, 1995)

Listed below are a number of statements concerning personal characteristics. Read each item and rate the extent to which you each is true for you.

Scale: 1 (not at all true) to 4 (exactly true)

1. I can always manage to solve difficult problems if I try hard enough
2. If someone opposes me, I can find the means and ways to get what I want
3. It is easy for me to stick to my aims and accomplish my goals
4. I am confident that I could deal efficiently with unexpected events
5. Thanks to my resourcefulness, I know how to handle unforeseen situations
6. I can solve most problems if I invest the necessary effort
7. I can remain calm when facing difficulties because I can rely on my coping abilities
8. When I am confronted with a problem, I can usually find several solutions
9. If I am in trouble, I can usually think of a solution
10. I can usually handle whatever comes my way
Short Grit Scale

(Duckworth & Quinn, 2009)

Please respond to the following 8 items. Be honest – there are no right or wrong answers!

Scale: 1 (not at all like me) to 5 (just like me)

1. New ideas and projects sometimes distract me from previous ones
2. Setbacks don’t discourage me
3. I have been obsessed with a certain idea or project for a short time but later lost interest
4. I am a hard worker
5. I often set a goal but later choose to pursue a different one
6. I have difficulty maintaining my focus on projects that take more than a few months to complete
7. I finish whatever I begin
8. I am diligent
Big Five Inventory
(John & Srivastava 1999)

Here are a number of characteristics that may or may not apply to you. For example, do you agree that you are someone who likes to spend time with others? Please select the extent to which you agree or disagree with that statement.

Scale: 1 (disagree strongly) to 5 (agree strongly)

I see myself as someone who…

1. Is talkative
2. Tends to find fault with others
3. Does a thorough job
4. Is depressed, blue
5. Is original, comes up with new ideas
6. Is helpful and unselfish with others
7. Can be somewhat careless
8. Is relaxed, handles stress well
9. Is reserved
10. Is curious about many different things
11. Is full of energy
12. Starts quarrels with others
13. Is a reliable worker
14. Can be tense
15. Is ingenious, a deep thinker
16. Generates a lot of enthusiasm
17. Has a forgiving nature
18. Tends to be disorganized
19. Worries a lot
20. Has an active imagination
21. Tends to be quiet
22. Is generally trusting
23. Tends to be lazy
24. Is emotionally stable, not easily upset
25. Is inventive
26. Has an assertive personality
27. Can be cold and aloof
28. Perseveres until the task is finished
29. Can be moody
30. Values artistic, aesthetic
31. Is sometimes shy, inhibited
32. Is considerate and kind to almost everyone
33. Does things efficiently
34. Remains calm in tense situations
35. Prefers work that is routine
36. Is outgoing, sociable
37. Is sometimes rude to others
38. Makes plans and follows through with them
39. Gets nervous easily
40. Likes to reflect, play with ideas
41. Has few artistic interests
42. Likes to cooperate with others
43. Is easily distracted
44. Is sophisticated in art, music, or literature
Mindfulness Attention Awareness Scale

(Brown & Ryan, 2003)

Below is a collection of statements about your everyday experience. Using the 1-6 scale below, please indicate how frequently or infrequently you currently have each experience. Please answer according to what really reflects your experience rather than what you think your experience should be. Please treat each item separately from every other item.

Scale: 1 (almost always) to 6 (almost never)

1. I could be experiencing some emotion and not be conscious of it until sometime later
2. I break or spill things because of carelessness, not paying attention, or thinking of something else
3. I find it difficult to stay focused on what’s happening in the present
4. I tend to walk quickly to get where I’m going without paying attention to what I experience along the way
5. I tend not to notice feelings of physical tension or discomfort until they really grab my attention
6. I forget a person’s name almost as soon as I’ve been told it for the first time
7. It seems I am “running on automatic,” without much awareness of what I’m doing
8. I rush through activities without being really attentive to them
9. I get so focused on the goal I want to achieve that I lose touch with what I’m doing right now to get there
10. I do jobs or tasks automatically, without being aware of what I’m doing
11. I find myself listening to someone with one ear, doing something else at the same time
12. I drive places on ‘automatic pilot’ and then wonder why I went there
13. I find myself preoccupied with the future or the past
14. I find myself doing things without paying attention
15. I snack without being aware that I’m eating
The Ruminatio-Reflection Questionnaire

(Trapnell & Campbell, 1999)

For each of the following statements, rate your level of agreement using the following scale:

Scale: 1 (strongly disagree) to 5 (strongly agree)

Rumination

1. My attention is often focused on aspects of myself I wish I’d stop thinking about
2. I always seem to be rehashing in my mind recent things I’ve said or done
3. Sometimes it is hard for me to shut off thoughts about myself
4. Long after an argument or disagreement is over with, my thoughts keep going back to what happened
5. I tend to “ruminate” or dwell over things that happen to me for a really long time afterward
6. I don’t waste time rethinking things that are over and done with
7. Often I’m playing back over in my mind how I acted in a past situation
8. I often find myself reevaluating something I’ve done
9. I never ruminate or dwell on myself for very long
10. It is easy for me to put unwanted thoughts out of my mind
11. I often reflect on episodes in my life that I should no longer concern myself with
12. I spend a great deal of time thinking back over my embarrassing or disappointing moments

Reflection

13. Philosophical or abstract thinking doesn’t appeal to me that much
14. I’m not really a meditative type of person
15. I love exploring my “inner” self
16. My attitudes and feelings about things fascinate me
17. I don’t really care for introspective or self-reflective thinking
18. I love analyzing why I do things
19. People often say I’m a “deep,” introspective type of person
20. I don’t care much for self-analysis
21. I’m very self-inquisitive by nature
22. I love to meditate on the nature and meaning of things
23. I often love to look at my life in philosophical
24. Contemplating myself isn’t my idea of fun
Multidimensional Perfectionism Scale

(Frost, Marten, Lahart, & Rosenblate, 1990)

Concern over mistakes
1. If I fail at work/school, I am a failure as a person
2. I should be upset if I make a mistake
3. If someone does a task at work/school better than I, then I feel like I failed the whole task
4. If I fail partly, it is as bad as being a complete failure
5. I hate being less than the best at things
6. People will probably think less of me if I make a mistake
7. If I do not do as well as other people, it means I am an inferior human being
8. If I do not do well at the time, people will not respect me
9. The fewer mistakes I make, the more people will like me

Personal standards
1. If I do not set the highest standards for myself, I am likely to end up a second-rate person
2. It is important to me that I be thoroughly competent in everything I do
3. I set higher goals than most people
4. I am very good at focusing my efforts on attaining a goal
5. I have extremely high goals
6. Other people seem to accept lower standards from themselves than I do
7. I expect higher performance in my daily tasks than most people

Parental expectations
1. My parents set very high standards for me
2. My parents wanted me to be the best at everything
3. Only outstanding performance is good enough in my family
4. My parents have expected excellence from me
5. My parents have always had higher expectations for my future than I have

Parental criticism
1. As a child, I was punished for doing things less than perfect
2. My parents never tried to understand my mistakes
3. I never felt like I could meet my parents’ expectations
4. I never felt like I could meet my parents’ standards

Doubts about actions
1. Even when I do something very carefully, I often feel that it is not quite right
2. I usually have doubts about the simple everyday things I do
3. I tend to get behind in my work because I repeat things over and over
4. It takes me a long time to do something “right.”

Organization
1. Organization is very important to me
2. I am a neat person
3. I try to be an organized person
4. I try to be a neat person
5. Neatness is very important to me
6. I am an organized person
The Mindset Quiz

(Dweck, 1999)

Read each sentence below and then mark the corresponding box that shows how much you agree with each sentence. There are no right or wrong answers.

Scale: 1 (strongly disagree) to 6 (strongly agree)

1. You have a certain amount of intelligence, and you really can’t do much to change it
2. Your intelligence is something about you that you can’t change very much
3. No matter who you are, you can significantly change your intelligence level
4. To be honest, you can’t really change how intelligent you are
5. You can always substantially change how intelligent you are
6. You can learn new things, but you can’t really change your basic intelligence
7. No matter how much intelligence you have, you can always change it quite a bit
8. You can change even your basic intelligence level considerably
9. You have a certain amount of talent, and you can’t really do much to change it
10. Your talent in an area is something about you that you can’t change very much
11. No matter who you are, you can significantly change your level of talent
12. To be honest, you can’t really change how much talent you have
13. You can always substantially change how much talent you have
14. You can learn new things, but you can’t really change your basic level of talent
15. No matter how much talent you have, you can always change it quite a bit
16. You can change even your basic level of talent considerably
Demographics

How old are you? [text box]

What gender do you primarily identify as?
- Male
- Female
- Other

What is your ethnicity? (check all that apply)
- White or Caucasian
- Black or African American
- Hispanic or Latino/a
- Asian
- Aboriginal (e.g., First Nations, Inuit, Metis)
- Other

What year of study are you in?
- 1\textsuperscript{st}
- 2\textsuperscript{nd}
- 3\textsuperscript{rd}
- 4\textsuperscript{th}
- 5\textsuperscript{th} year or more

What is your current cumulative GPA using the Carleton grading scale?

<table>
<thead>
<tr>
<th>Carleton Scale</th>
<th>Letter Grade</th>
<th>Percentage Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>A+</td>
<td>90-100%</td>
</tr>
<tr>
<td>11</td>
<td>A</td>
<td>85-89%</td>
</tr>
<tr>
<td>10</td>
<td>A-</td>
<td>80-84%</td>
</tr>
<tr>
<td>9</td>
<td>B+</td>
<td>77-79%</td>
</tr>
<tr>
<td>8</td>
<td>B</td>
<td>73-76%</td>
</tr>
<tr>
<td>7</td>
<td>B-</td>
<td>70-72%</td>
</tr>
<tr>
<td>6</td>
<td>C+</td>
<td>67-69%</td>
</tr>
<tr>
<td>5</td>
<td>C</td>
<td>63-66%</td>
</tr>
<tr>
<td>4</td>
<td>C-</td>
<td>60-62%</td>
</tr>
<tr>
<td>3</td>
<td>D+</td>
<td>57-59%</td>
</tr>
<tr>
<td>2</td>
<td>D</td>
<td>53-56%</td>
</tr>
<tr>
<td>1</td>
<td>D-</td>
<td>50-52%</td>
</tr>
</tbody>
</table>
Appendix B: Follow-Up Survey (T2)
Short-Term Goals

For the following questions, think about your [FIRST/SECOND/THIRD] short-term goal: <insert text>

Based on your experience DURING THE PAST WEEK, please indicate the extent to which you agree with each statement.

Scale: 1 (strongly disagree) to 7 (strongly agree)

Goal Progress

1. I have made a lot of progress on this goal
2. I feel like I am on track with my goal plan
3. I feel like I have achieved this goal

Commitment

4. I feel that I was committed to this goal

Difficulty

5. I tried really hard to achieve this goal
6. It was difficult to reach this goal

Implementation Intentions

7. I used specific plans for how, when, and where to reach this goal

Effort

8. I put in a lot of effort into achieving this goal

Goal Status

Where do you currently stand on this goal?
- I have achieved this goal
- I made some progress but did not yet achieve this goal
- I failed at this goal
- I abandoned this goal

Satisfaction with Goal Progress

How satisfied are you with the progress you made toward this goal?
Scale: 1 (extremely dissatisfied) to 7 (extremely satisfied)
**Subjective Ease**

How laborious and taxing did it feel to engage in activities related to this goal?
Scale: 1 (far too little) to 7 (far too much)

How easy and natural was it for you to work on this goal?
Scale: 1 (extremely difficult) to 7 (extremely easy)

**Obstacles During Goal Pursuit**

DURING THE PAST WEEK, I encountered obstacles to achieving this goal.
Scale: 1 (completely disagree) to 7 (completely agree)

DURING THE PAST WEEK, how frequently did you encounter these obstacles?
- Never
- Once during the week
- 2-3 times during the week
- 4-6 times during the week
- Once a day
- Many times a day

**Attribution of Goal Progress**

The reason I did or did not achieve this goal is…

Scale: 1 (strongly disagree) to 7 (strongly agree)

1. Totally due to other people or circumstances
2. Totally due to me
3. Totally due to the goal itself

**Re-Set Goal**

I would set this goal again for myself in the future.
Scale: 1 (strongly disagree) to 7 (strongly agree)

**Goal Conflict**

DURING THE PAST WEEK, did pursuing this goal have a helpful or harmful effect (or no effect at all) on the following goals?
Scale: -2 (very harmful effect), -1 (somewhat harmful effect), 0 (no effect), 1 (somewhat helpful effect), 2 (very helpful effect)

1. Short-Term Goal [1/2/3]: <insert text>
2. Short-Term Goal [1/2/3]: <insert text>
3. Long-Term Goal [1/2/3]: <insert text>
4. Long-Term Goal [1/2/3]: <insert text>
5. Long-Term Goal [1/2/3]: <insert text>
**Long-Term Goals**

For the following questions, think about your [FIRST/SECOND/THIRD] long-term goal: 
<insert text>

Think about the reasons that you are pursuing this goal. For each reason below, give a rating of 1 to 7 on how much you are pursuing your goal for that reason.

**Scale:** 1 (not at all for this reason) to 7 (completely for this reason)

**Autonomous and controlled motivation**

1. Because somebody else (parent, professor, friend, etc.) wants you to, or because you’ll get something from someone if you do
2. Because you would feel ashamed, guilty, or anxious if you didn’t – you feel that you should try to accomplish this goal
3. Because you really believe that it is an important goal to have
4. Because of the fun and enjoyment which the goal will provide you – the primary reason is simply your interest in the experience itself.
5. Because it represents who you are and reflects what you value most in life

**Approach and avoidance motivation**

6. To avoid negative consequences of not pursuing this goal
7. To get closer to something you want

**Goal Content**

To what extent does each of your personal goals help you to achieve the following possible futures?

**Scale:** 1 (not at all) to 7 (very much)

1. Self-acceptance and personal growth: being happy and having a very meaningful life
2. Intimacy and friendship: having many close and caring relationships with others
3. Societal contribution: working to help make the world a better place
4. Financial success: having a job that pays very well and having a lot of nice possessions
5. Fame and recognition: being known and admired by many people
6. Physical appearance: looking good and being attractive to others
Goal Conflict

Scale: -2 (very harmful effect), -1 (somewhat harmful effect), 0 (no effect), 1 (somewhat helpful effect), 2 (very helpful effect)

1. DURING THE PAST WEEK, did pursuing your FIRST long-term goal have a helpful or harmful effect (or no effect at all) on your SECOND long-term goal?
2. DURING THE PAST WEEK, did pursuing your FIRST long-term goal have a helpful or harmful effect (or no effect at all) on your THIRD long-term goal?
3. DURING THE PAST WEEK, did pursuing your SECOND long-term goal have a helpful or harmful effect (or no effect at all) on your THIRD long-term goal?
Appendix C: Data Screening
Sample 1

<table>
<thead>
<tr>
<th>Original Sample</th>
<th>Cleaned and Matched Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dataset</strong></td>
<td><strong>Final Sample Size</strong> 185</td>
</tr>
<tr>
<td><strong>Method</strong></td>
<td><strong>% Useable Data</strong>  51.39%</td>
</tr>
<tr>
<td><strong>Sample Size – T1</strong></td>
<td>360</td>
</tr>
<tr>
<td><strong>Sample Size – T2</strong></td>
<td>225</td>
</tr>
<tr>
<td><strong>Retention Rate</strong></td>
<td>62.5%</td>
</tr>
</tbody>
</table>

Note. We received 375 responses for T1 in Qualtrics, however we did not turn on “prevent ballot stuffing” and so the number above is without duplicates for a more accurate retention rate. Fortunately, there was only 1 duplicate at T2 (which is also reflected above, as T2 was originally 226)

Check for duplicate cases
- T1 – 15 duplicates – selectively remove a case based on completeness and time
  - 13 P’s identified by SPSS duplicate case function
  - 2 P’s identified and removed manually
- T2 – 1 P started the survey twice – selectively remove a case based on completeness and time

Completeness and Time
- T1 – 73 P’s completed the survey in less than 15 minutes and did not complete it
  - 1 P was also a duplicate
  - Decision: removed
- T2 – 18 P’s completed the survey in less than 5 minutes
  - Decision: removed

Completion Time – T1 (after removing duplicates)
- Mean (SD) = 505.93 (2174.69)
- Range = 20.05 to 24451.70
- 28 P’s (9.7%) completed in <30 minutes
- 143 P’s (49.7%) completed in >60 minutes
- 99 P’s (34.4%) completed in >75 minutes

Completion Time – T2 (after removing duplicates)
- Mean (SD) = 251.40 (1139.87)
- Range = 5.15 to 11523.30
- 18 P’s (0.8%) completed in <5 minutes
  - Already removed (see above)
- 67 P’s (32.4%) completed in >20 minutes
Attention Checks

- Item for the attention check were adapted from Maniaci and Rogge (2014). The following items were embedded in random locations throughout the initial (T1) survey:
  - “My main interests are coin collecting and interpretive dancing”
  - “I don’t like getting speeding tickets”
  - “I enjoy receiving telemarketers’ calls”
  - “I’d rather be hated than loved”

- Due to the more subjective nature of this item (e.g., people who actually like dancing may score positively), only the first 3 items were considered. **Those who failed at least 2 of the three attention checks (i.e., fell into the range of problematic scores listed below) were excluded.** The breakdown of the attention checks is as follows:

<table>
<thead>
<tr>
<th>Item</th>
<th>Scale</th>
<th>Problematic Score</th>
<th>#Ps who “failed”</th>
</tr>
</thead>
<tbody>
<tr>
<td>I enjoy receiving telemarketers’ calls</td>
<td>5 point Likert (not at all like me to just like me)</td>
<td>4 (like me) or 5 (just like me)</td>
<td>21</td>
</tr>
<tr>
<td>I don’t like getting speeding tickets</td>
<td>6 point Likert (strongly disagree to strongly agree)</td>
<td>1 (strongly disagree) to 3 (somewhat disagree)</td>
<td>26</td>
</tr>
<tr>
<td>I’d rather be hated than loved</td>
<td>9 point Likert (not at all important to extremely important)</td>
<td>5 (somewhat important) to 9 (extremely important)</td>
<td>51</td>
</tr>
</tbody>
</table>

Number of participants who failed all 3 attention checks: 3

Number of participants who failed at least 2 attention checks: 18

**Final sample to be used in T1 analyses**: 270

**Final sample to be used in the final analyses (T1 & T2)**: 185
Sample 2

<table>
<thead>
<tr>
<th>Original Sample</th>
<th>Cleaned and Matched Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dataset</td>
<td>Fall 2016</td>
</tr>
<tr>
<td>Method</td>
<td>T1 In-lab, T2 online</td>
</tr>
<tr>
<td>Sample Size – T1</td>
<td>293</td>
</tr>
<tr>
<td>Sample Size – T2</td>
<td>253</td>
</tr>
<tr>
<td>Retention Rate</td>
<td>86.3%</td>
</tr>
</tbody>
</table>

Check for duplicate cases
- T1 – 2 duplicates (not including the double entries from paper surveys – those were first removed separately)
  - 1 P started the survey twice, but had only completed one – removed the incomplete entry
  - 1 P had two entries that were exactly the same – removed the second one
  - 1 P from the paper surveys was identified by RA’s as a “crappy survey taker” – removed both entries
- T2 – 1 P started the survey twice, completed one but only finished 4% for the other.
  - Manually deleted the 4% version and updated the sample size – T2 count above to reflect the unique responses

Completeness
- T1 – 1 participant completed 35%
  - Decision: manually deleted
- T2 – 7 participants completed <50% of the survey
  - All 7 P’s also had incomplete T2 data
  - Decision: Manually Remove before compiling T1 and T2

Completion Time – T1 (after removing duplicates)
- Mean (SD) = 78.63 (151.00)
- Range = 13.58 to 1545.42
- 13 P’s (4.5%) completed in <30 minutes
- 106 P’s (36.3%) completed in >60 minutes
- 61 P’s (20.9%) completed in >75 minutes

Completion Time – T2 (after removing duplicates)
- Mean (SD) = 287.73 (1545.68)
- Range = 4.45 to 19888.65
- 3 P’s (1.2%) completed in <5 minutes
- 114 P’s (46.3%) completed in >20 minutes
- 64 P’s (26.0%) completed in >30 minutes
- 37 P’s (15.0%) completed in > 60 minutes
Matching T1 and T2

**Technique:** Open a new data file. Copy and paste the email variable from T1. Import the emails from T2 into the same column (I just manually copied and pasted). Use the “identify duplicate” function in SPSS with the first case as primary.

- Participants who successfully completed both T1 and T2 should be pushed to the top. The duplicate emails will be after one another and the duplicate variable should read 1 for the first email and 0 for the second (duplicate).
- Any participants that were not matched are at the bottom – you can find this by looking for the spot where the column becomes a string of 1’s.
  - The number of 1’s without a corresponding 0 should match the discrepancy between T1 and T2. If not, check for typos, rogue emails, etc.

**Results**

- 18 P’s couldn’t be initially matched because of typos in their email at T1
  - Corrected by manually by editing the email at T1 to match the email at T1
- After fixing typos, 49 P’s still could not be matched. However, 291 – 246 = 45, so 4 emails are not matched in error.
  - 1 P gave a non-Carleton email address that had to be corrected. Matched using the participant code, so matched T1 to the email address that was used to send T2.
  - 2 P’s were a duplicates at T1 that were missed in the initial screening – removed duplicates from T1
    - Thus, 289 – 246 = 43
- Final Result: 44 P’s completed T1 but didn’t complete T1 – **245 P’s successfully matched**
Attention Checks

- Item for the attention check were adapted from Maniaci and Rogge (2014). The following items were embedded in random locations throughout the initial (T1) survey:
  - “My main interests are coin collecting and interpretive dancing”
  - “I don’t like getting speeding tickets”
  - “I enjoy receiving telemarketers’ calls”
- As with sample 1, we will not use the coin collecting and interpretive dancing item. For samples 2 and 3, the item “I’d rather be hated than love” was not included due to the changing of scales (i.e., we forgot to add it back in)

<table>
<thead>
<tr>
<th>Item</th>
<th>Scale</th>
<th>Problematic Score</th>
<th>#Ps who “failed”</th>
</tr>
</thead>
<tbody>
<tr>
<td>I enjoy receiving telemarketers’ calls</td>
<td>5 point Likert (not at all like me to just like me)</td>
<td>4 (like me) or 5 (just like me)</td>
<td>10</td>
</tr>
<tr>
<td>I don’t like getting speeding tickets</td>
<td>6 point Likert (strongly disagree to strongly agree)</td>
<td>1 (strongly disagree) to 3 (somewhat disagree)</td>
<td>19</td>
</tr>
</tbody>
</table>

Number of participants who failed both attention checks = 2

**Final sample to be used in T1 analyses** = 287

**Final sample to be used in the final analyses (T1 & T2)** = 243

Note. Manually deleted participants who failed both attention checks.
Sample 3

<table>
<thead>
<tr>
<th>Original Sample</th>
<th>Cleaned and Matched Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dataset</td>
<td>Winter 2017</td>
</tr>
<tr>
<td>Method</td>
<td>T1 In-lab, T2 online</td>
</tr>
<tr>
<td>Sample Size – T1</td>
<td>249</td>
</tr>
<tr>
<td>Sample Size – T2</td>
<td>221</td>
</tr>
<tr>
<td>Retention Rate</td>
<td>88.8%</td>
</tr>
<tr>
<td></td>
<td><strong>Final Sample Size 211</strong></td>
</tr>
<tr>
<td></td>
<td>% Useable Data 84.7%</td>
</tr>
</tbody>
</table>

Check for duplicate cases
- T1 – no duplicates
- T2 – no duplicates

Completeness
- T1 – 1 participant completed 90%
  - Missing information for regulatory mode and some demographics
  - Decision: retain if no issues listed in logbook
- T2 – 4 participants completed <30% of the survey
  - P’s (to cross-reference to the logbook):
  - Decision: Manually Remove before compiling T1 and T2

Completion Time – T1
- Mean (SD) = 54.67 (18.97)
- Range = 17.30 to 141.58
- 10 P’s (4%) completed in <30 minutes
- 75 P’s (30.2%) completed in >60 minutes
- 25 P’s (11.7%) completed in >75 minutes

Completion Time – T2
- Mean (SD) = 104.18 (383.78)
- Range = 3.97 to 3245.57
- 5 P’s (2.3%) completed in <5 minutes
- 81 P’s (37.3%) completed in >20 minutes
- 45 P’s (20.7%) completed in >30 minutes
- 29 P’s (13.4%) completed in > 60 minutes
Matching T1 and T2

**Technique:** Open a new data file. Copy and paste the email variable from T1. Import the emails from T2 into the same column (I just manually copied and pasted). Use the “identify duplicate” function in SPSS with the first case as primary.

- Participants who successfully completed both T1 and T2 should be pushed to the top. The duplicate emails will be after one another and the duplicate variable should read 1 for the first email and 0 for the second (duplicate).
- Any participants that were not matched are at the bottom – you can find this by looking for the spot where the column becomes a string of 1’s.
  - The number of 1’s without a corresponding 0 should match the discrepancy between T1 and T2. If not, check for typos, rouge emails, etc.

**Results**

- 9 P’s couldn’t be initially matched because of typos in their email at T1
  - Corrected by manually by editing the email at T1 to match the email at T1
- After fixing typos, 35 P’s still could not be matched. However, $248 - 217 = 31$, so 4 emails (2 P’s) are not matched in error.
  - 1 P gave a random non-identifying email. Sorted out when emailing follow-ups, so matched T1 to the email address that was used to send T2.
  - 1 P had a typo that was not caught above. Matched T1 to the email address that was used to send T2.
- Final Result: 31 P’s completed T1 but didn’t complete T1 – 217 P’s successfully matched
Attention Checks

- Item for the attention check were adapted from Maniaci and Rogge (2014). The following items were embedded in random locations throughout the initial (T1) survey:
  - “My main interests are coin collecting and interpretive dancing”
  - “I don’t like getting speeding tickets”
  - “I enjoy receiving telemarketers’ calls”
- As with sample 1, we will not use the coin collecting and interpretive dancing item. For samples 2 and 3, the item “I’d rather be hated than love” was not included due to the changing of scales (i.e., we forgot to add it back in)

<table>
<thead>
<tr>
<th>Item</th>
<th>Scale</th>
<th>Problematic Score</th>
<th>#Ps who “failed”</th>
</tr>
</thead>
<tbody>
<tr>
<td>I enjoy receiving telemarketers’ calls</td>
<td>5 point Likert (not at all like me to just like me)</td>
<td>4 (like me) or 5 (just like me)</td>
<td>16</td>
</tr>
<tr>
<td>I don’t like getting speeding tickets</td>
<td>6 point Likert (strongly disagree to strongly agree)</td>
<td>1 (strongly disagree) to 3 (somewhat disagree)</td>
<td>23</td>
</tr>
</tbody>
</table>

Number of participants who failed both attention checks: 6

**Final sample to be used in T1 analyses**: 242

**Final sample to be used in the final analyses (T1 & T2)**: 211

Note. Manually deleted participants who failed both attention checks. 2 of 6 didn’t complete T2.

---

**Final Combined Sample Sizes**

<p>| | |</p>
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<th></th>
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</thead>
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<tr>
<td>T1 &amp; T2 Matched</td>
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Appendix D: Full EFA analyses on aggregated variables
Table 13. EFA on the aggregated scales to observe similarity among constructs – Sample 1.

<table>
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<tr>
<th>Construct</th>
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Table 15. Correlations among all constructs from the 14 individual difference measures.

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