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The Relationship Between Procrastination and Emotions

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NOTE ON INCLUSION OF PUBLISHED WORK

Certain chapters have contributed to conferences in the field of procrastination and health psychology

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ABSTRACT

Procrastination is conceptualized as an emotion regulation strategy that provides short-term mood repair. Yet research into how emotions function with respect to procrastination has focused mainly on negative emotions, with less research on positive and mixed emotions. Adopting the mood-repair conceptualization of procrastination as a theoretical framework, this thesis offers three studies that examined how procrastination is associated with negative, positive and mixed emotions, as well as which factors may influence these relationships. Study 1 (reported in Chapter 2) demonstrates the findings of a cross-sectional study, which found that procrastination, as a trait-like quality, was associated with higher levels of negative and mixed emotions, and lower levels of positive emotions. Sequential mediation analysis showed that less perceived social support and high threat appraisals explained the positive relationship between trait procrastination and negative emotions. Study 2 (reported in Chapter 3) demonstrates the findings of an experience-sampling study that examined the dynamic relationships between situational procrastination and emotions, and what role goal characteristics (i.e., goal motivation, goal focus and goal conflict) might play in these relationships. Results revealed that procrastination was positively associated with momentary negative and mixed emotions but not with positive emotions. Multilevel logistic regression analysis showed that controlled motivation and outcome focus exacerbated the effect of negative emotions in prompting procrastination. The experience of mixed emotions explained why people procrastinated more when faced with daily goal conflict. Study 3 (reported in Chapter 4) presents the findings of an experimental study that investigated whether adaptively regulating emotions is beneficial for reducing procrastination. When faced with aversive goals that elicit negative emotions,

reappraising the goals by assigning meaning or cultivating positive emotions were both effective in reducing procrastination. Overall, this thesis provides strong evidence that emotional distress (e.g., the experience of negative or mixed emotions) associated with performing intended goals is a root cause of procrastination. In addition, loss of positive emotions associated with goal achievement may contribute to procrastination. The implications of these findings and avenues for future research are discussed in Chapter 5.

CHAPTER 1

PROCRASTINATION AND EMOTIONS: A LITERATURE REVIEW

1.1 Chapter Overview

This chapter presents a review of the literature that summarises and synthesizes the theories and the extant research on procrastination and emotions. More specifically, the review discusses a theoretical framework for understanding the role of emotions[1] in procrastination, which is based on the mood repair conceptualization of procrastination (Sirois & Pychyl, 2013). Also, the review identified the strengths and gaps of the existing empirical evidence in the relationships between procrastination and emotions. The findings of the review informed the present research programme to investigate missing pieces in the extant research on procrastination and emotions.

This chapter is comprised of nine sections. This is the first section, the chapter overview, which briefly introduces the structure of this chapter. The second section (Section 1.2) provides a broad background to procrastination, including the definition, main types and prevalence of procrastination. Section 1.3 reviews the mood repair conceptualization of procrastination, highlighting that the priority of short-term mood repair over long-term goal pursuit is key for understanding procrastination (Sirois & Pychyl, 2013). Section 1.4 enumerates empirical evidence that provides support for

[1] Before discussing the role of emotions in procrastination in more detail, it is essential to acknowledge the distinctions among affect, emotion and moods. First, affect is an umbrella concept that consists of moods and emotion, which represents the feeling tone related to a sense of pleasure or unpleasure. Emotion is usually caused by an identifiable event and often leads to action tendencies relevant to the event (Lang, 1995). In contrast, moods are often independent of internal or external events. Moods differ from emotions in length and intensity. Moods are long-lasting and more diffuse than emotions (Gross, 1998). Making this distinction clear is essential; however, the detailed differences are beyond the scope of the current research programme. Therefore, the word "emotion(s)" was used as a general term that includes discrete emotions, moods, and affect in this thesis.

the mood repair conceptualization of procrastination. Section 1.5 discusses the role of emotions in understanding procrastination, including negative, positive and mixed emotions. By discussing prior research on the relationships between procrastination and emotions, this section identifies limitations in the previous literature. Section 1.6 and Section 1.7 provide an overview of the potential factors that may influence the relationships between procrastination and emotions. Specifically, Section 1.6 discusses the relationship between trait procrastination and emotions from the cognitive transactional perspective. Section 1.7 contains a review of the role of goal characteristics in procrastination. Section 1.8 presents a critical summary of the existing literature to identify research gaps and an outline of the main aims of the current research programme based on such gaps. The last section (Section 1.9) presents an overview of the remaining chapters.

1.2 Definition and Prevalence of Procrastination

1.2.1 Definition of Procrastination

Researchers have offered different definitions of what constitutes procrastination from personality, cognitive, behavioural, clinical and psychodynamic perspectives. Although there exists diversity in the conceptual definitions of procrastination, in all of the existing conceptualization of procrastination, delaying, postponing or putting off a task or action is a core element (e.g., Aitken, 1982; Lay, 1986). However, researchers (e.g., Anderson, 2016b; Haghbin, 2015) highlighted the problematic nature of procrastination, suggesting it is an essential element to distinguish procrastination from a simple delay. Given that procrastination is a problematic delay, people are cognitively aware that this delay will cause negative consequences (Klingsieck, 2013b).

Another crucial element differentiating procrastination from other delays is that the delay is needless (e.g., Haghbin, 2015; Steel, 2007). This element has been described by researchers using various other terms, such as unnecessary (Solomon & Rothblum, 1984), irrational (Silver & Sabini, 1981) and unwarranted (Anderson, 2016b). Needless means that there are no rational reasons or no external forces imposed on a person, causing them to postpone an intended action or a task (Milgram, Mey-Tal, & Levison, 1998). In other words, people voluntarily choose to delay. If a delay is due to a valid reason (e.g., IT issues such as computer failure), then the delay would be necessary and rational, therefore not count as procrastination. In summary, combining elements of procrastination, the definition most commonly used by researchers is the needless and voluntary delay of an intended course of action despite knowing that potential negative consequences may be caused by the delay (Ferrari & Tice, 2000; Klingsieck, 2013b).

Procrastination can be seen as behaviour, which is often influenced by several contextual factors and task characteristics. Behaviourally, Sirois and Giguère (2018) define procrastination as a form of disengaging from intended tasks that may come at an immediate cost but yet distant rewards, to engage in alternative activities that can provide immediate rewards. Procrastination as behaviour is closely associated with the characteristics of a task (Harris & Sutton, 1983; Van Eerde, 2000). For example, previous studies found that procrastination often occurs when a task is perceived as aversive (Blunt & Pychyl, 2000; Huang & Golman, 2019; Milgram, Marshevsky, & Sadeh, 1995).

When procrastination becomes a more entrenched pattern of behaviour responding to tasks, then procrastination can be defined as a relatively stable tendency or a personality trait, which is manifest across a range of life domains and endure over

time (Lay, 1992). This definition is the common practice of differentiating trait procrastinators from non-procrastinators (Lay, 1997). Compared to those with a weak tendency to procrastinate, people with a strong tendency should frequently engage in behavioural delay. The empirical evidence that supports procrastination having trait-like qualities comes from a behavioural-genetics study by Gustavson, Miyake, Hewitt, and Friedman (2014). Gustavson and colleagues investigated over 300 same-sex twin pairs, indicating that procrastination was moderately heritable (46%). In a meta-analysis, Steel (2007) outlined a 10-year longitudinal study conducted by R. Elliot (2002), showing that procrastination has good stability when it is measured as a trait. These findings further support the notion that procrastination could be conceived of as a personality trait.

Investigating procrastination from both a behavioural and a trait perspective is important. The situational approach (i.e., behavioural delay) highlights the role of contextual factors and/or goal characteristics might play in procrastination. That is, one may postpone only specific tasks (e.g., writing a paper) but not on others (e.g., exercising). On the other hand, the trait perspective focuses on characteristics common among procrastinators as a function of individual differences (Lay, Kovacs, & Danto, 1998). Each perspective pays particular attention to specific aspects of procrastination, in which one may overlook some aspects but can be supplemented by the other. Therefore, in an attempt to provide a comprehensive understanding of procrastination, the present research programme investigated procrastination based on both of these two perspectives.

1.2.2 The Prevalence of Procrastination

Procrastination is a relatively common and pervasive problem. Chronic procrastination has been expected to affect up to 20% of the general population (Díaz-

Morales & Ferrari, 2015). The prevalence rate in the academic domain is double or even triple that of the general population, with up to 50% of students reporting that they struggle with academic procrastination (Klassen, Krawchuk, & Rajani, 2008; Onwuegbuzie, 2004). Although procrastination in the working population has received relatively less attention, Van Eerde and Venus (2018) argue that the prevalence in this domain is approximately equal to, if not higher, in the academic domain. Because of the prevalence of procrastination, investigating the antecedents and consequences of procrastination may gain insights into when and why people procrastinate and develop theory-led interventions that overcome this pervasive problem.

1.3 Procrastination as Short-term Mood Repair

Procrastination is conceptualised as an emotion regulation strategy that short-term mood repair takes precedence over long-term goal pursuit (Sirois & Pychyl, 2013). Procrastination often occurs when people are faced with a task that is perceived as aversive and therefore results in negative emotions. The experience of negative emotions caused by aversive tasks shifts our focus from the ongoing tasks towards emotion regulation. In this case, postponing the aversive task may provide immediate emotional relief, making us feel better. In short, procrastination is a result of a focus on regulating emotions in the short term (Sirois & Pychyl, 2013).

Ironically, regulating emotions by procrastination may be effective in the short term but frequently backfires in the long term (Pychyl & Sirois, 2016; Sirois & Pychyl, 2013). First, giving priority to short-term mood repair often makes people feel worse. Once the mood-boosting effects wear off, people may maintain negative states or even experience additional negative emotions. This may perpetuate a vicious cycle of procrastination and negative emotions. That is, procrastination as a means of

regulating emotions causes additional negative emotions, further undermining the self-control necessary for task engagement (Pychyl & Sirois, 2016).

Second, prioritising short-term mood repair, long-term self-regulation goals are often abandoned (Pychyl & Sirois, 2016; Tice & Bratslavsky, 2000). Consistent with this, the bulk of research in the academic domain suggests that procrastination is associated with poor academic performance (Van Eerde, 2003), low academic achievement and high course withdrawal (Balkis, Duru, & Bulus, 2013; Özer, Demir, & Ferrari, 2009). Also, the awareness of these negative consequences due to past procrastination may contribute to self-judgemental thoughts and negative self-evaluations (Flett, Blankstein, & Martin, 1995). Over time, those with negative self-related thoughts may be less likely to exert self-control to accomplish their goals.

The experimental work of Tice, Bratslavsky, and Baumeister (2001) is important for understanding why a focus on regulating emotions prompts procrastination. In the third of a series of three studies, Tice and colleagues adopted a 2x2x2 design to test the impacts of negative emotions, changeable versus frozen emotions, and fun versus boring distracting activities on procrastination. Here, procrastination was measured by the amount of time that participants spent on alternative activities other than the preparation for the main test. The hypothesis of this study was that participants in the bad-mood condition would procrastinate more when they thought their emotions could be altered and provided distracting activities were fun.

Initially, participants were asked to read emotion-eliciting stories resulting in one of two mood conditions: happy or sad. Once the relevant mood was evoked, a mood-freezing manipulation was used to control participants' anticipations of the possibility of mood repair. Half of the participants were told that the aromatherapy

effects of the candle would cause their emotions to be frozen. In contrast, the other half of the participants were told that their emotions were changeable as normal during the candle was lit.

Furthermore, a third manipulation was added to investigate whether fun versus boring task-irrelevant, time-wasting activities would influence the amount of time people spend procrastinating. Half of the participants in the fun condition were provided enjoyable distracting activities, such as a challenging plastic puzzle and some popular magazines. In contrast, the other half of the participants in the boring condition were given relatively boring distracting activities, such as a pre-school level puzzle. All participants were told that they would be given 15 mins practice time before an intelligence test. Participants in all conditions could decide how much time they spent on practice or devote any part of the practice period to off-task activities.

As expected, Tice et al. (2001) found that participants spent significantly more time procrastinating when (i) they were in the bad mood condition, (ii) conceived that their moods were changeable, and (iii) were provided relative more enjoyable distracting activities. Pychyl and Sirois (2016) argue that although Tice et al.'s work did not include actual procrastinating behaviour, their findings identified two premises that bad moods could cause self-regulation failure. That is, people believe that they could change their moods and the alternative activities are enjoyable.

Pychyl and Sirois (2016) situated procrastination theoretically within the process model of emotion regulation (Gross, 1998) to further illustrate why procrastination is an outcome of emotion regulation. Gross (1998) defines emotion regulation as a set of automatic and controlled processes by which people use strategies to reduce, strengthen, or maintain one or more emotional states depending on an individual's current needs. Motivations for emotion regulation can be either seeking desirable

emotional states (i.e., hedonistic goals) or achieving some goals or performing certain behaviours (i.e., instrumental goals; Gross, 2002; R. Larsen, 2000; Tamir, Mitchell, & Gross, 2008).

According to the process model of emotion regulation (Gross, 1998), emotion can be regulated at five major points in the emotion generative process: situational selection, situational modification, attention deployment, cognitive change and response modulation (Gross, 1998). At the broadest level, the first four of these are antecedent-focused, in which individuals directly modify the emotional input before emotion-response tendencies have become fully activated. The fifth point (i.e., response modulation) is response-focused, which occurs after an emotional response has been generated (Gross, 2013; Gross & Thompson, 2007).

Pychyl and Sirois (2016) explained how procrastination serves as an emotion regulation strategy, primarily focused on the strategies of situational selection and attention deployment. Situation selection requires people to proactively anticipate how a situation might make them feel before approaching or avoiding it (Gross, 2013). When a situation or a task evokes negative emotions, people may choose to avoid the emotionally relevant situation and approach other situations. If they avoid or disengage from the situation that elicits negative emotions, they may regulate emotions in the moment. From this point of view, situational selection as a forward-looking, proactive emotion regulation strategy is fulfilled by procrastination (Pychyl & Sirois, 2016). Individuals regulate negative emotions by pulling away from tasks and situations that give rise to negative emotions.

Although situation selection is the first emotion regulation strategy fulfilled by procrastination, attentional deployment may occur simultaneously with situational selection (Pychyl & Sirois, 2016). Attentional deployment is often used when

individuals have been unable to alter or entirely escape the situations associated with negative emotions. In this case, people deal with these emotions by voluntarily directing their attention away from the negative aspects of the situation (Gross, 2013). Distraction is one typical form of attention deployment (Gross, 2013), which has been found to be the first-choice strategy for individuals who were in a state of cognitive dissonance caused by procrastination (D. Little & Pychyl, 2015).

Cognitive dissonance is a psychological process in which individuals recognize an inconsistency between their actions and beliefs (Festinger, 1957). In the context of procrastination, the dissonance between the desires of immediate hedonic gratification and long-term goals may result in psychological discomfort and negative emotions. In an effort to reduce such dissonance, people may actively avoid information and situations associated with the dissonance (Festinger, 1957). Thus, from the emotion regulation perspective, distraction and procrastination may be intertwined as both entails focusing on tempting activities (or aspects) to regulate emotions.

Pychyl and Sirois (2016) indicate that by this point, emotion regulation has been fulfilled by procrastination. More specifically, procrastination has met the goal of regulating emotions by either selecting a more enjoyable situation (or task) or voluntarily shifting attention from one aspect of a situation (or a task) to another more enjoyable aspect.

The focus on short-term mood repair that characterises procrastination is an instance of emotion misregulation (Pychyl & Sirois, 2016). Misregulation occurs when one uses an ineffective strategy to initiate, alter, or inhibit a behaviour. One typical form of an ineffective strategy is that people select to control irrelevant aspects of the problems (Carver & Scheier, 1982), which means that their efforts on

regulation are heading in a wrong direction (Baumeister & Heatherton, 1996). Pychyl and Sirois (2016) drew on the work of Tice et al. (2001), suggesting that procrastination is a form of misregulation instead of underregulation (i.e., a failure to exert self-control; Baumeister & Heatherton, 1996). In Tice et al.'s study, participants' final levels of moods did not differ between the frozen mood and changeable conditions. This means that the desired mood-boosting effect was short term as participants did not have a long-lasting mood improvement through engaging in enjoyable distracting activities (e.g., playing video games). People choose to engage in procrastination and/or distracting activities, as opposed to planful problem solving, is because they hold a false belief that procrastination can make them feel better (Pychyl & Sirois, 2016).

The conceptualization of procrastination as an emotion regulation strategy is not only the primacy of short-term mood repair over long-term goal pursuit but also the primacy of the needs of the present self over the future self (Sirois & Pychyl, 2013). In some cases, the awareness of the discrepancy between the present and future self may have motivational value, triggering goal-directed behaviour (Higgins, Roney, Crowe, & Hymes, 1994). However, negative emotions associated with goal discrepancy may narrow one's temporal scope, making them focus on the present pleasure with less concern for the consequences for future-self (Sirois & Pychyl, 2013).

Research on procrastination and time perspective provides support for such affect-driven short-sightedness. For example, a meta-analysis by Sirois (2014a) provides a comprehensive review of how procrastination is linked to time perspective, and the results of her meta-analysis revealed procrastination was negatively related to future time perspective and positively related to present time perspective. Mediation

analyses across two samples demonstrated that higher levels of stress and lower levels of positive affect explained in part the negative relationship between procrastination and future time perspective. Based on evidence from neuroscience research, Sirois (2014a) explained that perceived stress and/or threat-related negative emotions evoke a cascade of neurophysiological responses that redirect resources to cope with the perceived threats. Among these responses, the amygdala plays a pivotal role in rapidly increasing momentary vigilance towards threatening stimuli (Davis & Whalen, 2001). This response directs one's attention away from distal concerns to threat-relevant stimuli and immediate concerns to initiate coping efforts (LeDoux, 2000). Within procrastination, negative emotions may activate specific brain areas associated with threat detection, framing a narrow, present-oriented focus. This, in turn, may make it easier for people to choose the hedonic needs of the present self, regardless of the consequences for the future self (Sirois & Pychyl, 2013).

In summary, the mood-repair conceptualization of procrastination provides a framework explaining how procrastination serves as an emotion regulation strategy. First, negative emotions associated with aversive tasks lead people to prioritize emotional relief through procrastination as they mistakenly believe that negative emotions can be alleviated through avoidance instead of task completion. Furthermore, negative emotions narrow one's temporal scope, which enables them to solely focus on present hedonic needs and ignore the consequences of the present delay for future self (Pychyl & Sirois, 2016; Sirois & Pychyl, 2013).

1.4 Empirical Evidence Supporting Procrastination as Short-term Mood Repair

The main purpose of the present section is to review recent quantitative, qualitative and physiological research on procrastination that supports the mood-repair conceptualisation of procrastination (Sirois & Pychyl, 2013). This section

comprises three sections. The first section (Section 1.4.1) consists of a review of qualitative research using the interview to discover participants' inner experiences when they procrastinate. By producing detailed descriptions of participants' feelings and interpreting the meanings of their actions, researchers found that people frequently experience negative emotions at the time of procrastination. The second section (Section 1.4.2) contains a review of quantitative research that investigated the underlying mechanisms behind the link between procrastination and high negative emotions or low positive emotions. The final section (Section 1.4.3) presents physiological research that examined individual differences in neural activations in certain emotion-related brain regions in procrastinators and non-procrastinators. The (in)activities in several emotion-related brain regions may explain why certain people are susceptible to procrastination. These findings provide physiological evidence for the notion that procrastination is a problem with emotion regulation (Pychyl & Sirois, 2016).

1.4.1 Qualitative Evidence

A qualitative study by Laybourn, Frenzel, and Fenzl (2019) demonstrated that procrastination could be attributed to short-term hedonistic reasons. Laybourn and colleagues explored the phenomenon of procrastination in teachers, which primarily focused on their emotional and stressful experiences when they procrastinated. Twenty-seven teachers from primary and secondary schools were interviewed individually. Sixteen of those teachers (60%) reported that they procrastinated on professional tasks. Data from these 16 teachers were analysed through qualitative content analysis, showing that 15 of 16 teachers (94%) experienced overall negative emotions when they procrastinated, such as anger, guilt, unhappiness and

disappointment. Statements such as the following exemplify the downward spiral of procrastination:

> But when I think about it or when the pressure starts to get stronger then it just blocks the happiness, the high spirits or the spontaneity or so. All of that is restricted. Then I think I should really be doing this. I have a feeling as if the spiral is turning further and further downwards and always… the noose tightens more and more (p.7).

Importantly, four of the 16 interviewees attributed their procrastination to hedonistic reasons. They reported that they turned attention away from their duty and engaged in more enjoyable activities because the due date was still further in the future. However, they felt uncomfortable because of the initial delay as the deadline was approaching. This pattern is consistent with the mood repair conceptualization of procrastination (Sirois & Pychyl, 2013), which indicates that individuals use task avoidance to create the short-term hedonic shift. However, they feel worse because of the increased stress of time pressure (Pychyl & Sirois, 2016).

Furthermore, in terms of the question of why they procrastinate, 13 of 16 teachers reported that they procrastinate because of task aversiveness, such as uninteresting, boring, or effortful. Task aversiveness is a cause of procrastination, as aversive tasks often lead to unpleasant feelings (Blunt & Pychyl, 2000). From this standpoint, these results support the argument that procrastination is underpinned by avoiding and regulating negative emotions (Sirois & Pychyl, 2013).

Similar results have also been found in another qualitative study by Grunschel, Patrzek, and Fries (2013), which investigated the precursors or products of academic procrastination. In this study, Grunschel and colleagues found that most students

attributed their academic procrastination to affective reasons. For example, 22 of the 36 students (60%) attributed their academic procrastination to anxiety, and 17 of the 36 students (47%), attributed it to dissatisfaction. In addition, half of the students reported that they postponed intended tasks because of compelling alternative activities, for instance, when they thought these activities were fun or easier. The above findings are consistent with the mood repair conceptualization of procrastination (Sirois & Pychyl, 2013) and empirical evidence (e.g., Sirois & Giguère, 2018). The alternative activities provide an opportunity to experience positive emotions, making them more susceptible to choosing alternative activities over aversive intended tasks (Sirois & Giguère, 2018).

Fernie and Spada (2008) explored individuals' metacognitive beliefs about procrastination, suggesting the crucial role of negative emotions in maintaining procrastination. Metacognition refers to people's self-awareness and self-control of their cognitive processes, also called "cognition about cognition" (Flavell, 1979). Fernie and Spada interviewed 12 individuals who considered themselves are chronic procrastinators and asked them to describe their focus of attention when they were procrastinating. Seven of 12 participants reported that the focus of their attention was on emotional states and one principal goal of procrastination was to reduce negative emotions. Also, in response to the question of how they knew if they had achieved their procrastination goal, seven participants identified that an improvement in emotions is a sign that their goal had been achieved.

Within Gross's process model of emotion regulation (Gross, 1998), shifting attention from a stressful situation to others is an emotion regulation strategy (i.e., attentional deployment). In Fernie and Spada's (2008) study, procrastinators directed their attention from a task itself towards reducing negative emotions is a strategy of

emotion regulation. Fernie and Spada further indicate that this strategy seems to cause an escalation of negative emotions and behavioural procrastination. The results of their study indicate that internally attending to negative emotions may be common among procrastinators. From a metacognitive standpoint, procrastinators' focus of attention on negative emotions may explain why they are more susceptible to procrastination.

In summary, these qualitative studies provide an in-depth look into the antecedents and consequences of procrastination without taking a specific theoretical perspective. The core finding is that negative emotions are an antecedent of procrastination. This finding is consistent with the mood repair conceptualization of procrastination (Sirois & Pychyl, 2013). Down-regulating negative emotions to meet hedonic needs is the goal of procrastination for many participants.

1.4.2 Quantitative Evidence

The above qualitative studies explored the phenomena of procrastination through the interview, showing that negative emotions play a crucial role in procrastination (Sirois & Pychyl, 2013). The following quantitative studies confirmed and generalized this proposition by investigating associations between procrastination and emotions with larger sample sizes.

Procrastination as a maladaptive coping strategy used to regulate emotion has been substantiated through a meta-analysis by Sirois and Kitner (2015). Based on 15 studies and a total sample size of 4357, Sirois and Kitner examined whether and how trait procrastination is associated with coping strategies. Results demonstrated that trait procrastination was related to the greater use of maladaptive coping strategies, avoidant coping in particular, but the less use of adaptive coping strategies. By

analysing four independent samples, Sirois and Kitner found that maladaptive coping mediated the positive association between trait procrastination and perceived stress. This finding suggests that the greater use of maladaptive coping explained higher levels of stress that procrastinators experience.

According to the transactional model of stress and coping (Lazarus & Folkman, 1984), coping is viewed as behavioural and cognitive efforts to reduce the environmental demands perceived as endangering well-being. People use various strategies to cope with these demands to reduce negative emotions and stress. Some strategies seem to be maladaptive. These strategies mainly focus on immediate relief from the stress and/or negative emotional states activated by the stressors rather than solving the source of the stress (Lazarus and Folkman, 1984). The finding that maladaptive coping was linked to trait procrastination suggests that this coping style (i.e., avoidance) might be a habitual tendency of procrastinators. This type of coping makes it easier for procrastinators to avoid negative emotional states in the short term but end up with higher stress. These findings highlight that seeking immediate emotional relief is a characteristic coping response of procrastinators, and this maladaptive mood repair response may increase their stress in the long term (Sirois & Kitner, 2015).

Whereas the above study viewed procrastination as a personality trait that has been linked to maladaptive coping in response to stress, a series of cross-sectional studies by Sirois, Nauts, and Molnar (2018) investigated how individual differences in emotion regulation is related to bedtime procrastination. Here, bedtime procrastination was viewed as a form of procrastinating behaviour (Sirois et al., 2018). Bedtime procrastination refers to people unnecessarily going to bed beyond the intended time, despite knowing negative consequences may occur as a result of doing

so (Kroese, Nauts, Kamphorst, Anderson, & de Ridder, 2016). Sirois and colleagues found that individuals high in self-compassion were less likely to engage in bedtime procrastination because they experienced lower levels of negative emotions. Self-compassion is characterised as a trait that people take a kind and non-judgmental stance toward themselves in instances of failure (Neff, 2003). This quality has been linked to adaptive emotion regulation (Inwood & Ferrari, 2018; Neff, Kirkpatrick, & Rude, 2007).

To investigate why self-compassionate individuals experienced lower levels of negative emotions and engaged in less bedtime procrastination, Sirois et al. (2018) replicated the model found in their first study but expanded it to include one particular emotion regulation strategy, cognitive reappraisal. Path analysis confirmed the role of cognitive reappraisal in explaining lower levels of negative emotions and less bedtime procrastination in self-compassionate individuals. These findings suggest that self-compassionate people who are able to regulate emotions in a healthy and adaptive manner (e.g., the greater use of cognitive reappraisal) may be less likely to experience negative emotions. This, in turn, may reduce the desire for short-term mood repair through procrastination. As a reverse conclusion, therefore, those who have difficulty regulating emotions (e.g., chronic procrastinators) may tend to use task avoidance as a means of coping with negative emotions (Sirois & Pychyl, 2013).

In addition to cross-sectional studies, findings from longitudinal studies also provide support for the proposition that negative emotions play a crucial role in procrastination (Sirois & Pychyl, 2013). For instance, Pychyl et al. (2000) conducted a five-day experience-sampling study to investigate students' emotional states at the time of procrastination. In this study, participants completed self-report measures of behavioural delay and momentary ratings of their emotions eight occasions per day.

Negative emotions were assessed using five adjectives (i.e., depressed, unhappy, frustrated, angry/hostile and worried/anxious) and an additional emotional variable (i.e., guilty). Results demonstrated that procrastination was only associated with feelings of guilt but not with any other negative emotions.

The positive association between procrastination and guilt suggests people were more likely to experience guilt when procrastinating. Guilt has been identified as playing an important role in self-regulation in its capacity to modify one's thoughts and behaviour (Amodio, Devine, & Harmon-Jones, 2007). In theory, the experience of guilt may motivate people to exert self-control to repair issues created by the unnecessary delay of a task and decrease future procrastination. However, it is also possible that people continuously choose to postpone the task as a means to mitigate guilt. In this case, people may slip into a vicious circle of procrastination where negative emotions associated with aversive tasks prompt procrastination and not acting in a timely manner may heighten negative emotions (e.g., guilt), thereby leading to future procrastination. These findings highlight the importance of negative emotions, guilt in particular, in understanding procrastination. Procrastination may help people avoid aversive tasks that cause frustration or depression. However, it may also induce or stimulate other negative emotions, such as guilt (Pychyl & Sirois, 2016).

A recent lagged daily diary study supports the causal association between negative emotions and procrastinating behaviour. Pollack and Herres (2020) assessed the bidirectional relationship between daily emotions and procrastination for 14 days. They found that daily negative emotions, but not positive emotions, predicted next-day procrastination. In contrast, prior day procrastination did not predict changes in negative or positive emotions on the next day. In other words, people who

experienced more negative emotions in a prior day procrastinated more in the following days. The finding that negative emotions precede procrastination is in line with the mood repair conceptualization of procrastination (Sirois & Pychyl, 2013), which suggests that procrastination is driven by avoiding negative emotions.

1.4.3 Intervention Evidence

This section presents an intervention study by Eckert, Ebert, Lehr, Sieland, and Berking (2016), which points to the effect of emotion regulation strategies on reducing procrastination. This study provides direct evidence that difficulty in emotion regulation is one of the leading causes of procrastination (Sirois & Pychyl, 2013).

This intervention study was based on the results of a cross-sectional study and a cross-lagged study by Eckert et al. (2016). In the cross-sectional study, Eckert and colleagues assessed whether and how academic procrastination is linked to emotion regulation skills. Results showed that individuals with poor emotion regulation skills were more likely to postpone their academic tasks. A cross-lagged study was conducted to further examine the reciprocal effect of emotion regulation skills on procrastination. The researchers found that those who have a greater ability to modify aversive emotions procrastinated less. This finding suggests the importance of emotion regulation in reducing procrastination.

In order to investigate the causal relationship between emotion regulation and procrastination more in-depth, Eckert and colleagues conducted an intervention study. In this study, the researchers launched a two-week online training program designed to bolster individuals' skills of tolerating and modifying aversive emotions. Eighty-three participants were randomly allocated to the training group and control group.

Those in the training group learned multiple strategies that may increase their ability to tolerate and modify aversive emotions, including improving resilience, increasing affective commitment to their focal tasks, short relaxation exercises, and self-reflection. Participants in the control group were asked to wait for two weeks for the post-assessment and online training. Results showed that, compared to the control group, participants in the training group reported a significant increase in their ability to modify aversive emotions and less procrastination.

This intervention study suggests that an improvement in emotion regulation ability, particularly the ability to modify aversive emotions, reduced procrastination. From this standpoint, these findings align with the mood-repair conceptualization of procrastination proposed by Sirois and Pychyl (2013). That is, when people are confronted with aversive tasks and experience negative emotions, those with poor emotion regulation skills may intend to choose procrastination as a mood repair strategy.

1.4.4 Physiological Evidence

Several physiological evidence explains why procrastination is a problem of emotion regulation (Pychyl & Sirois, 2016). These studies showed that the structural abnormality and (in)activity in specific brain regions that are responsible for emotional and behavioural control had been found in trait procrastinators. These findings suggest that specific brain regions most closely associated with emotion control differ between procrastinators and non-procrastinators. This difference may be a reason why procrastinators tend to engage in procrastination as a means to regulate emotions.

W. Zhang, Wang, and Feng (2016) used resting-state functional magnetic resonance imaging (rs-fMRI) to examine whether differences in trait procrastination are associated with specific brain regions. The researchers found that procrastination was associated with greater activity in two brain regions, namely, the ventromedial prefrontal cortex (vmPFC) and the parahippocampal cortex (PHC). Furthermore, a functional connectivity analysis demonstrated that procrastination was related to less activity in the anterior prefrontal cortex (aPFC) and more activity in the default mode network (DMN). The following section lays out how these specific regions in the brain are connected to procrastination.

The greater activity in the vmPFC and PHC in chronic procrastinators may provide a physiological explanation for the emotional trade-off of procrastination. The vmPFC has been linked to reward-related decision making (Hare, Camerer, & Rangel, 2009; Kumaran, Summerfield, Hassabis, & Maguire, 2009). According to Bechara (2005), vmPFC activity is influenced by bottom-up affective signals from the impulsive system (e.g., the amygdala) and top-down control signals from the prefrontal cortex. The greater activity in the vmPFC reflects a preference for immediate emotional rewards (Ludwig et al., 2015; Pratt & Mizumori, 1998). In other words, chronic procrastinators' vmPFC is more activated than non-procrastinators, making them more susceptible to choosing immediate emotional rewards provided by behavioural delay. Also, the greater PHC activity causes one to focus on short-term rewards when vmPFC is making decisions (W. Zhang et al., 2016). As a result, vmPFC may not be able to make a rational choice between short-term emotional rewards and long-term goals.

Furthermore, procrastination has been found to be associated with less activity in the anterior prefrontal cortex (aPFC), which may fail to suppress the activity in the

DMN (W. Zhang et al., 2016). DMN is a large-scale network region of the brain that is activated when people are focusing on internal mental-state processes yet be less activated when performing cognitive tasks (Raichle et al., 2001). The aPFC can suppress the activity in the DMN, keeping the DMN in "chilling" mode and facilitating the execution of planned behaviours (R. Zhang & Volkow, 2019). The less activity in the aPHC in procrastinators indicates that they were less likely to suppress activity in the DMN (W. Zhang et al., 2016). This, in turn, may interfere with goal-directed behaviour with high cognitive demands. This finding may explain why procrastinators are difficult to persist in ongoing tasks but focus more on internal mental states.

In summary, these findings provide the neural basis for the notion that the temporal trade-off of procrastination reflects the primacy of short-term emotional rewards over long-term goal pursuit (Sirois & Pychyl, 2013). The physiological mechanisms of this trade-off could be (i) the greater activity in the vmPFC causes procrastinators to be more susceptible to immediate emotional rewards (ii) the greater activity in the PHC the biases responses in vmPFC during decision-making, making vmPFC prefers bottom-up affective signals triggered by the impulsive systems, and (iii) the less activity in the aPHC make it difficult for procrastinators to suppress DMN activity, thereby, interfering with task execution. As a result, people may fail to override emotional impulses, prioritizing short-term mood rewards over long-term goals.

An fMRI study by Wypych et al. (2019) provides another explanatory pathway linking procrastination and emotions. This study assessed the physiological mechanisms behind procrastination by comparing the neural activity in the anterior cingulate cortex (ACC) between procrastinators and non-procrastinators. The

researchers found that compared to non-procrastinators, chronic procrastinators had lower neural activity in the ACC when faced with a situation involving possible punishments. The ACC connects with the emotional limbic system, such as the amygdala and hypothalamus (Stevens, Hurley, & Taber, 2011), which is one of the core regions that underlie emotion regulation (Etkin, Egner, & Kalisch, 2011; Tang, Tang, & Posner, 2016). In a punishment condition that may elicit negative emotions, the less activity in the ACC in procrastinators implies that they may be less likely to control or regulate their emotional responses to potential threats.

On the other hand, increased activity in the right dorsolateral prefrontal cortex (DLPFC) and the ACC were found only in non-procrastinators (Wypych et al., 2019). The DLPFC is the crucial brain region responsible for executing top-down behaviour control (Cieslik et al., 2013; Kelley, Gallucci, Riva, Romero Lauro, & Schmeichel, 2019). In a threat-related situation, the greater activity in these two regions in non-procrastinators indicates that compared to procrastinators, they may be more capable of regulating emotions and enacting self-control. Although this study did not directly test whether this difference is associated with negative emotions, Wypych and colleagues argue that the possible punishments would make the required task perceived as aversive and thus induce negative emotions.

In summary, this physiological evidence provides support for the proposition that procrastination is a problem of emotion regulation (Pychyl & Sirois, 2016). Specifically, the less neural activity in specific emotion-regulation related brain regions (e.g., ACC) in procrastinators suggests that they may be less likely to effectively monitor and regulate emotions when under a punishment condition. Conversely, the finding that there is greater neural activity in emotion-control related brain regions (e.g., DLPFC and ACC) in non-procrastinators provides supplementary

evidence for the mood repair conceptualization of procrastination (Sirois & Pychyl, 2013) by showing there is greater neural activity in emotion-control related brain regions (e.g., DLPFC and ACC) in non-procrastinators. People do not engage in the irrational cycle of procrastination because they are capable of regulating their emotions.

Further neural evidence for the role of emotional control in understanding procrastination comes from a study by Schlüter et al. (2018), which examined brain structure and resting-state connectivity in individuals with poor action control. To investigate why individuals differ in their ability to enact self-control, Schlüter and colleagues compared the brain structures between action-oriented and state-oriented individuals. Action-oriented individuals are better at initiating emotional control and have greater resistance to events that elicit negative emotions. In contrast, state-oriented individuals commonly struggle to start working on an intended action and tend to ruminate about events that elicit unpleasant emotions and thoughts (Kuhl, 1984). Schlüter and colleagues found that decision-related action orientation (AOD; a subtype of action orientation that describes an individual's ability to initiate actions) was negatively associated with amygdala volume. In other words, those who scored low on the action control (i.e., state-oriented persons) has a larger amygdala.

As a component of the limbic system, the primary function of the amygdala is to process emotions and memories associated with fearful and threat-related stimuli (Davis & Whalen, 2001). There is evidence that individuals with a larger amygdala may experience higher levels of negative emotions, such as anxiety (De Bellis et al., 2000). In line with this, Schlüter et al.'s (2018) findings suggest that those with a larger amygdala may be more state-oriented and be vulnerable to fearful or threatening stimuli. As a result, they may feel more anxious about the negative

consequences of an action and be more likely to hesitate and delay the beginning of the action without any valid reason (Blunt & Pychyl, 1998).

Furthermore, Schlüter et al. (2018) assessed whether individual differences in action control could be predicted by the functional connectivity between the amygdala and other cortical and subcortical brain regions. They used the amygdala as a seed region to assess how it connects to the remaining 41 brain regions and its effects on action control. Results demonstrated that the high connectivity between the amygdala and the dorsal anterior cingulate cortex (dACC) was *only* found in individuals who scored high on AOD.

The synergy between the amygdala and the dACC plays an essential role in executing goal-directed behaviour (Feng, Feng, Chen, & Lei, 2014) and self-regulation (Schlüter et al., 2018). The dACC uses information from the amygdala to select actions that should be implemented. Additionally, the dACC can suppress competing actions and emotions that interfere with the intended actions, ensuring the intentions can be successfully implemented (Schlüter et al., 2018). The less connectivity between the amygdala and the dACC may heighten negative emotions (e.g., fear) associated with potential negative consequences and fail to suppress competing emotions (e.g., positive emotions associated with alternative activities). This, in turn, may make it difficult for state-oriented people to initiate actions on intentions, resulting in procrastination.

1.5 The Relationships Between Procrastination and Emotions

1.5.1. Procrastination and Negative Emotions

The robust link between procrastination and negative affect is well substantiated by the growing body of research. For example, procrastination has been

linked to shame (Fee & Tangney, 2000), guilt (Pychyl, Lee, Thibodeau, & Blunt, 2000), stress (Sirois, 2014b; Tice & Baumeister, 1997), depression and anxiety (Flett et al., 1995; Haycock, McCarthy, & Skay, 1998).

Previous evidence provides insights into the sources of negative emotions and how negative emotions contribute to procrastination. For instance, negative emotions can be evoked by the anticipation of having to complete aversive tasks (Blunt & Pychyl, 2000; Flett, Blankstein, Hewitt, & Koledin, 1992). Negative emotions consequential to aversive tasks prompt procrastination because people mistakenly believe that postponing the tasks is a way of improving their present emotions (Sirois & Pychyl, 2013).

Alternatively, negative self-related thoughts that are pervasive with procrastination account for the experience of negative emotions (Flett, Stainton, Hewitt, Sherry, & Lay, 2012; Stainton, Lay, & Flett, 2000). Using task avoidance to create short-term mood repair, people often end up worse off for the delay because of the awareness of the consequences caused by past ineffective coping (Pychyl & Sirois, 2016). This awareness may increase negative self-evaluative thoughts (Stainton et al., 2000) and self-criticism (Sirois, 2014b; Sirois & Tosti, 2012). These negative cognitions can be a self-generated source of stress and negative emotions (Sirois, 2014b).

The argument that negative self-evaluations underlie the link between procrastination-negative emotions is supported by a meta-analysis (Sirois, Molnar, & Hirsch, 2017). The main purpose of the study was to provide a conceptual analysis of whether and how procrastination is related to perfectionism. A key finding was that trait procrastination and perfectionistic concerns were both related to less perceived

self-regulatory resources and negative self-evaluative thoughts. By situating these associations within the control theory of self-regulation (Carver & Scheier, 1982, 1990), Sirois et al. explained how negative self-evaluations bias the resources assessment process, resulting in self-regulation failure and negative emotions.

The control theory of self-regulation (Carver & Scheier, 1982, 1990) explains control processes through discrepancy-reducing feedback loops. The process of self-regulation begins with setting a goal as a specific reference point, which gives the impetus for self-regulatory efforts. People monitor their own behaviour in relation to that reference point and then adjust their behaviour on the basis of the perceived discrepancy between the current and desired end-states. Prior to or during the discrepancy reduction attempt, people assess the likelihood of being able to reduce the sensed discrepancy (i.e., outcome-expectancy). If discrepancy reduction is perceived as likely, then goal-directed behaviour is taken to reduce the discrepancy. However, if the discrepancy reduction is perceived as unlikely given current resources, then an impulse to disengage from a task is activated (Sirois et al., 2017). Since the sensed current states and the possibility of discrepancy reduction are subjective, individual differences may play an important role in the process of assessment (Carver & Scheier, 1982, 1990).

Sirois et al. (2017) assert that negative self-evaluations may have detrimental effects on the expectancy-assessment process, resulting in negative emotions in "a dynamic and cyclically reinforcing manner" (p. 152). Specifically, negative self-evaluations as a central feature of procrastinators (Flett et al., 1995) may bias perceptions towards a lack of resources to reduce the discrepancy between the current and the ideal states (Sirois et al., 2017). This biased perception may further feed into negative self-evaluations and increase negative emotions. As a result, they may show

more susceptibility to negative emotions, which, in turn, trigger avoidance responses as a means to regulate negative emotions (Sirois & Pychyl, 2013).

1.5.2 Procrastination and Positive Emotions

Whereas avoiding negative emotions may prompt procrastination, the loss of immediate positive emotions associated with performing a task may also play a role (Sirois & Pychyl, 2013). Evidence that supports the role of positive emotions in procrastination comes from a study conducted by Sirois and Giguère (2018). Across two studies, the researchers examined whether and how procrastination, either a trait or a state, is linked to low levels of positive task-related emotions. Also, they investigated whether the presence of social temptations plays a role in the procrastination-positive emotions link. In the first study, mediation analysis showed that low levels of positive emotions associated with an intended academic task explained why trait procrastinators spent more time procrastinating. In the second study, they focused on a specific positive emotion-enjoyment and assessed its effects on procrastination when people were faced with a goal of making healthy behaviour changes. Results revealed the same pattern of the first study, showing that low task enjoyment explained in part why procrastinators were less likely to succeed in making healthy changes in the next six months.

In addition, the presence of social temptations has been found to exacerbate the effect of low positive emotions in motivating procrastination in both studies. That is, low positive task-related emotions prompted procrastination, and this tendency was more salient when positive social temptations were present. In this case, engaging in tempting activities and postponing the intended tasks may create short-term improvement in emotions. These findings suggest that the focus on short-term mood

repair that characterizes procrastination occurs not only when negative emotions are high (Sirois & Pychyl, 2013; Tice & Bratslavsky, 2000) but also when positive emotions are low relative to other tempting activities (Sirois & Giguère, 2018).

Given the loss of positive emotions associated with an intended goal may contribute to procrastination, an important question arises as to whether increasing positive goal-related emotions could decrease procrastination. The answer here appears to be "yes". This envisagement is based on the broaden-and-build theory of positive emotions (Fredrickson, 2001). Positive emotions broaden the scope of thought-action repertoires and augment individuals' resources. The increased personal resources may diminish the deleterious influences of negative emotions and allow people to bounce back from negative states quickly and effectively. From this perspective, the experience of positive emotions may "undo" the effects of negative emotions, thereby reducing the need for short-term mood repair through procrastination.

The self-regulatory resource model (SRRM; Sirois, 2015) provides another conceptual basis for the idea that increasing positive emotions may be beneficial for procrastination. The SRRM is a theoretical framework that focuses on the role of resources in facilitating health-promoting behaviours engagement. According to the model, positive emotions, such as joy and enjoyment, serve as a self-regulatory resource to promote health behaviours by shifting individuals' from a narrow, present-oriented perspective into a broader and future-oriented one (Sirois & Hirsch, 2015). The focus on short-term mood regulation that characterizes procrastination reflects a disconnection between the present and future self (Sirois & Pychyl, 2013). A future-oriented mindset associated with increased positive emotions may help bridge this connection through detecting potential consequences of the current delay choices.

This, in turn, may encourage people to act in advance to avoid negative consequences caused by delay and reduce procrastination.

Another pending question concerns the dynamic association between positive emotions and procrastination. Prior research on this association has revealed inconsistent patterns of results. On the one hand, procrastination functions as an emotion regulation strategy that creates a short-term, positive hedonic shift (Sirois & Pychyl, 2013). People may experience positive emotions by postponing aversive tasks and engaging in alternative pleasure activities. Two longitudinal studies by Tice and Baumeister (1997) demonstrated that procrastinators reported higher levels of well-being early in the semester than non-procrastinators, despite this pattern reversed later in the semester. This finding suggests that procrastination may provide emotional relief and increase positive emotions in the short term.

However, experience-sampling studies that focused on momentary emotions and situational procrastination found inconsistent results. For example, Pychyl et al. (2000) found that procrastination was not associated with positive emotions in terms of happiness, joy, pleasure and enjoyment/fun but feelings of guilt. It appears that people did not experience positive emotions while procrastinating but instead felt guilty. Similar results were reported by Pollack and Herres (2020), who found that procrastination did not predict increases in positive emotions. In light of the above inconsistent findings, investigating whether and how positive emotions are associated with procrastination has the potential to provide a clear picture of these relationships.

1.5.3 Procrastination and Mixed Emotions

One crucial emotional experience that has received little empirical attention in the field of procrastination is mixed emotions. Mixed emotion refers to the co-

occurrence of both positive and negative emotions, often experienced in bittersweet situations (J. Larsen, McGraw, & Cacioppo, 2001). Different types of mixed emotions have been studied, including the co-occurrence of happy and sad (e.g., Fong, 2006; J. Larsen et al., 2001; Williams & Aaker, 2002), pleasure and guilt (e.g., Ki, Lee, & Kim, 2017), and fear and hope (e.g., Bee & Madrigal, 2013).

Mixed emotion is a unique state with distinct characteristics (Kreibig, Samson, & Gross, 2015; Vaccaro, Kaplan, & Damasio, 2020). In light of feelings-as-information theory (Schwarz, 2011), the experience of positive emotions signals the potential or existing rewards, whereas the experience of negative emotions signals the potential or existing harm or loss. The simultaneous experience of both emotions represents a situation that might involve rewards and loss at the same time. Therefore, mixed emotions may provide both good and bad information. From this perspective, mixed emotions appear to be a more relevant emotional response to affectively complex events than a single emotion as it more accurately reflects the two sides of the same coin (Braniecka, Trzebińska, Dowgiert, & Wytykowska, 2014).

The question of whether people experience mixed emotions while procrastinating has not been fully investigated. Myrick (2015) found the guilty-enjoyment experience when people were watching funny kitty videos instead of doing more important tasks. The researcher explained that viewing the videos as a form of procrastination may increase positive emotions, such as enjoyment. However, when this behaviour is driven by the desire to avoid important tasks, feelings of guilt may decrease such enjoyment. Although Myrick's study provides a clue to the existence of mixed emotions at the time of procrastination, it is difficult to identify whether such feelings of guilt and enjoyment were simultaneously induced. In other words, there is

still a lack of studies that directly investigate the co-occurrence of positive and negative emotions in the context of procrastination.

There are different views on the patterns of mixed emotions and their consequences. One perspective is that mixed emotions are typically seen as a detrimental type of conflict (King & Emmons, 1990). Closely linked with this is the notion that people can feel conflicted emotions or ambivalence at a particular moment (Carver, Sutton, & Scheier, 2000). Mixed emotions may arise when a person is ambiguous about priorities when confronted with multiple goals or when experiencing intrapersonal conflict (i.e., a conflict arises within a person) towards a single goal (Mejía & Hooker, 2017). From this perspective, the experience of mixed emotions provides signals that there are conflicts, either between multiple goals or within an individual, that need to be resolved before goal pursuit can proceed. Given resolving conflicts require cognitive effort, people may choose to postpone intended goals because the choice of delay requires a minimum amount of cognitive effort relative to other choices (Shiv & Fedorikhin, 1999). In this regard, it seems likely that mixed emotions prompt procrastination or goal disengagement (Mejía & Hooker, 2017).

An alternative view is that mixed emotions are considered as a meaningful and adaptive emotional response, which should be distinct from conflicted emotions (Berrios, Totterdell, & Kellett, 2015b). The experience of mixed emotions has been found to be beneficial for coping with stressful situations (e.g., Adler & Hershfield, 2012; J. Larsen, Hemenover, Norris, & Cacioppo, 2003). J. Larsen et al. (2003) indicate that the co-activation of both positive and negative emotions makes people think about a stressful situation in a dialectical manner. Taking the good with the bad might facilitate sense-making processes and problem-solving. This, in turn, may bolster one's ability to cope with stress.

Evidence on the benefits of experiencing mixed emotions suggests that mixed emotions promote the self-control effort needed to resist temptations (Berrios, Totterdell, & Kellett, 2018a). An experience-sampling study by Berrios et al. (2018a) examined what role mixed emotions might play in self-control efforts, which showed that mixed emotions as a consequence of goal conflict motivated one's attempts to resist temptations when they were confronted with self-control dilemmas. The researchers explained that mixed emotions might facilitate the integration of complex information by assisting individuals in balancing the benefits and drawbacks of multiple courses of action. The consideration of potential benefits of taking action may make it easier for people to facilitate efforts to resist temptations and prioritise meaningful goals (Berrios et al., 2018a).

Indeed, the priority of short-term mood regulation that characterizes procrastination (Sirois & Pychyl, 2013) depicts a self-control dilemma involving a conflict between hedonic and long-term goals. Furthermore, there is evidence that procrastination was more likely to occur when social temptations were present (Sirois & Giguère, 2018).In this case, the experience of mixed emotions may be beneficial for procrastination as people may exert greater effort to resist temptations by searching for the positive meaning of intended tasks.

In summary, these diverging theoretical perspectives complicate predictions concerning the relationship between mixed emotions and procrastination. To address this issue, one purpose of this present research programme was to investigate whether procrastination, whether it be a trait or a state, is related to mixed emotions.

The following section provides an overview of the potential factors that may influence the associations between procrastination and emotions, which have not been fully investigated. These research gaps identified the aims and specific hypotheses

that the current research projects aimed to address. First, drawing on the transactional model of stress and coping (Lazarus & Folkman, 1984), the potential factors (i.e., perceived social support and threat appraisals) are reviewed that would explain the negative emotions that procrastinators experience. Second, goal characteristics, including goal motivation, goal focus and goal conflict, are reviewed that have been found to be tied to emotions. However, it remains unknown to what role these characteristics might play in the dynamic associations between procrastination and emotions. Third, Although the effectiveness of reappraisal, a particular emotion regulation strategy, in regulating negative emotions has been extensively reported, it is unclear whether reappraising intended goals is beneficial for reducing procrastination. In the present research programme, multiple studies were designed to address the above questions to extend the understanding of the associations between procrastination and emotions.

1.6 A Cognitive Transactional Perspective on Procrastination and Emotions

The transactional model of stress and coping developed by Lazarus and Folkman (1984) provides a useful conceptual framework for understanding how appraisal determines individuals' emotional experience and coping. The model emphasizes the person-environment relationship, arguing that stress can be seen as a product of a transaction between a person and the environment. Stress is perceived when individuals perceive the environmental demands placed upon them exceed their resources to cope (Lazarus & Folkman, 1984). Appraisal plays a central role in assessing the environment and determining appropriate coping. The following discusses the potential role of appraisal in the procrastination-negative emotions link (Section 1.6.1) and the role perceived social support might play in procrastinators' appraisals (Section 1.6.2).

1.6.1 Cognitive Appraisal

The concept of cognitive appraisal was put forward by Lazarus (1966), which is defined as a process in which people evaluate whether a situation affects their well-being. The experience of stress differs between individuals depending on how they appraise a situation, and this appraisal may affect how they cope with that situation (Lazarus and Folkman, 1984). For example, a person may see a goal as a challenge and work harder, and another may see it as a threat and struggle to follow through on the goal.

Lazarus and Folkman (1984) proposed two types of appraisals: primary appraisal and secondary appraisal. Primary appraisal is the process in which individuals evaluate whether a situation is relevant and whether it poses a threat (e.g., cause harm or loss) or is a positive challenge (e.g., will achieve personal growth). Secondary appraisal is the process in which individuals assess whether their abilities and coping resources are adequate to overcome harm or gain potential benefits from a situation. In theory, primary appraisal precedes secondary appraisal. However, primary and secondary appraisal may occur nearly simultaneously, and both are co-determined by changing environmental demands (Lazarus & Folkman, 1984). For example, primary appraisal evaluates whether a situation is a threat, and secondary appraisal determines the degree to which the situation is threatening. An employee who has been promoted to a leadership position very recently may appraise the situation as threatening because of the excessive work demands of the new position. However, if (s)he has adequate coping resources to meet the demands of the position (e.g., receive more support from the team members), then threats would be diminished. Primary and secondary appraisal is distinct but interdependent, with

different patterns of primary and secondary appraisal, resulting in threat and challenge appraisals (Lazarus & Folkman, 1984).

Individuals tend to interpret the environment in a habitual way (Lazarus, 1991; Matthews, Derryberry, & Siegle, 2000). General appraisal styles are influenced by personality traits (e.g., Gunthert, Cohen, & Armeli, 1999; Hemenover & Dienstbier, 1996). There is converging evidence that people with high trait anxiety have an attentional bias where they tend to concentrate their focus on threatening stimuli (e.g., Clarke, MacLeod, & Shirazee, 2008; Mathews & MacLeod, 2005). This bias towards threatening stimuli may affect how they evaluate stimulus valence and experience the stimulus (Yiend, 2010). When procrastination is viewed as a personality trait, specific characteristics that are common among procrastinators may likely influence their appraisals, reflecting stable appraisal styles across situations. By investigating the appraisal styles of procrastinators, this research may provide insights into why procrastinators respond differently from non-procrastinators. For example, why do procrastinators experience higher levels of negative emotions and stress than non-procrastinators?

Empirical research on the relations between appraisals and emotions has shown that threat and challenge appraisals often evoke strikingly different emotions from one another (e.g., Nicholls, Levy, Jones, Rengamani, & Polman, 2011; Schneider, 2004; Skinner & Brewer, 2002). Threat appraisals reflect low confidence in one's ability to cope with the demands of the environment, which predominantly generate negative emotions (e.g., Lazarus & Folkman, 1984). For example, Schneider (2004) found that threat appraisals mediated the positive link between neuroticism and negative emotions. This suggests that neurotic individuals (i.e., those who scored

high on the neuroticism index) may be more likely to experience negative emotions as they seem to be predisposed to perceive threats.

In terms of procrastination, one of the few studies that investigated the association between trait procrastination and appraisals demonstrated that chronic procrastinators spent a greater amount of time on fun, alternative activities and less time preparing for a math task when the task was perceived as threatening to them. When that same math task was perceived as a fun game, procrastinators spent the same amount of time as non-procrastinators on preparing for it (Ferrari & Tice, 2000). This research highlights the importance of appraisal in procrastination. However, pending questions are whether procrastinators habitually appraise a goal in a negative way (e.g., high threat appraisals) and whether this appraisal style predicts negative emotions.

Challenge appraisals reflect eagerness in anticipation of benefits and satisfaction from putting efforts into overcoming difficulties (e.g., Lazarus & Folkman, 1984), which predominantly generate positive emotions (Skinner & Brewer, 2002). Harter (1974) was the first to investigate the association between challenge appraisals and positive emotions. She found that when fifth and sixth graders worked on a series of problem-solving tasks that varied in difficulty, the greatest pleasure that they had experienced was derived from the solutions of the challenging tasks. This finding has been replicated by numerous studies (e.g., Brooks, 2014; Prem, Ohly, Kubicek, & Korunka, 2017).

The empirical picture of the relationship between procrastination and challenge appraisals is unclear. There is evidence that individuals who appraised a task as a challenge were more likely to view failure as an opportunity for growth and strengthen their effort after failure, making tasks move forward (Dickhäuser, Buch, &

Dickhäuser, 2011). In addition, challenge appraisals have been found to be positively associated with effortful intentions, greater behavioural engagement (e.g., Putwain, Remedios, & Symes, 2015) and confident coping expectancies (Skinner & Brewer, 2002). These tendencies can potentially be viewed as the opposite of procrastination. Therefore, it seems likely that challenge appraisals are associated with less procrastination. However, when procrastination is viewed as a personality trait, the questions thus becomes (i) whether procrastinators are less likely to evaluate a goal as a positive challenge, and (ii) whether less challenge appraisals can explain the negative association between procrastination and positive emotions.

1.6.2 Perceived Social Support

Social support is an important external resource that could influence one's appraisal of a situation and, thus, coping (Aspinwall & Taylor, 1997; S. Cohen & Wills, 1985; Lazarus & Folkman, 1984). Social support includes psychological and material resources provided by family, friends, or anyone who would help (Pilcher & Bryant, 2016). There are two general types of social support: perceived and received social support (Barrera, 1986; Eagle, Hybels, & Proeschold-Bell, 2019). The former is based on individuals' subjective appraisals of social support, whereas the latter is a true reflection of how much the support is given (Haber, Cohen, Lucas, & Baltes, 2007). This distinction is important because perceived support is the subjective feeling of being supported that may be influenced by personality characteristics (Kaul & Lakey, 2003). A special focus of the present research was on subjective evaluations of social support.

Personality traits play a role in how social resources are perceived (Pilcher & Bryant, 2016). Prior research found that neurotic individuals reported less perceived social support and higher levels of social anxiety (Arnetz, Edgren, Levi, & Otto,

1985; Uchino, 2009). Within procrastination, Sirois et al. (2017) suggest that procrastinators with negative self-evaluations may bias perceptions towards a lack of resources for coping, rather than towards resources that might be instrumental in reaching goals. Given that perceived coping resources determines the degree to which a situation is threatening (Folkman & Lazarus, 1980), the biased perception of a lack of social support may exacerbate threat appraisals. This appraisal style, may, in turn, contribute to negative emotions. Despite clear theoretical grounding, more empirical work is needed to directly test whether procrastinators who often plague with negative self-evaluative thoughts may view themselves as lacking in support, therefore, appraise a situation as threatening.

1.7 The Role of Goal Characteristics in Procrastination

Previous research on procrastination has investigated the role of task characteristics (or goal characteristics) in predicting procrastination. Blunt and Pychyl (2000) differentiated various dimensions of task aversiveness, indicating that boredom, frustration, and resentment are the key elements of task aversiveness. Negative emotions consequential to task aversiveness is a root cause of procrastination (Sirois & Pychyl, 2013). The above theory and empirical evidence suggest that the relations among goal characteristics, emotional states and procrastination seems to be inseparably intertwined. However, little attention has been given to other goal characteristics that may also play a role in the associations between emotions and procrastination. The present research programme focuses on three goal characteristics: goal focus, goal motivation and goal conflict, to address this issue.

1.7.1 Goal Focus

A goal comprises desired outcomes and a process to achieve these outcomes. People differ in the degree to which they focus on an outcome or a process of goal pursuit. Outcome focus emphasizes the end states that a person wants to achieve, whereas process focus emphasizes the actions that achieve the desired end states (Freund & Hennecke, 2015; Kaftan & Freund, 2018). For example, two people both pursue the goal of losing four pounds in a month. One of them may primarily focus on the outcomes of successfully losing weight (e.g., how attractive she will be), while the other may focus more on how to achieve the goal (e.g., what foods are high in carbs and sugar that should avoid).

Exploring whether and how goal focus can influence procrastination and emotions has the potential to offer insights into how the characteristics of goals and emotions interact to affect procrastination. Such insights may be beneficial for developing interventions to adjust goal focus in goal pursuit, thereby reducing procrastination. The following section discusses theories and empirical studies on the relations among goal focus, emotions, and procrastination.

Outcome Focus

An expected outcome provides a standard for the desired state of goal pursuit. On the one hand, focusing on the outcome can draw one's attention to a discrepancy between the current actual and the desired end state (Krause & Freund, 2014b). The awareness of this discrepancy might motivate goal-directed behaviour to reduce the perceived discrepancy (Carver & Scheier, 1982, 1990). From this perspective, outcome focus should be associated with task engagement and less procrastination.

On the other hand, adopting outcome focus may come with emotional and motivational costs, which would be maladaptive for goal pursuit (Krause & Freund,

2014b). This effect is more prominent when people fail to take action in the early phase of goal pursuit. For example, a person who has delayed starting to write a thesis would perceive the negative discrepancy between the current state and desired end state. Focusing on an outcome would highlight such discrepancy, leading to negative emotions as the current goal progress is relatively slower than anticipated. The experience of negative emotions shifts one's priority from long-term goal pursuit to short-term mood repair, resulting in future procrastination (Sirois & Pychyl, 2013).

The association between outcome focus and negative emotions has been inconclusive. Freund, Hennecke, and Riediger (2010) investigated age-related differences in goal focus and emotional consequences associated with different goal focuses. In this study, participants were asked to select one of two "thinking exercises", in which one exercise concentrated on ways of pursuing the selected goal (i.e., process focus), while the other concentrated on the potential benefits of achieving the goal (i.e., outcome focus). Following the "thinking exercises", participants rate their emotional state. The researchers found that younger adults (18-25 years) were more likely to focus on the outcome of the selected goal and reported higher levels of negative emotions relative to older adults (60-88 years). This result implies a positive link between outcome focus and negative emotions. This pattern, however, was not found in a real-life setting when participants were asked about their preference for process and outcome focus and their emotional status regarding starting to exercise regularly (Freund et al., 2010).

Similarly, Kaftan and Freund (2020) used an experience-sampling approach to examine the role of goal focus in pursuing exercise-related goals and how goal focus is associated with momentary emotions. Their results revealed that outcome focus was not associated with positive or negative emotions. These inconsistent findings left

open the questions of (i) whether outcome focus is linked to negative emotions, and (ii) what role outcome focus might play in procrastination associated with negative emotions. In an attempt to answer these questions, the present research programme investigated whether and how outcome focus interacts with negative emotions, influencing procrastination.

Process Focus

Prior research on process focus and procrastination has shown that process focus is related to less academic procrastination (e.g., Krause & Freund, 2014b, 2016), successful goal pursuit and higher subjective well-being (Krause & Freund, 2014). Focusing on the process of goal pursuit may draw one's attention to a subset of actions that are smaller and more concrete. People may perceive a long-term focal goal as less difficult when focusing on the smaller and more concrete sub-goals. Also, completing each small and concrete sub-goal may provide immediate rewards and evade the problem of delayed gratification (Krause & Freund, 2014). This, in turn, may increase positive emotions and give positive reinforcements in long-term goal pursuit (Kaftan & Freund, 2020).

Evidence that supports the positive association between process focus and positive emotions comes from two studies. First, the aforementioned research (Freund et al., 2010) on the emotional consequences of goal focus showed that people who focused more on the process reported higher levels of positive emotions. However, this positive association was only found in older adults (60-88 years of age), while younger adults (18-25 years of age) showed no such differences. Second, by exploring the dynamic relationships among process focus, positive emotions and procrastination more in-depth, Kaftan and Freund (2020) observed that process focus was related to

higher overall workout satisfaction and successful goal achievement (i.e., less procrastination).

A significant limitation that should be considered in Kaftan and Freund's (2020) study is that behavioural procrastination was not measured appropriately. This study measured behavioural procrastination with a single question (i.e., whether participants did workouts as scheduled). Failing to do scheduled workouts may not count as procrastination, as participants may have had to delay their workout schedule due to external circumstances rather than it being an unnecessary and irrational choice – both of which are two key features of procrastination (Haghbin, 2015). To address this issue, the current research programme used an ecological momentary assessment to assess situational procrastination. This measure assesses procrastination based on the conceptualization of procrastination, which has been found to be a valid measure that differentiates procrastination from other forms of delay (Wieland et al., 2018). By doing so, the present programme aimed to address the key limitation identified in Kaftan and Freund's study that arose as a result of using the inappropriate measure of procrastination.

1.7.2 Goal Motivation

Theory and empirical studies indicate that people differ in their motivations (i.e., the willingness to put effort into achieving goals) to pursue goals. Self-determination theory (SDT; Deci & Ryan, 1985, 1991) provides a broad framework for understanding people's motivational propensities. Deci and Ryan (1985) distinguished three forms of motivation, namely, autonomous, controlled motivation and amotivation, which are conceptualized as lying on a continuum of self-determination. Autonomous motivation lies at the end of this continuum, reflecting the highest degree of self-determination. Autonomous motivation entails performing a

behaviour for reasons that align with one's intrinsic needs and values or are inherently interesting or enjoyable. Controlled motivation reflects the intermediate and a low degree of self-determined motivation, which entails performing a behaviour for external and introjected reasons (Deci & Ryan, 2008; Ratelle, Guay, Vallerand, Larose, & Senécal, 2007). Amotivation lies at the other end of the continuum, reflecting the absence of motivation or intention (Deci and Ryan, 1985, 1991). Given that procrastination as a problematic delay is meaningful only if someone intends to begin but fails to act in accordance with this intention (Blunt & Pychyl, 1998; Haghbin, 2015), a special focus of the present research was, therefore, on two theoretically forms of motivation: autonomous and controlled motivation.

Autonomous and controlled motivation can be theoretically further divided into two types of motivation (Deci and Ryan, 1985; 1991). Autonomous motivation includes intrinsic and identified motivation. Intrinsic motivation refers to engagement in an activity that is interesting or enjoyable for its own sake. Identified motivation refers to engagement in an activity that is somewhat consistent with personal values or needs. Controlled motivation includes external and introjected motivation. External motivation refers to undertaking an activity in order to avoid punishments or obtain external rewards. Introjected motivation refers to undertaking an activity in order to avoid internal pressures such as feelings of shame or guilt (Deci and Ryan, 1985; 1991).

Controlled Motivation, Negative Emotions and Procrastination

The positive link between controlled motivation and negative emotions has been well-substantiated by a large body of research. For example, a meta-analysis of over 40 years of research on SDT demonstrated that controlled motivation was

associated with negative emotions (Cerasoli, Nicklin, & Ford, 2014). Furthermore, an experience-sampling study on momentary motivations and academic emotions demonstrated that students who were driven by external reasons (i.e., controlled motivation) reported higher levels of negative emotions (Ketonen, Dietrich, Moeller, Salmela-Aro, & Lonka, 2018).

The frustration of basic psychological needs is a key reason why individuals acting for controlled reasons are more likely to feel negative emotions (Vansteenkiste, Ryan, & Soenens, 2020). Deci and Ryan (2000) propose three basic psychological needs: autonomy (a sense of volition and psychological freedom), competence (a sense of effectiveness and efficacy), and relatedness (a sense of being affectively close to others). The satisfaction of these needs plays an essential role in motivation and well-being. Vansteenkiste et al. (2020) suggest that controlled motivation may cause the frustration of the need for autonomy because offering external rewards can shift one's attention from internal to external. In this case, people may behave in a certain way (e.g., to gain more external rewards) instead of acting in accord with their inherent sense of self. As the sense of autonomy goes down, pursuing goals are more likely to be experienced as pressure.

Controlled motivation has been found to be positively associated with procrastination (Senécal, Julien, & Guay, 2003; Senécal, Koestner, & Vallerand, 1995). For example, Senecal et al. (1995) found that students who were motivated by controlled reasons reported more procrastination than those who were motivated by autonomous reasons. Based on this, Senécal et al. (2003) further assessed the relations among goal motivation, role conflict (i.e., a conflict between studying and interpersonal life) and academic procrastination. They found that the experience of role conflict explained in part the positive association between controlled motivation

and procrastination. These findings suggest that controlled motivated individuals may be more likely to engage in procrastination.

However, some researchers argue that controlled motivation may also elicit goal-directed behaviour and facilitate goal progress, at least in a short-term period (Koestner, Otis, Powers, Pelletier, & Gagnon, 2008). Vansteenkiste, Simons, Soenens, and Lens (2004) investigated whether people differ in goal engagement and persistence in learning new physical exercises when they were randomly assigned to intrinsic, extrinsic, and no-goal control conditions. They found that participants in the extrinsic goal condition were more engaged and persistent than those in the no-goal control condition, even if their engagement and persistence were not driven by autonomous reasons. This finding suggests that extrinsic goals may have motivational value for task engagement due to the perception of obligation and a sense of external pressure. From this perspective, it seems that a controlled form of motivation may be associated with less procrastination, at least in a short period of time.

Autonomous Motivation, Positive Emotions and Procrastination

Research on the role of autonomous motivation in goal pursuit has consistently shown that this type of motivation is conducive to goal progress and goal persistence (e.g., Koestner et al., 2008; Sheldon & Houser-Marko, 2001; Sheldon & Kasser, 1998). One reason is that there is a reciprocal effect between autonomous motivation and the satisfaction of basic psychological needs. That is, engaging in activities for autonomous reasons supports one's innate needs for autonomy, a sense of control and efficacy in their action (Hagger et al., 2014). Also, support for and fulfilment of these needs, in turn, may increase autonomous motivation (Vansteenkiste et al., 2020).

Within procrastination, autonomous motivation has been found to be associated with lower levels of procrastination. For example, Katz, Eilot, and Nevo (2014) investigated how autonomous motivation is linked to self-efficacy and academic procrastination. They found that autonomous motivation mediated and moderated the negative link between self-efficacy and academic procrastination. In other words, students with high self-efficacy were less likely to procrastinate, and this tendency was more salient when they were motivated by autonomous reasons. This finding highlights the effect of autonomous motivation in academic procrastination; however, the mechanisms that underlie this relationship have not been fully investigated.

Autonomous motivation has strong links to positive emotions (e.g., Sheldon, Ryan, Deci, & Kasser, 2004). The experience of positive emotions associated with performing a task may be an important explanatory pathway linking autonomous motivation and less procrastination. Across a series of three studies on motivation and subjective well-being, Sheldon et al. (2004) found that students were happier when they pursued goals for autonomous reasons compared to controlled reasons.

Theory and evidence suggest that loss of task-related positive prompts procrastination, particularly when alternative activities are tempting (Sirois & Giguère, 2018; Sirois & Pychyl, 2013). The presence of alternative activities allows people to feel positive emotions and escape from a state of low positive emotions when they are faced with intended goals (Sirois & Giguère, 2018). This avoidance behaviour is self-defeating as it hinders long-term goal pursuit for immediate hedonic boosts. In the long term, increased task-related positive emotions as a result of autonomous motivation may replenish resources necessary for self-regulation and promote one's ability to resist positive temptations (Sirois & Hirsch, 2015). This, in

turn, may motivate people to work consistently towards their goals and reduce the likelihood of procrastination. Investigating how autonomous motivation and positive emotions interact in predicting procrastination may provide an in-depth understanding of what role motivation might play in the associations between emotions and procrastination. Furthermore, it may set a stage for future intervention studies to explore whether autonomy-supportive contexts could reduce procrastination caused by the loss of positive emotions.

1.7.3 Goal Conflict

Conflicts often arise when pursuing two or more competing goals simultaneously, as pursuing one goal may hinder the pursuit of the others (Boudreaux & Ozer, 2013). Prior research has identified several circumstances that goal conflict would occur (e.g., Slocum Jr, Cron, & Brown, 2002), suggesting that goal conflict occurs when (i) people are required to achieve multiple outcomes when pursuing a single goal, (ii) an externally imposed goal conflicts with one's personal goal, and (iii) there is a trade-off between several competing goals because of limited resources. An example of a goal conflict would be when a student tries to do well on an upcoming test while also hoping to meet new people. Thus, it may be necessary to make a trade-off between the academic and social goals as both of which will take time to accomplish.

From a mood repair perspective, the depiction of procrastination reflects a trade-off between hedonic goals and long-term instrumental goals (Sirois & Pychyl, 2013). In a laboratory experiment, Erez, Gopher, and Arzi (1990) found that participants often prioritize one goal at the cost of the other when they were asked to improve their performance on two conflicting tasks. This may be the case in procrastination. When people are confronted with a situation that one goal can

provide immediate hedonic boosts while simultaneously obstructing the pursuit of a long-term goal, they may choose to engage in procrastination as a means to handle this conflict. Thus, it is reasonable to assume that goal conflict may be positively associated with procrastination.

Yet to date, there is little research directly testing the link between goal conflict and procrastination. Senécal et al. (2003) found that students who felt more conflict between their roles as an academic (e.g., prepare for an exam) and a friend (e.g., go to a party) were more likely to procrastinate. Although this finding provides some support for the hypothesis that goal conflict is associated with procrastination, the focus of Senécal et al.'s study was on a conflict between goals related to certain roles (i.e., the amount of conflict that exists between self-identities). Therefore, it remains unclear whether and how other forms of goal conflict that go beyond a role-related conflict affect procrastination.

Previous empirical evidence showed that goal conflict is an antecedent of mixed emotions (Berrios et al., 2015b). However, less is known about the role of mixed emotions in the association between goal conflict and procrastination. As noted previously (see Section 1.5.3 procrastination and mixed emotions), the experience of mixed emotions may increase the likelihood of procrastination and task disengagement as it reflects uncertainty in goal prioritization and ambiguity in gains and losses (Mejía & Hooker, 2017). Alternatively, mixed emotions as a result of goal conflict may contribute to less procrastination as it may be experienced as a path to a meaningful and adaptive emotional response, which may facilitate self-control effort to resist temptations (Berrios et al., 2018a). Therefore, the empirical picture of the relationship among goal conflict, mixed emotions, and procrastination is less clear. In an attempt to provide a clear picture of how these three variables are linked, it is

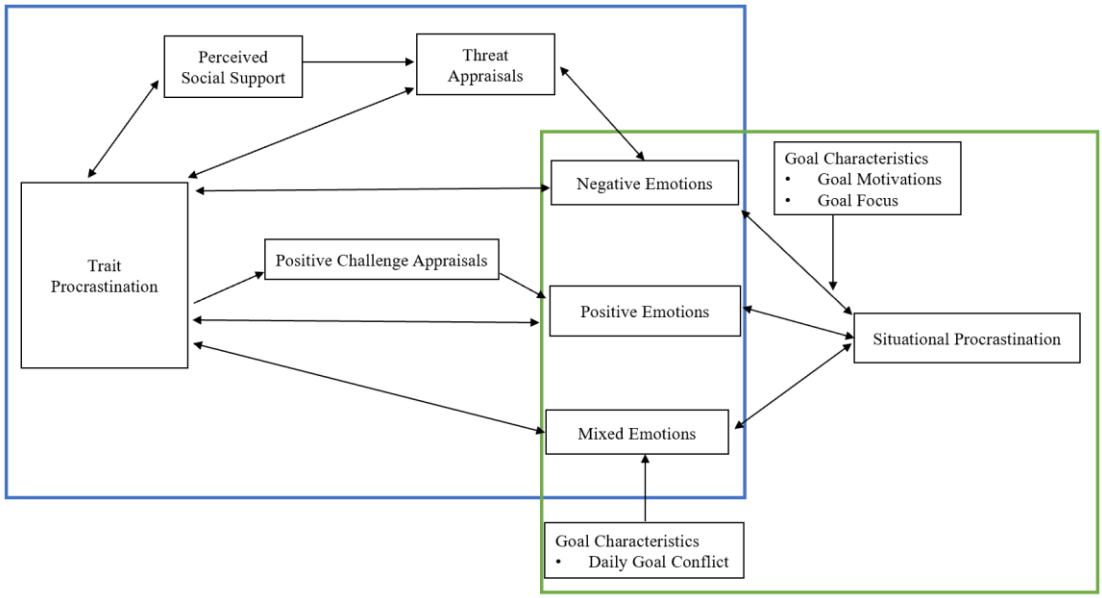
worthwhile to investigate the potential role of mixed emotions in the link between daily goal conflict and procrastination.

1.8 Critical Summary and Aims of the Current Research

The literature reviewed in this chapter provides the foundation for the current research programme. Embracing the mood-repair conceptualization of procrastination (Sirois & Pychyl, 2013) as a theoretical framework, the review presented evidence suggesting why procrastination can be understood as an emotion regulation strategy that provides short-term mood repair. It also pointed out several gaps by describing the strengths and limitations of the existing studies on procrastination and emotions. The current research programme is expected to make an initial step toward filling such gaps in the literature by achieving the following aims.

The overall aims of the current research programme were threefold. The main purposes of Study 1 and 2 are displayed in Figure 1.1. The half left of the figure displays the proposed model of Study 1 (shown in the blue frame). The aims of Study 1 were to evaluate how procrastination, when measured as a trait, is associated with goal-related emotions (i.e., negative, positive and mixed emotions), and whether and how perceived social support and appraisals (i.e., threat and challenge appraisals) explain the link between procrastination and negative emotions. The right half of the figure shows the proposed model of Study 2 (shown in the green frame). The purposes of Study 2 were to assess the dynamic associations between situational procrastination and emotions, and whether and how specific goal characterises influence these dynamic associations. The aim of Study 3 was to provide a preliminary investigation into whether adaptively regulating emotions (e.g., reappraisal or upregulation positive emotions) is effective in reducing procrastination.

Figure 1.1. *Overview of the main purposes of Study 1and 2*



1.8.1 Aim 1: Evaluate the Goal-related Emotions Associated with Procrastination

Theory and empirical evidence converge in suggesting that procrastination is associated with higher levels of negative emotions and stress (e.g., Sirois, 2014b). Yet research into the possible factors that contribute to negative emotions experienced by chronic procrastinators has focused mainly on task aversiveness, with less research on the internal sources of negative emotions. Individual differences in appraisal style may play a role in the procrastination-negative emotions link. Appraisal shapes one's emotional responses to a situation. People who tend to evaluate a situation as a threat rather than a positive challenge are more likely to experience negative emotions (Lazarus & Folkman, 1984). This may provide a conceptual basis for analysing the potential role of threat appraisals in explaining negative emotions that procrastinators experience. Also, the assessment of available coping resources determines the degree to which a situation is threatening (Folkman & Lazarus, 1980). Procrastinators' negative self-evaluations may bias this assessment process (Sirois et al., 2017). Therefore, social support, as an important external coping resource, may be perceived

as inadequate, regardless of its amount or quality. This biased perception may heighten threat appraisals.

Relative to negative emotions, less attention has been paid to positive emotions in the context of procrastination. Theory and empirical evidence suggest that a lack of positive emotions associated with an intended goal may prompt procrastination (e.g., Sirois & Giguère, 2018; Sirois & Pychyl, 2013). Given that positive and negative emotions have distinct but complementary roles in self-regulation (Aspinwall, 1998), investigating how positive emotions are linked to procrastination would provide a more comprehensive understanding of how emotions function with respect to procrastination.

Similarly, one conspicuous gap in the literature is whether and how mixed emotions are associated with procrastination. Previous research indicates that goal conflict elicited mixed emotions (Berrios et al., 2015b). Procrastination depicts a self-control dilemma between conflicting goals (i.e., a conflict between the pursuit of short-term hedonic goals and long-term instrumental goals). From this perspective, chronic procrastinators may be more likely to experience mixed emotions as they regularly face the dilemmas of choosing between hedonic and long-term goals. Examining the association between procrastination and mixed emotions may provide insights into the emotional complexity associated with procrastination.

Accordingly, in an attempt to achieve the first purpose, Study 1 sought to investigate the relationships between trait procrastination and different types of emotions. Furthermore, this study sought to investigate how procrastinators' emotional experience is influenced by their appraisal styles and perceived social support.

1.8.2 Aim 2: Examine the Dynamic Associations Between Situational Procrastination and Momentary Emotions

The second aim was to investigate the dynamic associations between situational procrastination and momentary emotions. From a mood repair perspective, procrastinating is driven by a desire to achieve a short-term positive "hedonic shift" (Sirois & Pychyl, 2013). However, the mood-boosting effect is temporary, and individuals' end up feeling worse as a result (Pychyl & Sirois, 2016). This implies that there is fluctuation in negative and positive emotions during procrastination.

Furthermore, examining the role of goal characteristics has the potential to provide an in-depth understanding of how goal-related factors and emotions interact to influence procrastination. Researchers have linked procrastination to specific task properties, such as boring, frustrating and lacking meaning (Blunt & Pychyl, 2000). Negative emotions consequential to these tasks contribute to the neglect of long-term goals in favour of short-term pleasure (Sirois & Pychyl, 2013). In addition, a cross-lagged study by Hoppe, Ignaz Preissler, and Förster (2018) revealed that task ambiguity (e.g., the criteria for performance evaluations is ambiguous) was a causal factor of procrastination. Although individuals' emotional states were not assessed in this study, it is possible that they feel anxious if they are uncertain whether their performance meets the standard.

Study 2 sought to examine the dynamic relationships between emotions and situational procrastination and the role of goal characteristics (i.e., goal focus, goal motivation and goal conflict) in explaining these relationships. In this sense, the present research may offer ways of addressing procrastination from a goal-setting perspective.

1.8.3 Aim 3: Manipulate Goal-related Emotions to Reduce Procrastination

The third and final aim was to conduct a preliminary investigation into whether and how adaptively regulating emotions might reduce procrastination. Theoretical and empirical contributions suggest that difficulty in emotion regulation is a causal factor of procrastination (Pychyl & Sirois, 2016; Sirois & Pychyl, 2013). A meta-analysis based on 24 intervention studies (Van Eerde & Klingsieck, 2018) showed that only one study (i.e., Eckert et al., 2016) had investigated the effectiveness of emotion-based strategies on procrastination. The effectiveness of reappraisal on regulating emotions has been substantiated through a meta-analysis by Webb, Miles, and Sheeran (2012). Given this, reappraising emotional stimuli (e.g., aversive tasks) was expected to be effective in reducing procrastination caused by difficulties in emotion regulation.

Another focus was whether increased positive goal-related emotions is beneficial for reducing procrastination. Given that a lack of positive emotions associated with pursuing a goal may prompt procrastination (Sirois & Giguère, 2018; Sirois & Pychyl, 2013), it is possible that an increase in positive emotions could reduce the likelihood of procrastination. This idea is based on theory and empirical evidence, which suggests that positive emotions broaden individuals' thought-action repertoires and "undo" the narrowing effects of negative emotions on attention (e.g., Fredrickson, 2001; Isen, Daubman, & Nowicki, 1987). Increased positive emotions may provide creative and flexible new ways of thinking and acting, thereby dampening an automatic coping response to aversive tasks (i.e., procrastination).

Accordingly, using an experimental design, Study 3 investigated whether reappraisal and directly cultivating positive goal-related emotions can reduce

procrastination. By doing so, this study has the potential to provide a promising and appropriate way to regulate emotions and therefore reduce procrastination.

1.9 Overview of the Remaining Chapters

The thesis comprises five chapters: this is the first chapter, the Literature Review chapter, and it provides a review of the mood repair conceptualization of procrastination (Sirois & Pychyl, 2013) and prior research which investigated how emotions function with respect to procrastination. Based on this, the review identifies the strengths and key gaps of the existing studies, which informed the specific aims of the current research programme accordingly.

Chapter Two, the First Study Chapter, presents a cross-sectional study. This study examined how trait procrastinators appraise and experience important goals that they were struggling with, and the role of perceived social support and appraisal styles in explaining emotions that procrastinators experience.

Chapter Three, the Second Study Chapter, presents an experience-sampling study. This study investigated the dynamic associations between situational procrastination and momentary emotions, and whether certain goal characteristics and emotions interact to influence procrastination.

Chapter Four, the Third Study Chapter, presents an experimental study, which examined whether adaptively regulating emotions is beneficial for reducing procrastination. This study primarily focused on two approaches of emotion regulation: reappraisal and upregulation of positive emotions.

Chapter Five discusses the main findings that help acquire a better understanding of the crucial role of emotions in procrastination. The chapter ends

with a discussion of the implications in a theoretical and practical perspective, the limitations common to all studies, and draw out future research directions.

CHAPTER 2

UNDERSTANDING THE ROLE OF PERCEIVED SOCIAL SUPPORT AND APPRAISAL IN THE ASSOCIATIONS BETWEEN PROCRASTINATION AND EMOTIONS

2.1 Chapter Overview

This chapter presents the findings from a cross-sectional study that examined the relations among trait procrastination, goal-related emotions and appraisals. The aims of this study were twofold: (i) to investigate the emotional experience and appraisals of procrastinators when they encounter an important but difficult goal, and (ii) to examine the role of perceived social support and appraisals in explaining the link between trait procrastination and goal-related emotions.

2.2 Rationale and Aims of the Current Study

The association between procrastination and negative emotions is supported by a considerable body of literature. There is converging evidence that trait procrastination is associated with high levels of negative emotions, such as stress (Sirois, 2014b), anxiety (Ferrari, 1991a; Lay & Silverman, 1996) and depression (Flett et al., 2012; Martin, Flett, Hewitt, Krames, & Szanto, 1996). Prior research suggests that negative emotions can arise from the anticipation of having to engage in an aversive task. These negative states may trigger procrastination as a means to regulate these negative emotions (Sirois & Pychyl, 2013). Also, when procrastination becomes a more entrenched pattern of behaviour responding to aversive tasks associated with negative emotions, then procrastination can be defined as a relatively stable, trait-like quality (Lay, 1992). Negative self-evaluations are a key feature of trait procrastination (Flett et al., 2012; Sirois, 2014b), which are self-generated sources of negative emotions and stress (Flett et al., 2012; Stainton et al., 2000).

In addition to negative emotions, a lack of positive emotions associated with pursuing a goal may also prompt procrastination (Sirois & Pychyl, 2013). Across two studies, Sirois and Giguère (2018) investigated how positive emotions function with respect to procrastination. They found that trait procrastinators reported lower levels of positive emotions when faced with academic and health-related tasks. A lack of positive emotions explained why procrastinators failed to successfully follow through on their intended behaviours. These findings highlight the importance of positive emotions for understanding procrastination, suggesting that people may postpone their intended tasks when negative emotions are high (Sirois & Pychyl, 2013; Tice et al., 2001) and positive emotions are low (Sirois & Giguère, 2018). As Sirois and Giguère (2018) have written, people "give in when feeling less good" (p.407).

Given there is relatively little research on procrastination and positive emotions, it is unclear whether all positive emotions are associated with trait procrastination. The current study focused on positive anticipatory emotions and investigated whether and how this type of positive emotion is associated with trait procrastination and its effects on procrastinators' appraisal styles. Anticipatory positive emotions refer to current emotional responses to the future outcome expectancies (Baumgartner, Pieters, & Bagozzi, 2008).

There are several reasons to assess positive anticipatory emotions rather than positive emotions in general. First, Lazarus and Folkman (1984) suggest that threat and challenge appraisal both are anticipatory appraisals, reflecting anticipated evaluations of potential harm or benefits. In this regard, examining positive anticipatory emotions may be more relevant to challenge appraisals as both provide information about the extent to which procrastinators view future desired events as beneficial. Second, the focus of the current study was not on demonstrating the

associations between procrastination and general emotions that have been reported in other studies (e.g., Sirois & Giguère, 2018) but rather to examine emotions associated with goals that procrastinators were struggling to achieve. This means that the consequences of their focal goals were pending. Therefore, positive anticipatory emotions may reflect procrastinators' emotional responses to pending outcomes.

Positive and negative emotions can co-exist and occur simultaneously, namely, mixed emotions (J. Larsen et al., 2001). Prior research has shown that people can experience mixed emotions in response to self-control dilemmas (Berrios et al., 2015b; Ramanathan & Williams, 2007). A self-control dilemma is a conflict between small immediate rewards and long-term options with larger rewards (Fishbach & Converse, 2010; Gillebaart, 2018; W. Hofmann, Baumeister, Förster, & Vohs, 2012). Within procrastination, prioritising short-term mood repair over long-term instrumental goals (Sirois & Pychyl, 2013) involves a self-control dilemma. From this perspective, chronic procrastinators may be more likely to experience mixed emotions as they regularly face the dilemmas of choosing between hedonic and long-term goals.

There, however, are different views on the patterns of mixed emotions and their consequences. On the one hand, mixed emotions are typically seen as a detrimental type of conflict (King & Emmons, 1990). Closely linked with this is the notion that people can feel conflicted emotions or ambivalence at a particular moment (Carver et al., 2000). Conversely, some researchers argue that mixed emotions may serve as a meaningful and adaptive emotional response, which should be distinct from conflicted emotions (Berrios et al., 2015b). Evidence on the benefits of experiencing mixed emotions suggests that mixed emotions were beneficial for eudaimonic well-being (Berrios, Totterdell, & Kellett, 2018b) and promoted the self-control effort

needed to resist temptations (Berrios et al., 2018a). Temptations, which provide an opportunity to experience more positive emotions, has been found to prompt procrastination (Sirois & Giguère, 2018).

One determinant of whether mixed emotions can be beneficial for self-control is whether people can accept this mixed emotional state (Berrios et al., 2018a). Yet to date, there is little (if any) research investigating the extent to which chronic procrastinators can accept or tolerate mixed emotions and the possible consequences of not doing so for their emotional distress.

Despite the substantial body of research indicating that trait procrastination is associated with higher levels of negative emotions and lower levels of positive emotions (Sirois & Giguère, 2018; Sirois & Pychyl, 2013), research into the underlying mechanisms of this link is sparse. Emotions are determined by how a person appraises a situation rather than the situation itself (Lazarus, 2000; Lazarus & Folkman, 1984). Individual differences in appraisal styles may provide an explanatory pathway linking procrastination and goal-related emotions.

Threat and challenge appraisals are conceptualised as anticipated appraisals of future events (Folkman & Lazarus, 1985), which often evokes different emotions from one another (e.g., Skinner & Brewer, 2002). Threat appraisals are based on an assessment of whether an event causes harm and loss (Lazarus, 2000; Lazarus & Folkman, 1984). Numerous studies have found that threat appraisals induce negative emotions (e.g., Lazarus & Folkman, 1984; Nicholls et al., 2011; Schlenker & Leary, 1982; Skinner & Brewer, 2002) and avoidant coping (e.g., Chung, Zhou, Eisenberg, & Wolchik, 2019; Lengua, Sandler, West, Wolchik, & Curran, 1999).

Procrastination is a form of avoidant coping that people adopt to cope with aversive tasks by avoiding or postponing them (Sirois & Kitner, 2015). Prior research demonstrated that people are more likely to procrastinate a task when it is perceived as a threat (Chatellier, 2015; Ferrari & Tice, 2000). For example, Ferrari and Tice (2000) found that procrastinators spent less time preparing for a math task when the task was perceived as threatening to them. However, when the same task was perceived as a fun game, procrastinators spent the same amount of time as non-procrastinators on preparing for it. These studies highlight the importance of threat appraisals in procrastination. However, when procrastination is viewed as a trait-like quality, pending questions are whether procrastinators habitually appraise a goal in a negative way (e.g., high threat appraisals) and whether this habitual appraisal style explains negative emotions that they experience.

The evaluations of coping resources and abilities play an important role in appraisal (Lazarus & Folkman, 1984). Social support serves as "a coping assistant" that may buffer the deleterious impacts evoked by a stressful situation (Steese et al., 2006; Thoits, 1986). The perceptions of adequate and sufficient support may make it easier for people to appraise a situation as positive (Lazarus & Folkman, 1984). In contrast, the perceptions of lower social support may contribute to threat appraisals (McNett, 1987). However, people may have a biased, subjective point of view that social support they perceived from others is inadequate and not available.

Sirois et al. (2017) argue that negative self-evaluations may bias perceptions towards a lack of resources for coping, rather than towards resources that might be instrumental in reaching goals (Sirois et al., 2017). In line with this, negative self-evaluations may negatively bias information processing, resulting in a biased perception of support. Given that negative self-evaluations are a central feature of

procrastinators (Flett et al., 1995), in the resources assessment process, procrastinators may tend to view others' support as insufficient. This biased, subjective evaluation of support may contribute to threat appraisals and negative emotions.

A situation is appraised as challenging when it is likely to provide gains or benefit personal growth (Lazarus, 2000; Lazarus & Folkman, 1984). Challenge appraisals have been linked to higher levels of task-related positive emotions (e.g., Searle & Auton, 2015; Skinner & Brewer, 2002). Skinner and Brewer (2002) suggest that individuals who appraise tasks as challenging were more likely to experience positive emotions and reported higher expectancies for successful coping.

Self-efficacy plays a role in whether people appraise an event as a positive challenge (Putwain & Remedios, 2014). Self-efficacy refers to a belief in one's own ability to perform required actions for goal accomplishment (Bandura, 1986, 1991). Self-efficacy influences self-regulation by impacting intention formation and persistence of intended actions (Bandura, 1986). Given difficulties in self-regulation are common among procrastinators, it is not surprising that trait procrastinators are more likely to have weak self-efficacy beliefs (e.g., Lay, 1992; Martin et al., 1996; Sirois, 2004). This, in turn, may make it easier for them to evaluate difficult goals in a negative but not a positive manner. From this perspective, procrastinators with a low sense of self-efficacy may be less likely to appraise difficult goals as challenging. Given that challenge appraisals are closely associated with positive emotions (Lazarus & Folkman, 1984; Skinner & Brewer, 2002), this appraisal style may explain why procrastinators experience lower levels of positive emotions when faced with difficult tasks.

The Current Study

The first purpose of the current study was to assess how chronic procrastinators appraise and experience a goal that they were struggling to achieve. This study focused primarily on three different types of emotions, namely, negative, positive and mixed emotions. Given the conflicting theoretical perspectives of mixed emotions, the current study assessed mixed emotions using two different measures. By doing so, it is possible to clarify whether the experience of mixed emotions in the context of procrastination is a reflection of the conflicted emotions experienced or a meaningful and adaptive emotional response.

The second aim of the current study was to investigate cognitive mechanisms underlying the proposed link between trait procrastination and goal-related emotions. Appraisal theories (e.g., Lazarus & Folkman, 1984) suggest that habitual appraisal styles influence one's emotional experience. It was expected that chronic procrastinators would be more likely to appraise difficult goals as threatening than challenging. This appraisal style would explain their emotional responses to the goals they were struggling with.

Also, social support as a coping resource may influence to what extent a situation is evaluated as threatening (Folkman & Lazarus, 1980). Yet, to date, the role of perceived social support and threat appraisals in explaining the negative emotions associated with procrastination has not been investigated. In an attempt to extend theory and research on how procrastination is liked to emotions, the current study examined the possible indirect effects of procrastination on negative goal-related emotions through perceived social support and threat appraisals. It was hypothesised that (i) less perceived social support and threat appraisals would explain the proposed positive relation between procrastination and negative goal-related emotions, and (ii)

challenge appraisals would explain the proposed negative relation between procrastination and positive goal-related emotions

2.3 Methods

2.3.1 Participants and Procedure

After obtaining ethical approval for data collection from the Department of Psychology Ethics Committee at the University of Sheffield, participants were recruited from the student and staff volunteers list of the University of Sheffield and ads placed on social media. The advert contained a link that directed people who were interested in the study to the information sheet (Appendix 2.1) outlining the inclusion criteria. The inclusion criteria were that they (i) were age 18 and over; (ii) were working on an important and difficult goal. Those who met the inclusion criteria and completed the online consent form (Appendix 2.2) could participate in the study. Participants who completed the survey package could enter a draw for a £25 Amazon voucher.

Five participants who did not complete all measures were omitted, leaving a final sample of 216 ranging in age from 18 to 64 (M_{age} = 27.86, SD = 8.53). The majority of participants were female (68.40%) and Caucasian (68.10%). A power analysis based on multiple linear regression was performed for sample size estimation (G*Power 3.1; Faul, Erdfelder, Lang, & Buchner, 2007). Results showed that a sample of 119 would have sufficient power (i.e., 95%), with an alpha of 0.05, to detect a medium effect size (f^2 = 0.15; Cohen, 1992) in the relation between trait procrastination and emotions.

2.3.2 Measures

Participants completed basic demographic questions, a Personal Project Analysis (PPA; B. Little, 1983) and a set of questionnaires.

Trait Procrastination. The short version of General Procrastination Scale (GPS-9; Sirois, Yang, & van Eerde, 2019) was used to examine global tendencies towards procrastination. This nine-item measure was derived from the 20-item General Procrastination Scale (GPS; Lay, 1986). Example items include "I often find myself performing tasks that I had intended to do days before", "Even with jobs that require little else except sitting down and doing them, I find they seldom get done for days". Items were scored on a 5-point Likert-type scale ranging from 1 (*false for me*) to 5 (*true for me*). The items are averaged into a single score with high values indicating a higher tendency to procrastinate. The GPS-9 has demonstrated good internal consistency ranging from 0.85 to 0.91 (Sirois et al., 2019). In the current sample, the internal consistency coefficient was 0.86, which indicated that this measure was internally reliable.

Goal-related Appraisal and Emotions. PPA (B. Little, 1983) was used to assess how individuals appraised and felt about their personal goals. PPA is a flexible, open-ended series of assessment procedure designed to rate, compare and examine the various cognitive and emotional dimensions of people's personal goals. Two modules were used in the present study: the project elicitation listing module and the personal project rating matrix. Working with the project elicitation listing module, participants were asked to list three important goals that they were struggling with. Next, they were instructed to select the most important goal and rate it on 19 dimensions via the personal project rating matrix. Of these dimensions, 10 reflected goal-related appraisals (i.e., threat or challenge appraisals) and nine reflected goal-related

emotions (i.e., negative, positive or conflicted emotions). These dimensions were either derived from Little's (1983) standard PPA rating matrix or linked to procrastination in previous research (e.g., Blunt & Pychyl, 2005). Each dimension was rated from 0 (if they did not feel the emotion at all) to 10 (if they felt the emotion very strongly), with a higher rating indicating that more of the dimension under consideration was present.

Mixed emotions. Mixed Emotions was measured using the four-item mixed emotion scale (Berrios, Totterdell, & Kellett, 2013). Items include "I'm feeling contrasting emotions", "I'm feeling a mixture of emotions", "I'm feeling different emotions at the same time", and "I'm feeling a combination of different emotions at the same time". Items were rated on a 5-point Likert- scale from 1 (*not at all*) to 5 (*very much*). The items are averaged into a single score with high values indicating higher levels of mixed emotions. This scale has shown good internal consistency in the previous studies ($\alpha = .90$; Berrios et al., 2015b). In the current sample, the internal consistency coefficient was 0.91.

Perceived Social Support. Perceived social support was measured using the eight-item Duke-UNC Functional Social Support Questionnaire (Broadhead, Gehlbach, De Gruy, & Kaplan, 1988). This questionnaire was designed to evaluate an individual's perceived satisfaction with social support. Items include both emotional and practical aspects of social support. Items such as "I get chances to talk to someone about problems at work or with my housework" and "I have people who care what happens to me" were scored on a 5-point Likert type scale ranging from 1 (*much less than I would like*) to 5 (*as much as I would like*). The items are averaged into a single score with high values reflecting greater perceived social support. This scale has demonstrated good internal consistency in previous studies (e.g., Epino et al., 2012;

Sirois, Millings, & Hirsch, 2016). In the current sample, the internal consistency coefficient was 0.89.

2.3.3 Data Analysis

Data were analysed using the IBM Statistical Package for Social Sciences (SPSS 24.0). A Principal Component Analysis (PCA) was conducted to extract the latent dimensions that might reflect features of goal-related appraisals and emotions. Prior to a PCA, Bartlett's test of sphericity and the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy were used to test the factorability of the data collected by the PPA rating matrix. The recommended minimum acceptable value of KMO is 0.6 (Tabachnick & Fidell, 2007); Bartlett's Test of Sphericity should be significant, $p < 0.05$ (Bartlett, 1950).

Following the recommendations of Tabachnick and Fidell (2007), since it was expected that some dimensions might be related, a PCA using oblique rotation with a delta value set to zero was initially performed. Results showed that the correlations between several dimensions exceeded the Tabachnick and Fiddell's threshold of 0.32. Thus, an oblique rotation was chosen. Four criteria were used to determine how many components should be retained to represent the original correlation matrix meaningfully: (i) the Kaiser rule, that is, a corresponding eigenvalue greater than one (Kaiser, 1970), (ii) Cattell's (1966) scree-plot test, (iii) the variance explained should not be less than 60% (Hair, Black, Babin, Anderson, & Tatham, 2006), and (iv) a primary factor loading of 0.5 or above and no cross-loading of 0.3 or above (Hulland, 1999; Truong & McColl, 2011).

Correlation analysis was then conducted to test the proposed bivariate relations among the model variables. To test the indirect effects of trait procrastination

on negative goal-related emotions through perceived social support and threat appraisals were assessed with the SPSS macro PROCESS (A. Hayes, 2013). This method allows for simultaneously examining multiple direct and indirect predicted paths. Trait procrastination was tested as a predictor (X); perceived social support (M1) and threat appraisals (M2) were tested as mediators, and negative goal-related emotion was tested as the dependent variable (Y). Analyses were conducted with both mediators entered simultaneously with 5,000 bootstrapping re-samples and bias-corrected 95% confidence intervals.

2.4 Results

2.4.1 Principal Component Analysis of Goal-related Appraisal and Emotions

The results of KMO and Bartlett's test of sphericity both revealed that the collected data were adequate for subsequent principal component analysis. For the appraisal components, the KMO value was equal to 0.73, and Bartlett's test of sphericity was significant ($\chi^2(45) = 489.86$, $p < .001$).

According to the above four criteria, two components with eigenvalues greater than one were extracted, accounting for 63.35% of the total variance. Three dimensions (i.e., Time Adequacy, Component, Support) were eliminated because they failed to meet the criterion of having a primary factor loading of 0.5 or above and no cross-loading of 0.3 or above (Hulland, 1999; Truong & McColl, 2011). Because only one dimension (i.e., Other's View of Importance) was loaded on the third, not theoretically predicted component, therefore, this dimension was excluded. As such, only two components were therefore retained.

Three dimensions constituted the component of *Threat Appraisals,* including Difficulty, (less) Control, and (less probable) Outcome, which explained 38.48% of

the variance. Three dimensions, including Importance, Positive Challenge and Autonomy, constituted the Challenge Appraisals component, which accounted for 24.88% of the variance. The Cronbach's alpha was 0.75 for threat appraisals and 0.63[2] for challenge appraisals.

For the emotional components, the KMO value was 0.82, and Bartlett's test of sphericity was also significant ($\chi^2(36) = 829.27$, $p < .001$). Only one dimension (i.e., Uncomfortable) was excluded, as this item loaded greater than 0.3 on more than one factor. Three principal components with eigenvalues greater than one were extracted, accounting for 76.39% of the total variance. *Negative Emotions* comprised the dimensions of "Stressed, Worried and Anxious", which explained 42.76% of the variance. *Positive Emotions* comprised the dimensions of "Hopeful, Eager and Confident", which explained 19.31 % of the variance. *Conflicted Emotions* was made up of the dimensions of "Conflicted and Confused", which explained 14.31 % of the variance. All factors demonstrated good internal consistency, with Cronbach's αs > 0.75.

2.4.2 Bivariate Correlations

As shown in Table 2.1, correlation analysis revealed the expected positive associations of trait procrastination with goal-related conflicted, mixed and negative emotions. Also, trait procrastination was negatively associated with positive goal-

[2] Given that an alpha value of 0.7 or higher is widely considered desirable (Nunnally & Bernstein, 1994), the alpha value of the measure of challenge appraisals was relatively low. However, some researchers point out that a value of around 0.6 is moderate but acceptable (e.g., Hair et al., 2017). Also, an alpha value depends upon the number of items where a scale with more items often shows a high value (e.g., Cortina, 1993; Tavakol & Dennick, 2011). A possible explanation for the low alpha value of the challenge appraisals measure is that it was only composed of three items. From this perspective, this measure could be seen as acceptable, especially if it has three items. However, researchers should be aware of the potential risk of low reliability and use it with caution when assessing challenge appraisals. Future research is needed to examine the reliability of this measure with different samples.

related emotions. Furthermore, trait procrastination was positively correlated with threat appraisals but not associated with challenge appraisals.

Table 2.1. *Bivariate Correlations Among Procrastination, Perceived Social Support, Goal-related Appraisals and Emotions*

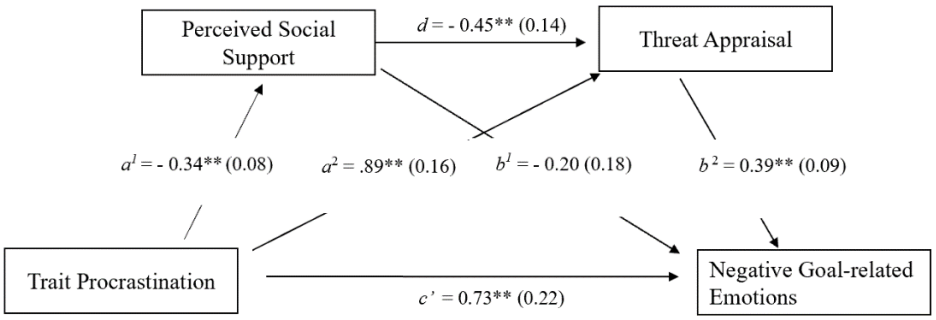
Variables	1	2	3	4	5	6	7	8
1. Trait Procrastination	-							
2. Perceived Social Support	-.29**	-						
3. Threat Appraisals	.42**	-.32**	-					
4. Challenge Appraisals	.07	.02	.22	-				
5. Negative Emotions	.37**	-.24**	.42**	.01	-			
6. Positive Emotions	-.33**	.13	-.45**	.60**	.31**	-		
7. Conflicted Emotions	.27**	.13	.43**	.23**	.38**	-.26**	-	
8. Mixed Emotions	.22**	-.17*	.32**	.00	.41**	-.12	.35**	-
M	3.11	3.99	5.24	6.99	6.20	5.40	4.38	2.89
SD	0.74	0.85	1.83	1.82	2.38	2.16	2.38	1.03

Note. * $p < 0.05$; ** $p < 0.01$;

2.4.3 Indirect Effects of Procrastination on Negative goal-related Emotions

The sequential mediation model of the relationship between trait procrastination and negative goal-related emotions are presented in Figure 2.1. The direct path from trait procrastination, perceived social support, threat appraisals and negative emotions, were all significant in the expected direction. Two significant indirect effects were found. First, as expected, the indirect effect of trait procrastination on negative goal-related emotions through perceived social support and threat appraisals was significant (a^1db^2), with the overall model explaining 23% [R^2 = .23, F (1, 214) = 34.89, p < .001] of the variance in negative goal-related emotions (see Table 2.2). After accounting for the indirect effect through the two mediators, the direct effect was still significant, supporting partial mediation. Second, there was a significant indirect effect of trait procrastination on negative goal-related emotions through threat appraisals only (a^2b^2). The indirect effect of trait procrastination on negative emotions through perceived social support was not significant (a^1b^1).

Figure 2.1. *Sequential mediation model of the relationship between trait procrastination and negative goal-related emotions via the perceived social support and threat appraisals (N = 216).*



Notes. Following recommendations made by Hayes (2013), values represent unstandardized beta coefficients with standard error (*SE*) shown in parentheses. * p < .05, ** p < .01.

Table 2.2. Indirect effects of Trait Procrastination (TP) on Negative Goal-related Emotions (NA) via Perceived Social Support (PSS) and Threat Appraisals (TH).

	Indirect Effect			
	Estimates		95% *CI*	
Path	Effect	Boot SE	Lower	Upper
TP-PSS-NA (a^1b^1)	0.07	0.06	-.04	0.20
TP-TH-NA (a^2b^2)	0.06	0.03	0.02	0.14
TP-PSS-TH-NA (a^1db^2)	0.35	0.11	0.17	0.60
Total effect *(c)*	1.21	0.20	0.02	0.14
Direct effect *(c')*	0.73	0.22	0.30	1.16
Total Indirect effect	0.48	0.13	0.24	0.76

Note. Effect = Unstandardized indirect effect; Boot SE = Standard error; 95% CI = Bias Corrected and accelerated 95 percent confidence intervals; Confidence intervals for indirect effects are based on 5,000 bootstrapped samples.

2.5 Discussion

The current study investigated how trait procrastination is linked to goal-related emotions and appraisals and the role of perceived social support and threat appraisals in explaining the relationship between trait procrastination and negative goal-related emotions. As hypothesised, chronic procrastinators scored high on threat appraisals, goal-related negative and conflicted emotions, and mixed emotions, but low on positive ones. The findings are consistent with earlier literature in that trait procrastination is associated with higher levels of negative but lower levels of positive emotions (e.g., Sirois & Giguère, 2018; Sirois & Pychyl, 2013). Furthermore, trait

procrastination was significantly associated with less perceived social support and high threat appraisals, both of which explained in part the indirect effect of trait procrastination on negative goal-related emotion.

The current findings provide novel evidence that procrastinators may experience higher levels of mixed emotions. This finding is inconsistent with previous research, which showed that the experience of mixed emotions is beneficial for self-control (Berrios et al., 2018a) and well-being (Berrios et al., 2018b). One possible reason for this inconsistent result is that compared to non-procrastinators, procrastinators may process mixed emotions differently. For non-procrastinators, experiencing mixed emotions may help them integrate complex information and find the meaning of goal achievement, thereby facilitating self-control to resist temptations (Berrios et al., 2018a). However, for procrastinators, the experience of mixed emotions may be perceived as a state of disharmony between incompatible emotions rather than a path to a meaningful and adaptive emotional response. This disharmonious state may evoke emotional distress and prompt procrastination. In this regard, the current findings support a detrimental view of mixed emotions (e.g., Carver et al., 2000) in the context of procrastination.

This study is the first to investigate whether and how trait procrastination is related to goal-related conflicted emotions. The current findings showed that procrastinators were more likely to experience higher levels of conflicted emotions. The experience of conflicted and mixed emotions may be similar in that they both reflect a state of disharmony between incompatible emotions. In situations involving self-control dilemmas, prioritising hedonic gratification over long-term goals with larger rewards may lead to conflicting emotional experiences (W. Hofmann, Kotabe,

& Luhmann, 2013). Thus, conflicted emotions that procrastinators experience may arise from their habitual choice of giving priority to hedonic gratification.

The findings from this study provide support for the proposed mediating effects of perceived social support and threat appraisals in explaining the link between procrastination and negative goal-related emotions. The current findings add to an emerging body of research that probes the reasons for negative emotions associated with procrastination noted in previous research (e.g., Lavoie & Pychyl, 2001; Lay, 1986; Sirois, 2014b). Procrastinators may view social support as inadequate and consequently evaluate difficult goals as more of a threat. These perceptions explained in part the negative emotions that they experienced.

The association between trait procrastination and less perceived social support parallels Ferrari, Harriott, and Zimmerman's (1998) finding that trait procrastination was associated with dissatisfying social relationships. One possible explanation is that negative self-evaluations of chronic procrastinators (Flett et al., 1995) may bias the resources assessment process towards judging that their coping resources are inadequate (Sirois et al., 2017). The current findings indicate that this bias may distort their perceptions of social support. In other words, trait procrastinators may tend to perceive or interpret available social support as inadequate, almost regardless of the amount of support they received from others.

Self-handicapping may provide a possible alternative explanation for the link between trait procrastination and the subjective perception of low levels of social support. Self-handicapping has been operationalized as creating external excuses that carry the blame for anticipated failures (Baumgardner, Lake, & Arkin, 1985; Leary, 1986). Compared to non-procrastinators, procrastinators were prone to self-handicapping and seeking easy, nondiagnostic information instead of self-relevant,

diagnostic information (Ferrari, 1991c). These suggest that procrastinators may tend to blame failures on external obstacles or behavioural delay itself instead of a lack of ability, thus, serving a self-protective function. Thus, less perceived social support may be a plausible external obstacle to protect themselves from negative evaluations caused by irrational delay.

The absence of significant direct effects for perceived social support on negative emotions is intriguing. It could be reasoned that the perception of social support is subjective, which may be primarily based on appraisals. This explanation is consistent with prior research demonstrating that perceived social support did not load highly on the negative affectivity component (Lakey & Cassady, 1990). Lakey and Cassady found that people with lower perceived support reported more psychological distress due to their negative bias in evaluating the received support. This suggests that cognition, in comparison to an emotional response itself, plays a more important role in the association between perceived social support and distress. Indeed, the sequential mediational model in the current study is consistent with this proposition, which revealed that the role of perceived social support on negative goal-related emotions was indirectly through threat appraisals.

Highlighting the role of threat appraisals in predicting negative emotions associated with procrastination is another noteworthy contribution of the current research. Procrastinators' threat appraisals may contribute to a vicious cycle of negative emotions and procrastination. Lazarus and Folkman (1984) suggest that coping is the process of minimizing the gap between environmental demands and available resources. Negative emotions will be experienced when the demands exceed resources for coping. Coping includes strategies that provide immediate relief from the negative emotions of threats without addressing the real problems (i.e.,

maladaptive coping) or strategies that solve the problems causing the negative situations (i.e., adaptive coping).

A meta-analysis showed that the greater use of maladaptive coping as a form of short-term mood regulation might be a habitual coping tendency of procrastinators (Sirois & Kitner, 2015). Once people use procrastination to cope, they may temporarily relieve negative emotions (Sirois & Pychyl, 2013). However, this coping strategy may exacerbate their threat appraisals because the gap between environmental demands and resources remains and may even become larger. Also, the original negative emotions elicited by threat appraisals, as well as the additional negative emotions arising from maladaptive coping (i.e., procrastination), may intensify the tendency to view ongoing goals as more threatening. This, in turn, may contribute to a vicious cycle of negative states and habitual procrastination.

The current findings may provide a fruitful direction for procrastination interventions. Reinterpreting the meaning of an emotion-eliciting situation is an effective way to change emotional responses (e.g., Siemer, Mauss, & Gross, 2007). The effectiveness of cognitive change in regulating emotions has been substantiated through a meta-analysis by Webb, Miles, et al. (2012). Thus, interventions designed to change procrastinators' irrational appraisals of (e.g., high threat appraisals) may effectively reduce their negative emotions. This, in turn, may reduce the need for procrastination as a mood repair strategy (Sirois & Pychyl, 2013).

2.5.1 Limitations and Future Directions

Although novel, this study has several limitations worth noting. First, the current findings are based on cross-sectional data, limiting inferences about causality among procrastination, perceived social support, threat appraisals and negative

emotions. However, the presumed direction among trait procrastination, threat appraisals, and negative emotions is consistent with theory, and a previous longitudinal study which found that procrastinatory cognitions (a particular set of negative automatic thoughts and brooding about past procrastination that is associated with trait procrastination) explained in part the positive link between trait procrastination and negative emotions (Stainton et al., 2000).

Nonetheless, prior research suggests that threat appraisals and negative emotions might interact in mutually reinforcing ways (e.g., Frijda, 1993), indicating the possibility of more complex links between threat appraisals and negative emotions. Also, Schwarz (2011) suggests that negative emotions serve as a source of information that can provide individuals with feedback on their capacity to cope. In this case, negative emotions associated with performing a difficult goal may provide procrastinators with the indication that working on the goal may cause harm or loss (e.g., damage their self-esteem), thereby resulting in threat appraisals. Future research using a longitudinal or experiential design would be helpful to establish causal interference among these variables and provide an in-depth look at whether less perceived social support and/or threat appraisals can contribute to a vicious cycle of negative emotions and procrastination.

A second limitation was that the present data limits inferences about the dynamic associations between goal-related emotions and procrastination. Given that daily affect shows a considerable degree of stability (Hudson, Lucas, & Donnellan, 2017; Lay, 1986), the link between procrastination and one-time measure of emotions in the current study may, therefore, reflect more enduring emotional states associated with procrastination. Nonetheless, mapping the temporal dynamic patterns of emotions and procrastination would provide insight into how the fluctuation of

emotions are associated with state procrastination. Longitudinal research is therefore needed to investigate the dynamics of emotional responses across situations in the context of procrastination. This limitation was addressed in Study 2, which investigated the associations of momentary emotions with situational procrastination.

2.5.2 Conclusion

The current study assessed the relations among procrastination, goal-related emotions, and appraisals through personal project analysis. In addition to confirming that procrastination was associated with high levels of negative and low levels of positive goal-related emotions, this research demonstrated for the first time that procrastination was positively associated with conflicted and mixed emotions. These findings provide preliminary evidence for the emotional complexity in the context of procrastination.

The present research also provides evidence suggesting that chronic procrastinators may habitually appraise available social support as inadequate and, therefore, evaluate an important, difficult goal in a more threatening manner. This appraisal style explained in part the negative goal-related emotions that they experience. From a theoretical standpoint, the current study provides an explanatory path in understanding the relationship between procrastination and negative emotions. From a practical standpoint, this study indicates that a promising intervention designed to change one's appraisal of goals may be beneficial for reducing negative goal-related emotions. This, in turn, may reduce the need for procrastination as a mood repair strategy.

CHAPTER 3

THE DYNAMIC ASSOCIATIONS BETWEEN SITUATIONAL PROCRASTINATION AND EMOTIONS

3.1 Chapter Overview

This chapter presents findings from the second study, which examined the dynamic associations between emotions and situational procrastination. The aims of the current study were twofold: (i) to investigate whether and how situational procrastination is linked to negative, positive and mixed emotions on a momentary basis, and (ii) to test the role of goal characteristics in explaining the possible relations between situational procrastination and momentary emotions.

3.2 Rationale and Aims of the Current Study

The mood-repair conceptualization of procrastination highlights the importance of emotions in understanding procrastination (Sirois & Pychyl, 2013). Study 1 revealed that trait procrastination was associated with higher levels of goal-related negative and mixed emotions and lower levels of positive emotions. However, these findings were based on cross-sectional data, limiting conclusions about the potential dynamic associations between situational procrastination and emotions.

Procrastination serves as an emotion regulation strategy that provides a short-term hedonic shift in the emotions experienced (Sirois & Pychyl, 2013), suggesting that there is fluctuation in emotional states before, during and after procrastination. From a short-term perspective, putting a goal off to avoid negative emotions associated with the goal may provide temporal emotional relief or even promote positive emotions. However, once the temporary mood-boosting effects wear off, the negative emotions remain (Pychyl & Sirois, 2016). Also, the awareness of the

consequences caused by past procrastination may increase negative emotions and elicit self-judgmental thoughts (Sirois & Pychyl, 2013). Thus, people should experience ups and downs in their emotions during procrastination as their hedonic shift is not long-lasting. Investigating how situational procrastination is related to momentary emotions over the course of goal pursuit may offer insights into the dynamic associations between procrastination and emotions.

The Possible Links Between Situational Procrastination and Momentary Emotions

Despite there being a large literature on procrastination linked to emotions, only a few studies have investigated the associations between situational procrastination and momentary emotions. A recent experience-sampling study by Pollack and Herres (2020) assessed whether changes in daily negative and positive emotions predict subsequent procrastination and vice versa. Cross-lagged panel analysis revealed that people procrastinated more following days they experienced negative emotions; however, prior-day procrastination did not predict changes in next-day negative emotions. In addition, positive emotions were related to neither prior-day nor next-day procrastination when controlling for the effects of negative emotions.

Although Pollack and Herres's (2020) work provides evidence for the causal relationship between negative emotions and procrastination, one significant limitation should be addressed in future studies. In their study, daily procrastination was assessed by Lay's General Procrastination Scale (GPS; Lay, 1986). The GPS may not be sensitive to examining changes in procrastination over time because this scale is based on a conceptualization of procrastination as a trait (Lay, 1986; Sirois et al., 2019). Thus, it would be more appropriate to use other assessments to examine situational procrastination rather than general tendencies as the GPS assesses.

Another experience-sampling study by Pychyl et al. (2000) investigated individuals' momentary emotional states at the time of procrastination. Participants completed questionnaires eight times a day for five days prior to an academic deadline. Correlation analysis showed that situational procrastination was not associated with either general negative emotions or positive emotions but only feelings of guilt.

These studies raised several questions in need of further investigation. First, these studies have predominantly focused on negative and positive emotions, it is unclear whether people simultaneously experience opposite-valence emotions when procrastinating (e.g., happiness and guilty). Study 1 showed that trait procrastination was positively associated with mixed emotions. Mixed emotions that procrastinators regularly experience may represent a conflicted and disharmonious emotional state, which may arise from an inner conflict between competing desires (Berrios et al., 2015b). From a mood repair perspective, procrastination as a means of resolving such emotional conflict is fulfilled by prioritizing the hedonic desires (Sirois & Pychyl, 2013). In other words, the experience of mixed emotions is likely to prompt procrastination.

Second, the characteristics of goals that may influence the dynamic relationships between procrastination and emotions have not been fully explored. Procrastination is influenced by the complex interplay among emotional states, contextual or situational influences (such as goal characteristics) and trait-like characteristics (Wieland, Ebner-Priemer, Limberger, & Nett, 2021). It was found that between-person differences can partially explain the effects of fluctuations in within-person on procrastination (e.g., trait self-control; Van Eerde & Venus, 2018). Thus, it

is necessary to take into account both between- and within-person differences to understand the dynamic changes in procrastination.

The Role of Goal Characteristics in the Links Between Emotions and Situational Procrastination

Goal characteristics play a pivotal role in procrastination behaviour (Hoppe, Prokop, & Rau, 2018). On the behavioural side of procrastination, a person may be likely to postpone certain goals but work on others in a timely manner. One underlying mechanism is that certain goals may evoke unpleasant feelings or negative emotions, which, in turn, prompt procrastination as a means to regulate emotions (Sirois & Pychyl, 2013).

Procrastination has been linked to specific task properties, such as task aversiveness. For example, Pychyl et al. (2000) found that students were more likely to procrastinate on tasks that were perceived as stressful, difficult and confusing. Likewise, a recent experience-sampling study by Wieland et al. (2021) demonstrated that academic tasks labelled as aversive resulted in more procrastination. From a mood repair perspective, negative emotions consequential to aversive tasks prompt procrastination (Sirois & Pychyl, 2013). In addition to task aversiveness, other characteristics of goals may also interact with emotions, which exacerbate or attenuate procrastination. To extend the understanding of these interplay effects, the current study focused primarily on three goal characteristics: goal conflict, goal motivation and goal focus.

The Effects of Goal Conflict

Mixed emotions have been found to be elicited by conflicting goals (Berrios et al., 2015b). This finding sets a stage for investigating how goal conflict and mixed

emotions interact to affect procrastination. Berrios and colleagues conducted two experimental studies to examine whether goal conflict can trigger mixed emotions. Their first study 1 was performed in an artificial but controlled goal-activation situation. Participants in the experimental group were faced with a decision about whether to spend more time on a task in return for increasing the researchers' donation to a charity (i.e., goal-conflict group). In contrast, those in the control group were told that the researchers would donate the same amount of money regardless of the time they spent on the task. Results revealed that individuals in the goal-conflict group reported higher levels of mixed emotions than those in the control group. This pattern was also found in a naturally occurring goal-activation situation where participants were asked to recall the most recent conflicting goals (i.e., an experimental group) or facilitating goals (i.e., a controlled group). These findings suggest that mixed emotions can be elicited if the pursuit of one goal thwarts the pursuit of another (Berrios et al., 2015b; J. Larsen, Coles, & Jordan, 2017).

Within procrastination, the primacy of short-term mood repair at the expense of long-term goal pursuit (Sirois & Pychyl, 2013) reflects a clash between hedonic and instrumental goals. For instance, findings showed that conflict between roles as an academic and a friend contributed to more academic procrastination (Senécal et al., 2003). If a student is working on an important academic task and receives a birthday party invitation from a friend, they may experience mixed emotions. In this case, mixed emotions may be experienced as an inner conflict between two competing desires, thereby leading to task avoidance as a means of resolving the conflict. Despite clear theoretical grounding, yet to date, there was little empirical evidence to support the assumption that mixed emotions consequential to goal conflict may prompt procrastination.

Interestingly, a recent experience-sampling study offered another possible explanation for the link among goal conflict, mixed emotions and procrastination. Berrios et al. (2018a) investigated whether experiencing mixed emotions in situations involving self-control dilemmas may facilitate the self-control effort needed to resist temptations. Temptations in this study were defined as immediate impulses that suddenly appeared in participants' minds but were not associated with an activity that they were doing. Results revealed that mixed emotions partially mediated the link between perceived goal conflict and efforts to resist temptations. That is, experiencing mixed emotions in response to conflicting goals contributed to greater effort to resist temptations. Berrios and colleagues explained that mixed emotions might assist individuals in resolving conflicts or reducing uncertainties through searching for meaning in a self-control dilemma, thereby giving priority to meaningful long-term goals. From this perspective, mixed emotions resulting from goal conflict may be associated with less procrastination. Given the inconsistent views of mixed emotions, one purpose of the current study was to assess what role goal conflict, as a source of mixed emotions, might play in procrastination.

The Effects of Goal Motivation

Self-determination theory (SDT; Deci & Ryan, 1991) provides a framework for understanding the interaction between motivations and emotions in predicting procrastination. Motivation differs in the extent to which it is controlled or autonomous. Controlled motivation implies performing a goal because of external rewards or internal pressures, whereas autonomous motivation implies performing a goal because it well aligns with one's interest or inner value (Deci & Ryan, 1991; Sheldon & Elliot, 1998).

Prior research suggests that individuals acting for controlled reasons are less likely to be self-regulated and have difficulty following through on their intended goals. One possible reason is that a goal pursued out of controlled motivation is likely to be experienced as threatening, pressuring, and less desirable (A. Elliot & Thrash, 2001). Cerasoli et al. (2014) provide a comprehensive review of how motivation is linked to emotions. The results of their meta-analysis of over 40 years of research on SDT showed that controlled motivation was positively associated with negative emotions. From this perspective, a goal coupled with underlying controlled motivation may be likely to induce negative emotions, which, in turn, prompt procrastination.

However, some researchers argue that controlled motivation might elicit desired goal-direct behaviour and facilitate goal progress by emphasising the importance of striving for a particular goal (Koestner et al., 2008). This argument implies that controlled motivation, even if it is associated with negative emotions, may lead to less procrastination, at least in a short period of time. Given the above inconsistent findings, a question arises as to how controlled motivation interacts with negative emotions, which plays a role in procrastination.

The beneficial effects of autonomous motivation in goal pursuit have been well-substantiated. Individuals acting for a goal due to autonomous reasons are more likely to initiate and persist in the goal (Deci & Ryan, 2000). Within procrastination, autonomous motivation has been found to be associated with less academic procrastination (Katz et al., 2014). However, the emotional mechanisms that underlie the link between autonomous motivation and procrastination have not been fully investigated.

Previous studies revealed that autonomous motivation is associated with higher levels of positive emotions in various life domains (e.g., Black & Deci, 2000; Gillet, Vallerand, Lafreniere, & Bureau, 2013). A goal coupled with underlying autonomous motivation is likely to be experienced as a valued and energizing endeavour (A. Elliot & Thrash, 2001). In light of the broaden-and-build theory of positive emotions (Fredrickson, 2001), the experience of positive emotions may attenuate the adverse effects of negative emotions and stress, especially when progress towards a goal is blocked. Given that a lack of positive emotions is a reason for procrastination (Sirois & Giguère, 2018; Sirois & Pychyl, 2013), it was expected that pursuing a goal due to autonomous reasons may increase positive emotions. An increase in positive emotions may dampen the deleterious impacts of negative emotions, therefore reducing procrastination.

The Effects of Goal Focus

Individuals may differ in their goal focus preference, namely progress versus outcome (Krause & Freund, 2014a). Individuals primarily focus on the steps taken to achieve the desired outcome (i.e., process focus) or the end state they want to achieve (i.e., outcome focus). For example, two people both set a goal of losing weight. One of them may focus on how to make a high protein breakfast; the other may focus on whether she looks more attractive after she drops a few pounds. When goal focus is considered as a stable tendency, it is similar to process- or outcome-oriented thinking (Pham & Taylor, 1999).

Research on procrastination and goal focus suggests that process focus may be beneficial for reducing procrastination, whereas outcome focus appears to be maladaptive during procrastination (Kaftan & Freund, 2020). An eight-week experience-sampling study by Kaftan and Freund (2020) investigated how goal focus

influences procrastination (i.e., the number of workouts that were fewer than planned) and individuals' emotional experiences during exercise or procrastination. The researchers found that process focus, both at the within-and between-person level, was positively related to exercise pleasantness and satisfaction, increased positive emotions (i.e., content and good) and the total number of completed workout sessions as planned (i.e., less procrastination). However, outcome focus seems to be not associated with either procrastination or negative and positive moods.

A limitation of Kaftan and Freund's (2020) study was that procrastination was measured with a single question (i.e., whether participants did workouts as scheduled). Failing to do scheduled workouts may not count as procrastination, as participants may have had to delay their workout schedule because of external factors (e.g., have to take care of a sick baby) rather than it being an unnecessary and irrational choice – both of which are two key features of procrastination (Haghbin, 2015). Thus, using different measures to assess the relationship between outcome focus and procrastination may yield different results in future studies.

There are several theoretical reasons to think that outcome focus may be related to procrastination. Outcome focus may provide a clear standard for comparing the current state with the desired end state. In self-regulation, individuals continuously evaluate how well they are doing to reduce the perceived discrepancy between the actual and derided state. A negative emotion arises when the sensed rate of progress is slower than the desired rate (Carver & Scheier, 1982, 1990). In some cases, the experience of negative emotions may motivate a person to engage in goal-directed behaviour, thereby reducing the emotions. However, within procrastination, negative emotions could shift one's priority from goal-directed behaviour to the primacy of immediate emotional relief, leading to task avoidance (Sirois & Pychyl, 2013). At this

point, focusing on outcomes may emphasize a discrepancy between the expected and the actual rate of progress. This, in turn, may heighten negative emotions and prompt future procrastination. In other words, outcome focus, negative emotions and procrastination may be associated in a cyclically reinforcing manner.

The Current Study

Existing theory and empirical evidence suggest that emotions play a pivotal role in understanding procrastination. Much research has revealed the relationships between procrastination and emotions (e.g., Fee & Tangney, 2000; Sirois, 2014b; Sirois & Giguère, 2018). Consistent with this, Study 1 showed that trait procrastination was positively associated with negative emotions and mixed emotions but negatively associated with positive emotions. Due to the cross-sectional nature of these findings, it was not possible to determine whether certain emotions are associated with situational procrastination. The present study used an experience-sampling approach to repeatedly investigate situational procrastination and momentary emotions on multiple occasions over time. This approach may clarify the associations between procrastination and emotions suggested by Study 1 and extend the understanding of the dynamic links between momentary emotions and procrastination. It was hypothesised that both procrastination behaviour would be positively associated with both momentary negative (Hypothesis 1a) and mixed emotions (Hypothesis 1c), but negatively associated with positive emotions (Hypothesis 1b), respectively.

There is evidence that negative emotions consequential to task aversiveness prompt procrastination (e.g., Blunt & Pychyl, 2000; Wieland et al., 2021). These findings suggest that certain goals characteristics and emotions interact to affect procrastination. The current study sought to investigate the role of three

characteristics of a goal (i.e., goal focus, goal motivation and goal conflict) in the links between momentary emotions and situational procrastination. It was hypothesised that (i) the relationships between momentary negative emotions and procrastination would be moderated by the between-person effects of controlled motivation (Hypothesis 2a) and outcome focus (Hypothesis 3a), whereas the relationships between momentary positive emotions and procrastination would be moderated by the between-person effects of autonomous motivation (Hypothesis 2b) and process focus (Hypothesis 3b), and (ii) at the within-person level, mixed emotions would mediate the effects of goal conflict on procrastination (Hypothesis 4).

3.3 Methods

3.3.1. Participants and Recruitment

After obtaining ethical approval for data collection from the Department of Psychology Ethics Committee at the University of Sheffield, participants were recruited from the student and staff volunteers list of the University of Sheffield, social media platforms and online participant recruitment platforms. The advert contained a link that directed people who were interested in the study to the information sheet (Appendix 3.1) outlining the inclusion criteria. The inclusion criteria were that they (i) were age 18 and over, (ii) were working on an important goal over the next seven days, and (iii) had accessibility to the internet on mobile phones. Those who met the inclusion criteria and completed the online consent form (Appendix 3.2) could participate in the study. The information sheet stated the procedures of the study and the need for their personal information (e.g., mobile number and email). It was explained that all their personal information would be saved in a different document and would not be linked to their responses. Those who had agreed to take part in the survey were given a link of the survey including a

baseline questionnaire. Participants who completed the baseline and the following survey were given a chance to win a £50 gift certificate as an incentive for participation.

A total of 83 participants were recruited. Following the recommendation for an experience-sampling study (e.g., Ployhart & Vandenberg, 2010) and to minimize the risk of recall bias, two inclusion criteria were considered for data analysis: (i) a minimum of three repeated observations, and (ii) all daily surveys had to be completed within 30 minutes after the survey links had been sent. Data from sixteen participants were excluded from the analysis. Of these, 13 participants failed to complete more than three repeated assessments, and three participants had not completed the daily questionnaires within the given time. This left a final sample of 67 participants (M_{age} = 29.82, *SD* = 7.55, 63.6% female), resulting in 477 matched level-1 (within-person) observations.

3.3.2 Procedure

Data collection was divided into two phases. During the first phase, participants were instructed to list one important goal that they were working on over the next seven days and to complete a set of baseline measures. Subsequently, the experience-sampling period (Phase two) was started on the first Monday following the day that they had completed the baseline measures. Participants received three text messages containing a survey link daily at random times within each of the following periods: 9:00 and 13:59, 14:00 and 18:59, and 19:00 and 22:00. Each message sent was separated by at least 1 hour. This temporal separation of measurements allows the researchers to investigate the dynamic changes in emotional states and procrastination at different time points. On each occasion participants were signalled, they were

instructed to complete a state measure of procrastination, followed by the momentary emotional questionnaires and the goal conflict scale.

3.3.3 Measures

Baseline Questionnaires

Demographics. The following demographic information was collected from participants: gender, level of education, and ethnicity.

Goal Motivation. Goal motivation was assessed by the four-item goal motivation scale (Sheldon & Kasser, 1998). This scale lists four different reasons why one pursues a goal. These four reasons include an external reason (i.e., "because somebody else wants you to, or because you'll get something from somebody if you do"), introjected reason (i.e., "because you would feel ashamed, guilty, or anxious if you didn't—you feel that you ought to strive for this"), intrinsic reason (i.e., "because of the enjoyment or stimulation that this goal would provide you"), and identified reason (i.e., "because you really identify with the goal"). Participants rate the degree to which they pursue their goal for each of four reasons, ranging from 1 (*not at all because of this reason*) to 9 (*completely because of this reason*). A score of controlled motivation was computed by an average score of external and introjected reason ratings, whereas autonomous motivation was computed by an average score of intrinsic and identified reason ratings. This scale has demonstrated acceptable internal consistency in the previous research, with Cronbach's alpha = 0.60 and above (Sheldon & Kasser, 1998).

Goal Focus. Goal focus was assessed by a four-item scale. Of these, two items were derived from Freund and Hennecke (2012)'s study, which have been used to measure how much participants focused on the process and the outcomes of a goal. An item,

"how much did you think about what you have to do to achieve your goal?" assesses process focus; the other item, "How much did you think about what achieving your goal would be like?" assesses outcome focus. These items have demonstrated good retest reliability in previous research (for process focus, Cronbach's alpha = .83, for outcome focus, Cronbach's alpha = 0.87; Freund & Hennecke, 2012). The other two items were adapted from Mustafić and Freund (2012)'s study, which have been used to examine age-related differences in goal focus. An item, "To what extent is the pursuit of this goal a priority for you?" examines process focus. The other item, "To what extent is the attainment of this goal a priority for you?" examines outcome focus. Items were rated on a 7-point Likert-format scale, ranging from 1 (*not at all*) to 7 (*very much*).

Experience-sampling Measures

Situational Procrastination. The five-item ecological momentary assessment of procrastination scale (e-MAPS; Wieland et al., 2018) was used to examine situational procrastination. The e-MAPS comprises the two main components of procrastination, cognitive-affective appraisal of the delay (CA component) and situational determinants (SD component), using a binary response format. Three items assess the CA component specifying the delay should be unnecessary, irrational and associated with subjective discomfort. The other two items examine the SD component, identifying whether the delay is necessary. An item such as "If I'm honest, putting off this goal is unnecessary" is classified as the CA component, whereas an item such as "I'm putting off working on my chosen goal because another important goal arose that took priority" is classified as the SD component. Respondents rate whether the criteria described by the items are false or true (0 = false; 1 = true). The coding for the CA-items and SD-items are added up separately. If either any CA-item or SD-item

identifies as true (i.e., CA > 0 and SD > 0), and observed delay then would be identified as fulfils the criteria for procrastination. Omega coefficient was used as an indicator of the scale reliability, which has demonstrated good reliability in the previous study ($\omega = 0.80$ covered by a 95% confidence interval between 0.49 and 1.0; Wieland et al., 2018).

Negative and Positive Emotions. An adjective-based questionnaire was used to assess participants' emotional state on each occasion when they were signalled. Three adjectives of positive emotions include hopeful, confident, eager and three adjectives of negative emotions include stressed, worried and anxious. The reasons why these items were chosen are that (i) these emotional states have been found were the core dimensions of positive or negative emotions associated with individuals' most important personal goal through Personal Project Analysis (B. Little, 1983) in Study 1, and (ii) these dimensions such as hope, worry, anxiety have been found to be strongly related to procrastination in previous research (e.g., Alexander & Onwuegbuzie, 2007; Stöber & Joormann, 2001). The items were rated on a 5-point Likert-format scale, ranging from 1 (*not at all*) to 5 (*very much*). This rating is consistent with the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). This questionnaire has demonstrated good internal consistency in Study 1 (all Cronbach's $\alpha > .75$).

Mixed Emotions. The four-item mixed-emotions scale (Berrios et al., 2013) was used to assess the extent to which participants were experiencing mixed emotions on each occasion. Example items include "I'm feeling a combination of different emotions at the same time" and "I'm feeling different emotions at the same time". The items were rated on a 5-point Likert-format scale, ranging from 1 (*not at all*) to 5 *(very much*). The items are averaged into a single score with high values indicating higher levels of

mixed emotions. The scale has revealed good internal consistency previously (Cronbach's α = 0.90; Berrios et al., 2015b).

Goal Conflict. Goal conflict was assessed using a three-item conflicting goals scale, which was derived from Emmons and King (1988) instrumentality matrix. Example item includes, "Your current activity is having harmful effects on the chosen goal you are trying to achieve". Participants rated the degree to which their current activity/activities conflicted with the chosen goal. Response options range from 1 (*not at all*) to 5 (*very much*). The items are averaged into a single score with high values indicating a higher level of goal conflict. The scale was used to assess goal conflict in previous research (e.g., Berrios et al., 2018a) and has shown good longitudinal reliability (ω = 0.83).

3.3.4. Data Analysis

All data were first checked for normality. Apart from the dependent variable (i.e., situational procrastination), all variables were normally distributed. Since the dependent variable is dichotomous with a 0 and 1 coding for the categories, point-biserial correlations were used to measure the proposed bivariate correlations among the variables.

Longitudinal designs with experience-sampling methods are characterised by repeated measures nested within individuals. More specifically, each participant provides multiple responses over time (Level-1) that are nested within individual differences representing a higher level in the data structure (Level-2). In this study, Multilevel Modelling (MLM) was used to examine (i) hypotheses concerning the fluctuations of emotions and situational procrastination from individuals over time,

and (ii) whether goal motivation and goal focus are modelled as stable characteristics that influence the relationships between situational procrastination and emotions.

Furthermore, given the dependent variable is dichotomous (yes/no outcome), multilevel logistic regression analysis was conducted. This approach allows researchers to examine data with a hierarchical structure and binary response variables (Wong & Mason, 1985). More specifically, a multilevel logistic regression was run to determine the odds that situational procrastination occurred while taking the within-person variables (e.g., momentary emotions and goal conflict) and the way they were interrelated with between-person variables (e.g., goal motivation and goal focus) into account. The analysis was performed using the IBM Statistical Package for Social Sciences (SPSS 24.0). Following the practice recommendations of D. A. Hofmann, Griffin, and Gavin (2000), the within-person variables were group-mean centred to examine whether and how a person's momentary emotional experiences and day-level goal conflict predict situational procrastination. The between-person variables were grand-mean centred.

Three multilevel logistic regression models were fitted to test the hypotheses. The first was a *null model* (i.e., no predictors) that was used to estimate whether goal motivation and goal focus (i.e., between-person variables) can significantly influence the proportion of variability in the chance of procrastination. In short, this model confirms whether multilevel modelling is necessary. The Intraclass Correlation Coefficient (ICC) is an index that represents the proportion of variance in the outcome variable that can be explained by variables at the between-person level, which generally ranges from 0 to 1 (Bliese & Hanges, 2004). Heck, Thomas, and Tabata (2013) point out that 0.05 is often regarded as a conventional threshold that indicates evidence of clustering. If ICC is less than 0.05, then running traditional one-level

regression analysis would be more appropriate. If ICC is greater than 0.05, MLM is appropriate to estimate dependency in the data from between-person variables (Harlow, 2005). In a logistic model, ICC can be calculated using the following formula:

$$ICC = \frac{var(u_{oj})}{var(u_{oj}) + (\frac{\pi^2}{3})}$$

Where var(u_{0j}) is the Level 2 variance component, $\pi^2/3$ is the assumed Level 1 variance that refers to the standard logistic distribution and is fixed at 3.29 (Mood, 2010).

The second model included the four within-person variables to test whether and how momentary emotions and goal conflict are associated with situational procrastination (Model 2). The final model included both within-person variables and the two between-person variables to test whether and how goal motivation and goal focus, and their interactions, can explain situational procrastination (Model 3).

Finally, a single-level mediation analysis was used to test the hypothesis that mixed emotions mediate the effects of goal conflict on procrastination. This proposed mediation model was tested using the SPSS macro PROCESS v3.5 (A. Hayes & Rockwood, 2020). The analysis was conducted with a mediator entered with 10,000 bootstrapping re-samples and bias-corrected 95% confidence intervals.

3.4 Results

3.4.1 Preliminary analyses

Participants listed various goals that they were struggling to meet (see Table 3.1). The majority of which focused on two themes: losing weight (included becoming more physically active) and studying. Of 477 behavioural samples, participants reported 367 times (77%) procrastination on their focal goal.

Table 3.1. *List of personal goals (N = 67).*

Personal goals	Mentions	Percentage
Eating healthier	4	6%
Losing weight and becoming more physically active	21	31%
Learning new skills (e.g., speaking a foreign language)	6	9%
Studying	18	27%
Working	10	15%
Others (e.g., invest £5 a day in smartshares platform)	8	12%

3.4.2 Descriptive results

Means, standard deviations, and intercorrelations among variables are presented in Table 3.2. The within-person correlations among the day-level variables showed that procrastination was associated with negative and mixed emotions but not with positive emotions when measured at the point of immediate experience. Also, there was a positive correlation between goal conflict and situational procrastination. The between-person correlations revealed that procrastination was positively related to outcome focus and controlled motivation.

Table 3.2. *Bivariate Correlations Among Situational Procrastination, Momentary Emotions and Goal Characteristics (N = 477)*

Variable	1	2	3	4	5	6	7	8	9
1. Situational Procrastination	-								
2. Negative Emotions	.41**	-							
3. Positive Emotions	.07	-.10	-						
4. Mixed Emotions	.33**	.53**	.14**	-					
5. Goal Conflict	.36**	.48**	.11**	.45**	-				
6. Process Focus	-.04	-.24**	-.36**	-.41**	-.32**	-			
7. Outcome Focus	.45**	.47**	-.00	.46**	.38**	-.09	-		
8. Autonomous Motivation	-.24**	-.35**	-.04	-.55**	-.32**	.62**	-.45**	-	
9. Controlled Motivation	.39**	.37**	-.12**	.48**	.34**	-.25**	.57**	-.36**	-
M	0.77	3.29	2.59	2.86	2.97	4.79	4.90	5.84	5.93
SD	0.42	1.27	1.02	1.24	1.20	1.66	1.72	2.08	2.17
α	0.60	0.94	0.89	0.95	0.88	0.81	0.72	0.61	0.69

Note. N = number of participants; * $p < 0.05$; ** $p < 0.01$;

3.4.3. Test of Hypotheses

Results of the *null model* demonstrated that the ICC was equal to 0.31. This means that between-person variables explained 31% of the chance of procrastination.

It was hypothesised that procrastination would be positively related to momentary negative emotions (Hypothesis 1a) and mixed emotions (Hypothesis 1c) but would be negatively related to momentary positive emotions (Hypothesis 1b). Since the relationship between procrastination and momentary positive emotions was not significant, the multilevel analysis only assessed how negative and mixed emotions are linked to situational procrastination.

Results revealed that momentary negative emotion was significantly related to the increased likelihood of procrastination, OR = 1.73, 95% CI = (1.34, 2.22), $p < 0.05$. That is, participants who experienced negative emotions were about 1.73 times more likely to procrastinate than not to procrastinate. Similarly, participants who experienced mixed emotions were about 1.60 times more likely to procrastinate, OR = 1.60, 95% CI = (1.18, 2.17), $p < 0.05$, Thus, Hypotheses 1a and 1c were supported.

Hypothesis 2a predicted that controlled motivation would moderate the within-person relationship between negative emotions and procrastination. Cross-level moderation analysis revealed that there was an interaction with controlled motivation and negative emotions on procrastination, OR = 1.15, 95% CI = (1.00, 1.32), $p < 0.05$. That is, individuals who pursued a goal due to controlled motivation were more likely to experience negative emotions, which in turn, resulted in more procrastination.

Similarly, Hypothesis 3a predicted that outcome focus would moderate the within-person relationship between negative emotions and procrastination. Cross-level moderation analysis revealed that outcome focus moderated the positive

relationship between daily negative emotions and procrastination, OR = 1.25, 95% CI = (1.02, 1.54), $p < 0.05$. This suggests that individuals who focus more on the outcome of their intended goal experienced higher levels of negative emotions, which, in turn, increased the likelihood of procrastination. Therefore, Hypothesis 3a was supported.

Finally, a single-level mediation analysis showed significant indirect effects of day-level goal conflict on situational procrastination through mixed emotions, B = 0.23, 95% CI = (0.12, 0.37). The path from goal conflict to mixed emotions was positive and statistically significant, B = 0.56, SE = 0.11, $p <.001$. Also, the direct effect of mixed emotions on procrastination was positive and significant, B = 0.50, SE = 0.11, $p < .001$, indicating that persons scoring highly on mixed emotions were more likely to procrastinate than those who experienced lower levels of mixed emotions. Therefore, Hypothesis 4 was supported. The direct effect of goal conflict on procrastination was also significant after accounting for the effect of mixed emotions, B = 0.56, 95% CI = (0.35, 0.79), suggesting that mixed emotions only partially mediated the effect of goal conflict on situational procrastination.

3.4.4 Exploratory analysis

Given that theory and evidence suggest that procrastination can induce additional negative emotions and stress (e.g., Pollack & Herres, 2020; Pychyl & Sirois, 2016), it is possible that procrastination on a preceding time point results in higher levels of negative emotions at a current occasion. This, in turn, may exacerbate procrastination on the following occasions. Therefore, an exploratory analysis was conducted by performing multilevel analysis but controlling situational procrastination assessed on a preceding time point. Results showed that the effects of day-level predictors, negative emotions, OR = 1.72, $p < 0.05$, mixed emotions, OR =

1.51, $p < 0.05$, and goal conflict, OR = 1.96, $p < 0.05$, on procrastination were significant. These findings indicate that procrastination that occurred at a previous time point did not influence the positive association between procrastination and negative emotions assessed at the point of a current occasion. Similarly, procrastination assessed at a previous occasion did not significantly influence the procrastination-mixed emotions and procrastination-goal conflict link assessed at a current occasion.

These findings need to discuss under two circumstances. First, it is possible that negative emotions occurred before situational procrastination. In this case, the positive link between procrastination and negative emotions indicates that procrastination was evoked by negative emotions when participants were signalled, but not previous procrastination. Another possibility is negative emotions were experienced after procrastination. In this case, negative emotions were elicited by procrastination when participants were signalled rather than previous task avoidance.

3.5 Discussion

The current study investigated the dynamic relationships between emotions and situational procrastination and whether and how goal characteristics play a role in these associations. Results revealed that negative and mixed emotions, but not positive emotions, were positively associated with procrastination measured moment-to-moment. At the within-person level, the experience of mixed emotions explained the association between daily goal conflict and procrastination. At the between-person level, controlled motivation and outcome focus moderated the positive association between momentary negative emotions and procrastination.

The finding that situational procrastination was positively associated with momentary negative emotions is consistent with previous research and empirical evidence (e.g., Pychyl & Sirois, 2016; Sirois, 2014b). The source of negative emotions may vary. First, in light of the mood repair conceptualization of procrastination (Sirois & Pychyl, 2013), negative emotions may arise from the anticipation of having to complete an aversive goal, which may occur before procrastination. This explanation is also consistent with previous research, which demonstrated that procrastination most often occurs when people are faced with aversive goals that are accompanied by negative emotions (Blunt & Pychyl, 2000).

However, another possible explanation is that negative emotions may be a consequence of procrastination. This explanation can be derived from the control theory of self-regulation (Carver & Scheier, 1982, 1990). According to Carver and Scheier, the process of self-regulation is accomplished by two nested feedback loops, namely, the "action" loop and the "meta" loops. The action loops monitor a discrepancy between the current and ideal state and adjust behaviours to reduce the sensed discrepancy. The meta loops are responsible for checking how well the action loops are reducing the perceived discrepancies (i.e., a rate of discrepancy reduction). Negative emotions are a consequence of a sensed low speed of discrepancy reduction. When procrastination occurs, a rate of discrepancy reduction would be slower than an ideal standard, thereby resulting in negative emotions. This explanation is consistent with one common consequence of procrastination put forward by Sirois and Pychyl (2013), namely that procrastination as a mood repair strategy often makes people feel worse.

Two explanations are possible for the lack of an association between positive emotions and procrastination. The first explanation is based on the premise that

positive emotions were associated with performing a goal, which may occur before procrastination. In the current study, positive emotions are future-oriented (i.e., positive anticipatory emotions), which represent the possibilities of future desired consequences would occur (Baumgartner et al., 2008). In some cases, anticipatory emotions that reflect outcome expectancies can influence subsequent behaviour; however, it may also be influenced by other determinants, such as perceived self-efficacy (Bandura, 1986).

Bandura differentiated the concept of self-efficacy and outcome expectancy. The former was defined as a belief in one's own ability to perform required actions that need for goal accomplishment. The latter was defined as anticipatory consequences of engaging in a behaviour. Self-efficacy, but not outcome expectancy, plays a causal role in whether people engage in a behaviour (Bandura, 1986, 1991). In other words, people who believe they are capable of completing a goal will still work towards the goal rather than procrastination, even if the outcome expectancy is low. From this perspective, low levels of positive goal-related emotions (i.e., outcome expectancy) may not be a causal reason for procrastination. However plausible, this explanation should be considered with caution until further research confirms the interactions between positive emotions and self-efficacy in predicting procrastination.

Alternatively, if considering positive emotions as a consequence of procrastination, the present results suggest that putting a goal off did not cause changes in positive emotions. This is consistent with research conducted by Pollack and Herres (2020), which demonstrated that procrastination did not predict an increase in positive emotions. In an attempt to achieve a hedonic shift in emotions, people may engage in enjoyable activities while procrastinating. However, these positive emotions may be tempered by negative self-conscious emotions, leading to

no net gain in positive emotions. W. Hofmann et al. (2013) called this phenomenon the effect of "spoiled pleasure". That is, negative emotions may undermine hedonic gratifications gained from procrastination. Also, procrastination often induces additional negative emotions due to the increased stress of time pressure and self-critical thoughts associated with past ineffective coping (Pychyl & Sirois, 2016). In this case, individuals tend to place more attention on the escalation of negative emotions over positive ones because negative emotions often result in greater physiological arousal (Rozin & Royzman, 2001).

The current study extends previous findings by examining the indirect effects of mixed emotions in the association between goal conflict and procrastination. Findings showed that people were more likely to experience mixed emotions when faced with conflicting goals. This result is consistent with previous research by Berrios et al. (2015b), which revealed that goal conflict is an antecedent of mixed emotions. Furthermore, the current study demonstrated that mixed emotions as a result of goal conflict explained why people spent more time procrastinating. However, this finding is inconsistent with Berrios et al.'s (2018a) findings. Berrios et al. (2018a) found that mixed emotions contributed to greater self-control effort needed to resist temptations in the face of self-control dilemma. In theory, greater self-control efforts in resisting temptations should be beneficial for goal accomplishment and, therefore, may lead to less procrastination.

One possible explanation for this inconsistency is that there were different types of mixed emotions (i.e., the different combinations of positive and negative emotions in both studies). The co-occurrence of guilt and pleasure may be a typical type of mixed emotions in the case of procrastination (Myrick, 2015). Positive emotions (e.g., pleasure) may overlap with and eventually be overwhelmed by

negative emotions (e.g., guilt) because the mood-boosting effect of procrastination is temporary (Pychyl & Sirois, 2016). In this case, individuals may progress into a conflicted state in which they are satisfied with the fulfilment of hedonic needs but afflicted by accumulated negative emotions. The experience of this type of mixed emotions may make people feel "torn" and uncomfortable and prompt future procrastination.

Mixed emotions contain different combinations of emotions (e.g., hope-fear or guilty-pleasure) that may cause different reactions (Braniecka et al., 2014). These combinations are determined by emotional valence (positive or negative) and intensity of each emotion (i.e., variations in the magnitude of emotional experience; Russell, 1980). Emotions with various intensity levels have different purposes or functions (M. Clark, Milberg, & Ross, 1983). For example, positive emotions have been found to broaden one' attentional scope when it is low in approach motivational intensity but narrow attentional scope when it is high in intensity (Gable & Harmon-Jones, 2008). By examining the effects of mixed emotions in goal conflict-procrastination link, the current finding provides preliminary evidence that mixed emotions may be perceived as a disharmonious emotional, thereby, prompting procrastination. However, given that mixed emotions are the result of combining emotions with different valence and intensity, future research into the possible combinations of emotions that contribute to procrastination would provide a deeper understanding of the role of mixed emotions in procrastination.

Another important contribution of the current research is examining between-person effects in the relationships between momentary emotions and procrastination. That is, controlled motivation may exacerbate the effects of negative emotions in prompting procrastination. As for a potential explanation for this effect, it is possible

that acting for controlled motivation fails to meet basic psychological needs for autonomy, competence, and relatedness (Deci & Ryan, 2000). There is evidence that controlled motivation is associated with low need satisfaction and high need frustration (e.g., Hope, Holding, Verner-Filion, Sheldon, & Koestner, 2019; Unanue, Dittmar, Vignoles, & Vansteenkiste, 2014). The frustration of basic needs predicted higher levels of work-related stress (Olafsen, 2017) and distress (Holding, St-Jacques, Verner-Filion, Kachanoff, & Koestner, 2020). In other words, the need frustration associated with controlled motivation may heighten negative emotions as they are compelled to do things that do not align with one's inner values or interests. The increased negative emotions and stress, in turn, may increase the likelihood of procrastination as a mood repair strategy (Sirois & Pychyl, 2013).

Likewise, the current study also clarified what role outcome focus might play in the link between negative emotions and procrastination. Previous research on outcome focus and procrastination suggests that outcome focus was not associated with workout adherence (i.e., procrastination), overall workout satisfaction and moods (Kaftan & Freund, 2020). Yet Kaftan and Freund inferred that outcome focus could be detrimental for goal attainment, as outcome-focused individuals tend to rationalize their procrastination. The current results showed that outcome focus and negative emotions interacted to exacerbate procrastination, which offers an alternative explanation for the associations of outcome focus to procrastination. Outcome focus may direct one's attention to the discrepancy between the actual and desired state in goal pursuit. This may heighten negative emotions resulting from the perception that a rate of progress is slower than expected, thereby exacerbating procrastination.

The present findings have several practical implications. First, by examining the role of mixed emotions in procrastination, this finding provides fertile ground for

future research on emotion-focused interventions. Previous research found that improving one's ability to tolerate and modify aversive emotions was beneficial for reducing procrastination (e.g., Eckert et al., 2016). Addressing mixed emotions via interventions based on Acceptance and Commitment Therapy (ACT; S. Hayes, Strosahl, & Wilson, 1999) may provide far-reaching benefits. The core feature of acceptance-based interventions is to instruct individuals to accept and embrace undesired emotions without judging or avoiding them (S. Hofmann & Gordon, 2008). When mixed emotions are perceived as a disharmonious state, assisting people in accepting the emotions without critical judgements may make it easier for them to resolve inner conflicts, thereby reducing procrastination.

Second, considering the effects of goal characteristics while goal-setting may benefit reducing negative emotions and procrastination. For example, in terms of controlled motivation, Deci and Ryan (2000) suggest that while goals pursuit might start from controlled reasons, providing meaning for non-self-determined goals may make it move from controlled to autonomous motivated. This process is known as "internalization". Deci, Eghrari, Patrick, and Leone (1994) found that people were more likely to internalize their behaviour when they were provided with a meaningful rationale and an acknowledgement of conflicting feelings. Therefore, interventions designed to provide meaningful rationales for non-self-determined goals may facilitate internalization, thereby increasing goals' acceptance and making them less aversive. This, in turn, may reduce procrastination.

3.5.1. Limitations and Further Studies

The current study has several limitations that warrant mention. First, it is difficult to establish temporal precedence of procrastination and emotions. Emotions and procrastination can mutually influence each other (Pychyl & Sirois, 2016). More

specifically, negative emotions may disrupt goal-driven self-control, causing people to give priority to end such emotions through task avoidance. Also, procrastination may heighten negative emotions due to the increased stress of time pressure and the awareness of the consequences of past ineffective coping (Pychyl & Sirois, 2016). Thus, further research is needed to clarify causal inference by assessing either negative or mixed emotions immediately after procrastination or procrastination immediately after goal-related negative or mixed emotions were evoked.

Second, the relatively small sample size may increase the possibility of Type I error (McNeish, 2017) and lead to bias in the estimated standard errors (Maas & Hox, 2005). In line with Kreft and De Leeuw (1998), a sample of 30 groups and 30 observations within each group is sufficient to produce reliable parameter estimates for multilevel modelling. The small sample in this study may be due to the features of the experience-sampling methods (e.g., collecting data by repeating assessments). In the current study, participants were required to complete emotional states and procrastination measures three times a day for seven days. This may increase the response burden, resulting in low response rates. To minimize potential estimation bias caused by a small sample, followed the recommendation by McNeish (2017), this study used the restricted maximum likelihood estimation (REML) combined with a Kenward-Roger approximation to calculate the effect sizes. However, given that a large sample size at both levels may be more desirable for generalizability, further studies are therefore needed to replicate these findings in larger samples.

Last but not least, the between-person effects that may influence the link between procrastination and mixed emotions have been not explored. Williams and Aaker (2002) indicate that negative consequences that fall from the experience of mixed emotions are affected by individual differences in acceptance of contradiction.

Individuals with a lower propensity to accept contradiction reported greater discomfort in response to mixed emotions. From this perspective, individuals with a higher propensity to accept contradiction may experience less discomfort and, therefore, procrastinate less as their need for procrastination as a means of avoiding discomfort may be relatively low. Further research into this and other possible between-person effects that influence the effects of mixed emotions on procrastination is needed. By doing so, researchers could understand why some people who experience mixed emotions are more likely to engage in procrastination behaviour but others not.

3.5.2. Conclusions

The present experience-sampling study extends previous research on procrastination and emotions by examining the dynamic associations between emotions and situational procrastination, as well as the cross-level interactions of goal characteristics in these relationships. The current findings demonstrated that momentary negative emotions were positively associated with procrastination, and controlled motivation and outcome focus exacerbated the effects of negative emotions in motivating procrastination. In addition, this study provides preliminary evidence that goal conflict was positively associated with procrastination, and the experience of mixed emotions explained this association. This research provides in-depth insight into how situational procrastination is linked to momentary negative, positive and mixed emotions and evidence for the value of developing emotion-focused interventions on procrastination.

CHAPTER 4

ENHANCING GOAL-RELATED MEANING AND POSITIVE EMOTIONS TO REDUCE PROCRASTINATION

4.1 Chapter Overview

This chapter presents findings from an experimental study that examined whether regulating emotions in an adaptive manner is protective against procrastination. More specifically, the aims of this study were threefold: (i) to investigate whether cognitively reappraising intended goals by presenting goal-related meaning is beneficial for reducing procrastination, (ii) to examine whether directly cultivating positive goal-related emotions can decrease the likelihood of procrastination, (iii) to examine whether the effect of meaning-making is above and beyond the effect of positive emotions on reducing procrastination.

4.2 Rationale and Aims of the Current Study

Theory and empirical evidence suggest that the inability to regulate emotions in a healthy manner is the underlying problem that results in procrastination (Pychyl & Sirois, 2016; Sirois & Pychyl, 2013). When a goal is perceived as aversive, difficult, or lacking meaning, negative emotions are likely experienced (Blunt & Pychyl, 2000). In such circumstances, procrastination becomes the emotion regulation strategy of choice when people mistakenly believe that they can avoid undesired emotions by avoiding the goal. However, this maladaptive strategy may maintain or generate additional negative emotions because the underlying sources of emotions are not directly addressed (Pychyl & Sirois, 2016). The above premises raise the question of whether regulating emotions in a healthy and adaptive manner can reduce the likelihood of procrastination.

Evidence on the benefits of adaptive emotion regulation for reducing procrastination comes from a study conducted by Eckert et al. (2016). They conducted a two-week emotion regulation training program to investigate whether enhancing emotion regulation skills can reduce procrastination. Eighty-three participants were randomly allocated to an emotion regulation training group and a control group. Those in the training group learned multiple strategies in order to increase their ability to tolerate and modify aversive emotions, including improving resilience, increasing affective commitment to the focal tasks, a short relaxation exercise and reappraisal. Participants in the control group were asked to wait for two weeks for the post-assessment and online training. Results showed that, compared to the control group, participants in the training group reported less procrastination and a significant increase in their ability to tolerate and modify aversive emotions.

Although Eckert et al.'s (2016) study demonstrated that tolerating and modifying aversive emotions was beneficial for reducing procrastination, some limitations should be noted. First, procrastination as behaviour was measured by Lay's General Procrastination Scale (GPS; Lay, 1986). This scale may not be sensitive to examining changes in procrastination over time because it is most commonly used when procrastination is defined as a relatively stable, trait-like chronic tendency (Lay, 1986; Sirois et al., 2019). Thus, other measures that examine behavioural procrastination would be more appropriate than the GPS. Since multiple strategies have been used in their training programme, the effects of one particular emotion regulation strategy (e.g., reappraisal) on procrastination remain unknown.

Reappraisal is a particular form of emotion regulation strategy (Gross & John, 2003). The core feature of this strategy is reinterpreting the meaning of a stimulus or situation as benign, valuable or beneficial, thereby altering emotional responses to the

stimulus or situation accordingly (Gross & John, 2003; Gross & Thompson, 2007). For example, presenting a speech in front of a large audience may cause anxiety because one may concern that others are judging him; however, reappraising the situation by giving a new positive meaning (e.g., this is a great opportunity for personal growth) may change their emotional response to it, such as reduce anxiety or evoke feelings of excitement.

The existing literature on the effectiveness of emotion regulation strategies demonstrates that reappraisal contributes to significant changes in both negative and positive emotions. A meta-analysis by Webb, Miles, et al. (2012) evaluated the effectiveness of various strategies (i.e., attentional deployment, response modulation and cognitive change) in modifying emotional responses. Results demonstrated that cognitive change (involving reappraisal) is more effective than other strategies. The effectiveness of reappraisal has also been found in serval experimental studies. For example, there is evidence that participants who were instructed to use reappraisal to regulate their emotions reported less negative emotion than those in other regulation strategies groups (e.g., emotional suppression group) and control groups (e.g., Gross, 1998; Keng, Robins, Smoski, Dagenbach, & Leary, 2013; Wolgast, Lundh, & Viborg, 2011).

Trait procrastination has been linked to certain appraisal tendencies. For example, prior research found that procrastinators and non-procrastinators seemed to differ in their appraisals toward ongoing tasks (Burka & Yuen, 1983; Lay, 1986). It was found that procrastinators were more likely to evaluate tasks as aversive before task execution (Burka & Yuen, 1983) and to consider themselves were less likely to complete the tasks (Lay, 1986). These evaluations were not common among low procrastinators. In addition, the evidence presented in Study 1 demonstrated that

chronic procrastinators were more likely to appraise important and difficult goals as threatening, which explained the negative emotions that they experience. These findings have the potential to provide insights for understanding why reappraisal may play a role in reducing procrastination.

Negative goal-related appraisals have been found to play an important role in the frequent occurrence of procrastination. A recent experience-sampling study by Wieland et al. (2021) examined the associations between academic procrastination and monetary task-related appraisals (i.e., expectations of success, task aversiveness, and task value). They found that tasks that were perceived as aversive, had lower chances of success, and less important (compared to initial appraisals) were more likely to be postponed. In other words, procrastination may be influenced by the ways that people appraise the tasks. These findings set a stage for analysing whether changing appraisal of a task can reduce the need for procrastination as a mood repair strategy.

Evidence comes from a study focused on bedtime procrastination also supports the role of cognitive reappraisal in procrastination. Sirois et al. (2018) investigated whether lower negative emotions and individual differences in the use of reappraisal can explain the association between trait self-compassion and bedtime procrastination. They found that self-compassionate people who tend to reappraise potential stressors as less stressful felt low levels of negative emotions and were less likely to engage in bedtime procrastination. That is, reappraisal may effectively regulate negative emotions and, thereby reducing the need to engage in bedtime procrastination as a maladaptive means to regulate the emotions (Sirois et al., 2018).

Whereas this study demonstrated that reappraisal was associated with procrastination, the causal nature of this relationship is unclear. Gross and Thompson

(2007) suggest that "reappraisal" is a large umbrella term of an extensive variety of strategies. Difference subtypes of reappraisal may exert differential effects on emotional outcomes (Shiota & Levenson, 2012). Thus, a primary focus of the current study was on one specific reappraisal strategy. That is, encouraging individuals to reinterpret a difficult goal by searching for positive meanings of performing the goal.

Reappraising a situation by assigning it new meaning reduces negative emotions and avoidance tendencies (Gross, 1998; Keng et al., 2013; Wolgast et al., 2011). Meaning refers to the extent to which people feel their goals have purposes and are worth pursuing (Strauss & Parker, 2014). Meaning is implicated in the appraisal of person-environment transactions, which plays a role in determining the personal significance of transactions between a person and environment, emotions, and strategies to cope with environmental demands (Lazarus, 1991; Lazarus & Folkman, 1984). Finding meaning from negative events has been linked to lower levels of distress (e.g., Updegraff, Silver, & Holman, 2008; Wu et al., 2008) and greater active coping (Halama, 2014). In addition, a sense of meaning is an important resource for people to cope with stressful situations (Hooker, Masters, & Park, 2018).

Blunt and Pychyl (2000) provided a closer look into the relationship between meaning and procrastination. Using Personal Projects Analysis (PPA; B. Little, 1983), they investigated the qualities of task aversiveness related to procrastination across different stages of personal projects (i.e., inception, planning, action, and termination stage). Participants rated their ongoing projects in terms of various dimensions, such as personal meaning, boredom, frustration, autonomy and enjoyment. Results demonstrated that in the inception, planning and termination stages of project development, lack of meaning was identified as an underlying aspect of task aversiveness. Task aversiveness is a central predictor of procrastination (Blunt &

Pychyl, 2000; Lay, 1992; Sirois & Pychyl, 2013). In other words, pursuing a goal without meaning may lead to procrastination, as this makes it easier for people to perceive a goal as aversive and experience negative emotions as a result. From an emotion regulation perspective, reappraising a goal by highlighting its meaning could be effective in reducing negative emotions. In this case, people may be less likely to engage in procrastination as a means of regulating emotions.

Investigating whether cultivating positive emotions can be beneficial for reducing procrastination is another focus of the current study. There are several theoretical reasons to argue that cultivating positive emotions may reduce procrastination. First, theory and empirical evidence suggest that a lack of positive emotions associated with pursuing a goal is a reason why people procrastinate (Sirois & Giguère, 2018; Sirois & Pychyl, 2013). Two longitudinal studies investigated whether loss of positive emotions explains why procrastinators have difficulty following through with intended goals (Sirois & Giguère, 2018). In their first study, Sirois and Giguère found that procrastinators who reported low levels of positive emotions toward academic tasks spent a greater amount of time procrastinating. A similar pattern has also been found in a community sample, showing that enjoyment explained why procrastinators were less likely to engage in health-promoting behaviour in the next six months. The effect of positive emotions on procrastination was salient when social temptations were present. These findings highlight the importance of positive emotions in procrastination, suggesting that the absence of positive goal-related emotions may be particularly detrimental for procrastinators. This could explain why they have difficulties with self-regulation.

Previous studies on the role of positive emotions in promoting a broad, future-oriented perspective provide a conceptual basis for analysing the effects of positive

emotions on procrastination. Sirois (2014a) suggests that positive emotions, such as joy and enjoyment, serve as a self-regulatory resource that can promote health behaviours by shifting individuals' cognition from a narrow and present-oriented perspective into a broader and future-oriented one. The primacy of short-term mood repair that characterizes procrastination reflects not only the primacy of immediate emotional relief over the long-term goal but the primacy of the present self over the needs of the future self. In short, difficulty in bridging the connection between the present and future self is an antecedent of procrastination (Sirois & Pychyl, 2013). Cultivating positive emotions may broaden one's perspectives towards the future, and this may bridge a connection between their present delay choice and negative consequences for future self.

The broaden-and-build theory of positive emotions (Fredrickson, 2001) provides an additional conceptual basis. This theory asserts that positive emotions (e.g., interest, contentment and love) broaden one's scopes of attention, cognition, and receptivity in the present moment. Over time, these broadened mindsets can build their enduring personal resources, such as psychological resilience. Increases in personal resources may help individuals to cope with negative emotions and stress during the process of goal pursuit by diminishing deleterious influences of negative emotions and allowing them to bounce back from such states quickly and effectively (Fredrickson, Cohn, Coffey, Pek, & Finkel, 2008). In terms of procrastination, the experience of positive emotions regarding an intended goal may produce flexible and creative thinking in the process of goal pursuit. This process may augment individuals' resources to cope with negative emotions that often arise when goals are blocked or frustrated. This, in turn, may reduce the need for procrastination as a means to regulate emotions.

Meaning and positive emotions were reciprocally correlated (Fredrickson, 2001; King, Hicks, Krull, & Del Gaiso, 2006; Li, Wong, & Chao, 2019). That is, searching for meaning may trigger positive emotions, whereas increased positive emotions may broaden the scope of attention and cognition serve to meaning-making (Fredrickson, 2000).

Empirical research on meaning and emotions supports the notion that enhancing meaning can cultivate positive emotions. An experimental study by Miao and Gan (2018) assessed the effect of meaning on future-oriented coping and the mediating effects of positive emotions in this link. A sample of 68 participants was randomly assigned to a meaningfulness manipulation group and a waiting-list control group. Results revealed that individuals in the meaningfulness manipulation group reported higher levels of positive emotions and more future-oriented coping than those in the control group.

Similar results were presented by Schutte, Searle, Meade, and Dark (2012). In a 2x2 experimental study, Schutte and colleagues investigated the effects of meaningfulness and integrative processing in expressive writing on emotions. A sample of 222 participants was randomly assigned to one of four groups, that is, low or high meaningfulness writing groups and low or high integrative processing writing groups. They found that individuals who were in the high meaning and high integrative processing writing group reported the greatest increase in positive emotions. These findings indicate that enhancing meaning through expressive writing may promote positive emotions. Given the reciprocal relation between meaning and positive emotions, exploring the effects of both meaning-making and positive emotions on procrastination may provide an in-depth look at which approach can affect procrastination and whether one approach is more effective than the other.

The Current Study

Despite previous findings suggesting that enhanced emotion regulation skills reduced procrastination (Eckert et al., 2016), the effect of reappraisal in reducing procrastination has not been well understood. The current study aimed to address this gap by investigating whether reappraising aversive goals by presenting goal-related meaning can result in less procrastination. Second, theory and empirical evidence suggests that a lack of positive goal-related emotions may contribute to procrastination (Sirois & Giguère, 2018; Sirois & Pychyl, 2013). Positive emotions can broaden one's momentary thought-action repertoires and build resources to cope with negative emotions and stress (Fredrickson, 2001, 2004). Yet to date, there is little research into whether cultivating positive emotions can reduce the likelihood of procrastination. The second aim of the current study was to close this gap. Third, given that meaning and positive emotions were reciprocally correlated with each other (Fredrickson, 2001; King et al., 2006; Li et al., 2019), the present study aimed to clarify whether the effect of meaning-making is above and beyond the effect of positive emotions on procrastination.

This study adopted an experimental design, in which the participants' levels of goal-related meaning and positive emotions were experimentally manipulated to explore the effects of these manipulations on procrastination. It was hypothesised that (i) participants in a meaning-making group would procrastinate less than those in a control group (Hypothesis1a) and a positive emotions manipulation group (Hypothesis1b), and (ii) participants in a positive emotions manipulation group would procrastinate less than those in a control group (Hypothesis 2a), but they would procrastinate more than those in a meaning-making group (Hypothesis 2b).

Prior research on the associations between procrastination and other personality traits suggest that perfectionism is a common correlate and potential precursor of procrastination (e.g., Flett et al., 2012; Sirois et al., 2017). Perfectionism is defined as a tendency to strive for personal improvement and set exceedingly high standards of performance (Frost, Marten, Lahart, & Rosenblate, 1990; Hewitt & Flett, 1991). Prior research found that individuals who are high in perfectionistic concerns tend to draw their attention to the negative feelings surrounding a goal rather than to ways of taking instrumental action to attain the goal. From this perspective, a person with maladaptive perfectionistic characteristics may be more likely to engage in procrastination as they are plagued with self-critical thoughts and psychological distress (Rice, Richardson, & Clark, 2012). Thus, trait procrastination and perfectionism were considered as control variables in the current study when examining the effects of meaning-making and positive emotions manipulation on procrastination.

4.3 Method

4.3.1 Participants and Recruitment

This study was preregistered on the Open Science Framework (https://osf.io/ewfuz) prior to data collection. After obtaining ethical clearance for data collection from the Department of Psychology Ethics Committee at the University of Sheffield, participants were recruited from the student and staff volunteers list of the University of Sheffield, social media platforms and online participant recruitment platforms. The advert contained a link that directed people who were interested in the study to the information sheet (Appendix 4.1) outlining the inclusion criteria. The inclusion criteria were that they (i) were age 18 and over, and (ii) were working on an important goal. Those who met the inclusion criteria and had

agreed to take part in the survey were given a link of the survey including a baseline questionnaire. Participants who completed the baseline and the following survey were given a chance to win a £50 gift certificate as an incentive for participation.

A total of 282 participants were recruited. Nine participants were omitted as five did not complete the meaning-making task, and four failed to complete the measure of procrastination in the follow-up survey. This left a final sample of 273 participants (M_{age} = 28.00, SD = 8.80, 51.3% Female). A power analysis using G*Power 3.1 (Faul et al., 2007), based on one-way ANOVA, was conducted for sample size estimation. Results demonstrated that a sample of 159 (i.e., 53 participants in each group) would be required to reach 80% power (with an alpha of 0.05) and medium effect size (f = 0.25; Cohen, 1992). Also, a power analysis based on a t-test was conducted to estimate the minimum number of participants required for between-group comparison. With power set at 80% and an alpha of 0.05, a sample of 128 (i.e., 64 participants in each group) would be required to detect a medium effect size (d = 0.05; Cohen, 1992).

4.3.2 Procedure

Data collection comprised three parts: (i) a baseline questionnaire (T1), (ii) after the manipulation immediately (T2), and (iii) a follow-up survey after approximately 36-48 hours following the manipulations (T3). In the first part, participants were randomly allocated to one of three groups: a meaning-making group, a positive emotions manipulation group or a control group. All participants completed basic demographic questions and baseline measures that assessed dispositional procrastination and perfectionism, levels of goal-related meaning, positive and negative emotions. Next, participants were instructed to list the important goal. To maximise the chance they would procrastinate on a focal goal, the instruction

emphasised that they needed to list an important goal that they were struggling to achieve and expected to make progress towards.

In an attempt to manipulate meaning and positive emotions, this study followed procedures used in the study of expressive writing (e.g., King & Miner, 2000; Miao & Gan, 2018; Rubin, Boals, & Klein, 2010). This method has been found to be effective in enhancing meaning in previous research (Miao & Gan, 2018). Before writing, they were assured that their writing would be kept confidential.

Participants in each group were given different instructions (see Appendix 4.3 for the instruction set). Those in the meaning-making group were instructed to concentrate on the meaning of their listed goal and complete a set of sentences by writing down reasons. An example of a statement is "completing this goal will be valuable to how I see myself, because _____". Participants in the positive emotions manipulation group were instructed to write about something that may increase their positive emotions associated with goal accomplishment. An example of a statement is "completing this goal will make me feel happy, because_____". Participants in the control group were instructed to write about something neutral. Participants in all groups were given 15-20 minutes to complete the writing tasks. Following the manipulations, participants in all groups completed the measures of goal-related meaning as well as the measures of positive and negative emotions.

Lastly, participants were invited to complete a follow-up survey after approximately 36-48 hours following the manipulations. The follow-up survey included the measures that evaluated levels of goal-related meaning, positive and negative emotions and behavioural procrastinating of a focal goal during the day following their completion of the initial survey.

4.3.3. Measures

Demographics. The following demographic information was collected from participants: gender, level of education and ethnicity.

Trait procrastination. The 9-item General Procrastination Scale (Sirois et al., 2019) was used to test whether the participants are equal in the level of trait procrastination. An example item from the GPS-9 is: "I often find myself performing tasks that I had intended to do days before". Items were scored on a 5-point Likert-type scale ranging from 1 (*false for me*) to 5 (*true for me*). This measure was derived from the 20-item General Procrastination Scale (GPS; Lay, 1986) that was used to examine the tendency to procrastinate across a variety of tasks. The 20-item measure of trait procrastination has demonstrated good internal consistency ($\alpha = 0.82$; Lay, 1986) and good test-retest reliability previously (Steel, 2007). The GPS-9 also has demonstrated good internal consistency range from 0.85 to 0.91 in the previous research (Sirois et al., 2019).

***Trait Perfectionism*.** The 15-item short form of the Multidimensional Perfectionism Scale (MPS; Cox, Enns, & Clara, 2002) was used to assess individuals' dispositional perfectionism. This measure was derived from the original 45-item Multidimensional Perfectionism Scale (Hewitt & Flett, 1991) that assesses levels of three dimensions of dispositional perfectionism: self-oriented perfectionism (e.g., "I am perfectionistic in setting my goals"), other-oriented perfectionism (e.g., "If I ask someone to do something, I expect it to be done flawlessly"), and socially-prescribed perfectionism (e.g., "The better I do, the better I am expected to do"). The items are scored using a Likert scale that includes seven options, ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Higher scores reflect higher levels of dispositional perfectionism. This scale has demonstrated good psychometric properties in the previous studies

(e.g., Cox et al., 2002; Hewitt, Habke, Lee-Baggley, Sherry, & Flett, 2008; Hill, Stoeber, Brown, & Appleton, 2014). Only the data from self-oriented perfectionism and socially-prescribed perfectionism subscale was analysed for the current study because previous research indicates that these two dimensions, but not other-oriented perfectionism, were associated with procrastination (e.g., Sirois et al., 2017)

Goal-related Meaning. The meaning of a goal was assessed by a 5-item scale, which was derived from the meaning in life questionnaire (MIL; Steger, Frazier, Oishi, & Kaler, 2006). The meaning in life questionnaire consists of two five-item subscales: (i) Presence of meaning and (ii) Search for Meaning. In this study, only the presence of meaning subscale was used, in which participants were asked to rate how much they felt their focal goal had meaning. Items such as "I understand the goal's meaning" are rated from 1 (*absolutely untrue*) to 7 (*absolutely true*). The presence of meaning subscale has demonstrated good internal consistency ($\alpha = .90$; Miao & Gan, 2018).

Positive and Negative Emotions. Positive and negative emotions were measured using the short version of the Positive and Negative Affect Schedule (PANAS; Mackinnon et al., 1999). This scale comprises 10 items describing five negative emotional states (i.e., afraid, upset, nervous, scared, and distressed) and five positive emotional states (i.e., inspired, alert, excited, enthusiastic, and determined). Participants rated the extent to which they are currently experiencing each of these emotional states on a 5-point Likert scale, ranging from 1 (*not at all*) to 5 (*extremely*). Psychometric properties for the PANAS subscales have shown good internal reliability ($\alpha = .78$ for Positive Affect and $\alpha = .87$ for Negative Affect; Mackinnon et al., 1999).

Situational Procrastination Situational Procrastination was assessed using the method from Sirois and Giguère (2018). Participants were first asked to complete a grid that divided their day into 20-minute time intervals, followed by a request indicating what they were doing during each interval. Then, participants were asked to indicate if at that time they were putting off doing something they had intended to do towards achieving their goal. If so, these 20-minute intervals were counted as a procrastination interval and summed into an index reflecting the number of minutes spent procrastinating.

4.3.4 Data Analysis

All data were first checked for normality. Descriptive statistics on age, gender, education level and ethnicity in each group were used to summarize our sample data. A Chi-square test was used to assess the difference in the distribution of categorical variables among groups, including gender, education level and ethnicity. A one-way ANOVA was employed to examine whether there are differences in the distribution of continuous variables among groups (i.e., age, trait perfectionism, trait procrastination, the baseline levels of goal-related meaning, positive and negative emotions)

Two mixed ANOVAs were conducted to do manipulation checks to verify whether there are significant changes in goal-related meaning or positive emotions from pretest, posttest and follow-up within each of the respective experimental groups. Next, a one-way ANOVA was conducted for the main hypothesis test. The summed procrastination score was served as the outcome variable. Condition (i.e., meaning-making, positive emotions manipulation and control) was served as a between-subjects independent variable. Three independent samples t-tests were conducted to test whether there is a statistically significant difference between the time spent procrastination in two unrelated groups. An ANCOVA, including the mean

score on trait procrastination and perfectionism as covariates, was conducted for each experimental manipulation group to examine whether the effectiveness of the manipulations was affected by these personality factors.

4.4 Results

4.4.1 Preliminary Analyses

Participants who withdrew from the study were compared with those who completed the study on demographics and trait procrastination. Results showed that there was no difference between completers and non-completers in age, $t(280) = 1.29$, $p > .05$, gender, $\chi^2(2) = 2.50$, $p > .05$, educational level $\chi^2(5) = 0.42$, $p > .05$, nor with trait procrastination, $t(280) = -1.86$, $p > .05$.

The means and standard deviations of the variables measured at baseline were presented in Table 4.1, including trait procrastination, perfectionism, goal-related meaning, positive and negative emotions. The above variables were approximately normally distributed (all *p*s > .89), and no outliers were identified.

A one-way ANOVA comparing the baseline measures across the three groups showed that there were no significant group differences in trait perfectionism, trait procrastination, goal-related meaning, positive and negative emotions. This suggests that the randomization was effective in reducing group differences. A Chi-square test was conducted to see whether gender, education level, or ethnicity affected the goal-related meaning or positive emotions in each group. Results shows that there was no significant group difference in gender, $\chi^2(4) = 5.23$, $p > .05$, education level, $\chi^2(10) = 7.82$, $p > .05$, and ethnicity, $\chi^2(10) = 13.65$, $p > .05$.

Correlation analyses (see Table 4.1) of the baseline measures collapsed across the three groups found that trait procrastination was negatively associated with goal-

related meaning and positive emotions but was positively associated with negative emotions. In addition, there was a positive association between goal-related meaning and positive emotions but a negative association between goal-related meaning and negative emotions.

Table 4.1. *Bivariate correlations among the baseline measures of trait procrastination, perfectionism, goal-related meaning, positive and negative emotions (N = 273).*

Variable	1	2	3	4	5	6
1. Trait Procrastination	-					
2. Self-oriented Perfectionism	-.06	-				
3. Socially Prescribed Perfectionism	.38**	.39**	-			
4. Goal-related Meaning	-.49**	.01	-.50**	-		
5. Negative Emotions	.55**	.14*	.57**	-.70**	-	
6. Positive Emotions	-.40**	.23**	-.06	.37**	-.29**	-
M	3.55	5.13	4.52	4.86	2.73	2.69
SD	0.75	0.94	1.24	1.49	1.09	0.80
α	0.89	0.75	0.83	0.91	0.92	0.84

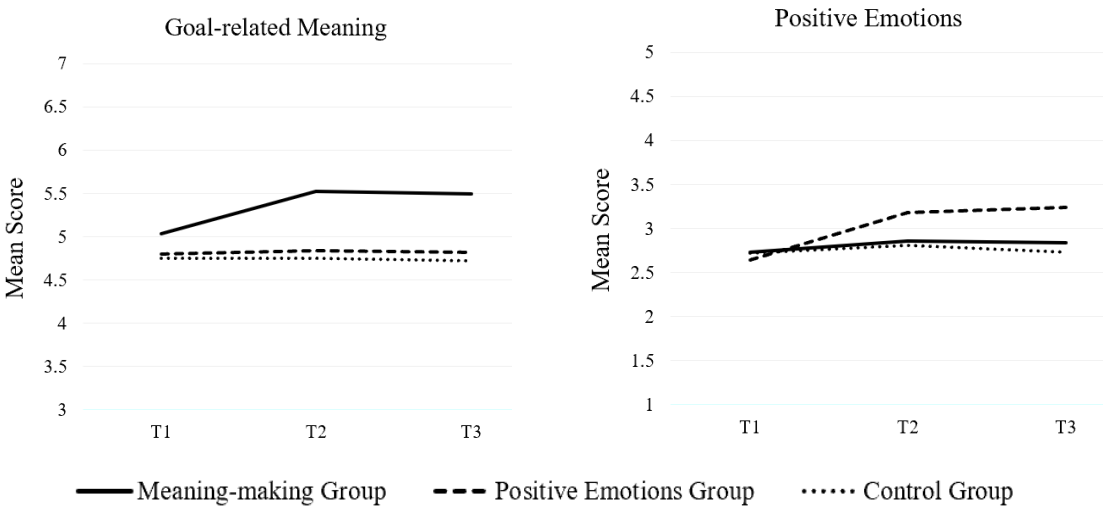
Note. N = number of participants; * $p < 0.05$; ** $p < 0.01$;

4.4.2 Manipulation Check

Because the assumption of sphericity was violated, the Greenhouse-Geisser correction was used (e.g., Abdi, 2010; Geisser & Greenhouse, 1958). As shown in Figure 4.1, for the meaning-making group, the level of goal-related meaning differed significantly between time points, $F(1.95, 526.62) = 4.34$, $\eta_p^2 = 0.02$, $p < 0.01$. The mean scores on goal-related meaning increased significantly from pretest ($M = 5.03$, $SD = 1.50$) to posttest ($M = 5.52$, $SD = 1.36$), but slightly decreased at follow-up ($M = 5.49$, $SD = 1.05$). The mean scores on goal-related meaning did not significantly change over time in the other two groups. The mean scores of goal-related meaning differed across groups, $F(2,270)=6.17$, $\eta p^2 = 0.04$, $p < 0.01$. Participants in the meaning-making group reported higher levels of goal-related meaning compared to those in the other two groups. In addition, there was a significant interaction between time and groups, $F(3.9, 526.62) = 3.76$, $\eta p^2 = 0.03$, $p < 0.001$.

Likewise, a mixed ANOVA with a Greenhouse-Geisser correction on positive emotions revealed that the levels of positive emotions increased significantly after the positive emotional manipulation, $F(1.35, 361.65) = 13.41$, $\eta p^2 = 0.05$, $p < 0.001$. Compared to the baseline, participants in the positive emotions group reported higher levels of positive emotions at posttest and at follow-up (see Figure 4.1). The mean scores on positive emotions did not significantly change over time in the other two groups. The levels of positive emotions differed across groups, $F(2,268) = 3.97$, $\eta p^2 = 0.03$, $p < 0.05$. Participants in the positive emotions manipulation group reported higher levels of positive emotions, compared to those in the other two groups. There was a significant interaction between time and group, $F(2.70, 361.65) = 6.11$, $\eta p^2 = 0.04$, $p < 0.01$.

Figure 4.1 *Mean scores on goal-related meaning and positive emotions at T1, T2 and T3 by groups*



Note. T1 = before the manipulation; T2 = after the manipulation; T3 = after 36-48 hours following the manipulations. The mean scores on the goal-related meaning (i.e., the y-axis) could range from 1.0 to 7.0; however, to ease visual impressions of the data, the y-axis in the graph ranges from 3.0 to 7.0. the mean scores on the positive emotions could range from 1.0 to 5.0.

4.4.3 Test of Hypotheses

The normality test showed that the procrastination behaviour variable was not normally distributed. However, real-world data are often not normally distributed, in particular, when a variable is made of count data (Blanca, Alarcón, Arnau, Bono, & Bendayan, 2017). Previous research suggests that although the ANOVA or t-test assumes normality, they are both robust when the normality assumption is violated. There is evidence that the false positive rate was not significantly affected by the violation of the assumption of normality (Blanca et al., 2017; Glass, Peckham, & Sanders, 1972; Harwell, Rubinstein, Hayes, & Olds, 1992; Lix, Keselman, & Keselman, 1996). Therefore, the ANOVA was still used to test whether people in both manipulation groups spend less time procrastinating than those in the control group. The t-test was still used to determine whether there is a difference in time spent procrastinating between groups.

Hypothesis 1 predicted that the participants in the meaning-making group would procrastinate less than those in the control group (H1a) and positive emotion manipulation group (H1b). Results of a one-way ANOVA revealed that there was a statistically significant difference in time spent procrastinating among groups, $F(2,270) = 15.88$, $\eta p^2 = .11$, $p < 0.001$. A Tukey Post Hoc test revealed that participants in the meaning-making group spent less time procrastinating on their focal goals at T3 (M = 79.12 min, SD = 118.13) than the control group (M = 221.74 min, SD= 240.71). Specifically, comparing the average time people spent procrastinating, participants in the meaning-making group procrastinated approximately two hours less than those in the control group. An independent samples t-test was carried out to compare the time spent on procrastination between the meaning-making and the control group. Results demonstrated that there was a significant group difference in the time spent procrastinating, $t(181) = -5.08$, $p < 0.001$, $d = 0.75$. The effect size for this analysis ($d = 0.75$) exceeds Cohen's (1992) convention for a medium effect ($d = 0.50$). Thus, H1a was supported.

Hypothesis 2 predicted that participants in the positive emotions manipulation group would procrastinate less than those in the control group (H2a) but procrastinate more than those in the meaning-making group (H2b). Results of an independent samples t-test demonstrated that participants in the positive emotions manipulation group (M = 112.89 min, SD = 154.32) reported less procrastination behaviour than those in the control group, $t(190) = -3.62$, $p < 0.001$, $d = .54$. H2a was supported. However, there was no statistically significant difference in time spent procrastination between the meaning-making and positive emotions manipulation group, $t(179) = -1.66$, $p > 0.05$. Thus, H1b and H2b were not supported.

4.4.4 Exploratory Tests

An exploratory test examined how the effectiveness of the manipulation is affected by other personality factors, namely, trait procrastination and perfectionism. Results demonstrated that after controlling for trait procrastination and perfectionism, there was a significant group difference in an amount of time spent procrastinating $F(2,266) = 17.15$, $\eta p^2 = .11$, $p < 0.001$. A Tukey Post Hoc test showed that there was a significant difference between the meaning-making and the control group in the time spent procrastinating ($p < 0.001$). Similar, the difference in the time spent procrastinating was also found between the positive emotions manipulation group and the control group ($p < 0.001$).

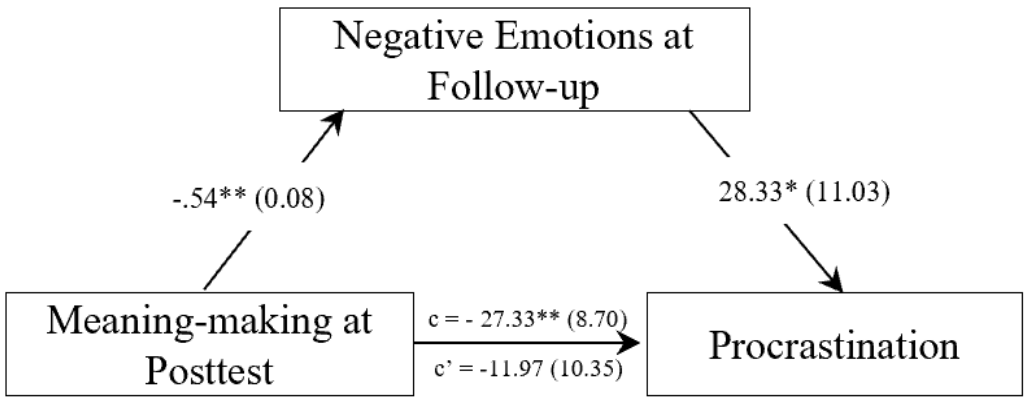
The second exploratory test assessed the potential mediating effect of negative emotions in the negative association between meaning-making and procrastination. A substantial body of research indicates that the levels of negative emotions can be effectively reduced through reinterpreting the meaning of emotion-eliciting situations (Gross, 1998; Keng et al., 2013; Wolgast et al., 2011). Also, a previous intervention study found that an increase in meanings has a significant effect on reducing negative emotions (Schutte et al., 2012). Thus, it was expected that the effect of meaning-making on procrastination might, at least in part, be due to a decrease in negative emotions. Mediation analysis was used to test whether negative emotions at follow-up mediate the effects of meaning-making at posttest on time spent procrastinating at follow-up. The mediation analysis was conducted using the SPSS macro PROCESS v3.5 (A. Hayes & Rockwood, 2020) with 10,000 bootstrapping re-samples and bias-corrected 95% confidence intervals.

Prior to mediation analysis, a one-way repeated measure ANOVA was conducted to test whether there was a significant change in negative emotions from pretest, posttest and follow-up. Results demonstrated that negative emotions differed

significantly between time points, $F(1.73, 156.07) = 3.43$, $\eta p^2 = 0.04$, $p < 0.05$. As shown in Table 4.2, compared to the baseline, negative emotions decreased at posttest and increased at follow-up. The decrease in negative emotions at post-test was not found in the other two groups.

Mediation analysis demonstrated that the indirect effects of meaning making at post-test on the time spent procrastinating through negative emotions at follow-up was significant (B = -15.36, SE = 7.34, 95 % CI: -29.38, -.65), with the overall model explaining 10% of the variance in negative emotions, $R^2 = 0.10$, $F(1, 89) = 9.86$, $p < .01$. The direct effect of meaning-making at posttest on the time spent procrastinating was not significant after accounting for the contribution of the mediator (B = -11.97, SE = 10.35, 95 % CI: .25, -32.53), supporting mediation via negative emotions at follow-up.

Figure 4.2. *The indirect effect of meaning-making on procrastination through negative emotions (N = 91)*



Note. Following recommendations made by Hayes (2013), values represent unstandardized beta coefficients with standard error (*SE*) shown in parentheses. * $p < .05$, ** $p < .01$.

Table 4.2. *Means scores and standard deviations for goal-related meaning, the levels of positive and negative emotions at T1, T2 and T3 by groups*

	Goal-related Meaning *M (SD)*			Positive Emotions *M (SD)*			Negative Emotions *M (SD)*		
Group	T1	T2	T3	T1	T2	T3	T1	T2	T3
Meaning-making	5.03	5.52	5.49	2.73	2.86	2.84	2.65	2.33	2.60
	(1.50)	(1.36)	(1.05)	(0.84)	(0.85)	(0.96)	(1.17)	(1.11)	(1.28)
Positive Emotions	4.80	4.84	4.82	2.64	3.18	3.24	2.71	2.68	2.73
	(1.50)	(1.39)	(1.45)	(0.79)	(0.76)	(0.90)	(1.07)	(1.08)	(1.20)
Control	4.75	4.75	4.72	2.72	2.81	2.73	2.82	2.81	2.83
	(1.47)	(1.44)	(1.45)	(0.77)	(0.78)	(0.89)	(1.04)	(1.04)	(1.16)

Note. T1 = before the manipulation; T2 = after the manipulation; T3 = after 36-48 hours following the manipulations.

4.5 Discussion

The current study investigated whether enhancing meaning and positive goal-related emotions result in less procrastination (relative to a control group). In support of the hypotheses, the current results showed that participants in each manipulation group reported less time spent procrastinating. However, the effects of the meaning-making manipulation on procrastination were not greater than the positive emotions manipulation. Overall, the findings suggest that manipulating emotions through either reappraisal or increases in positive emotions were beneficial for reducing procrastination.

The current findings confirm and extend theory and empirical evidence on procrastination and emotions in several important ways. First, it was found that regulating emotions through reappraisal resulted in lesser procrastination relative to a control group. This finding is consistent with previous research by Eckert et al. (2016), which suggests that enhancing emotion regulation skills reduced procrastination. The current research builds on this by highlighting the role of meaning-making in relation to aversive goals. That is, reappraising an aversive goal through presenting or searching for meaning was effective in reducing procrastination.

One of the major functions of meaning is to modify one's perceived meaning of a situation to make it less aversive or minimize its effect (Park, 2016). The current findings are consistent with this argument, showing that meaning-making contributed to lower levels of negative emotions, which, in turn, resulted in less procrastination. These findings provide insight into the mechanism underlying the effect of meaning-making on procrastination and empirical support for the notion that negative emotions play a central role in procrastination (Sirois & Pychyl, 2013).

Second, this study provided a novel contribution to understanding the relationship between positive emotions and procrastination by demonstrating that directly cultivating positive goal-related emotions is effective in reducing procrastination. One possible reason is that cultivating positive emotions may break a vicious cycle of procrastination. Procrastination as a coping response towards aversive goals may create additional negative emotions as well as negative self-evaluations and rumination (Flett et al., 2012; Pychyl & Sirois, 2016). The escalation of emotional distress and negative self-related thoughts may further undermine the self-regulation necessary for goal accomplishment (Pychyl & Sirois, 2016). Over time, this avoidant coping may become automatic and more entrenched as a pattern of behaviour. Because positive emotions can broaden individuals' thought-action repertoires (Fredrickson, 2001), increased positive goal-related emotions may dampen the automatic response caused by negative emotions and provide creative and flexible new ways of thinking and acting. In the long run, the experience of positive emotions may build resources to cope with negative emotions. As a result, procrastination may no longer be an automatic coping response to aversive goals.

An interesting finding was that the effects of meaning-making on procrastination were not greater than the effects of positive emotions. This suggests that the ways in which meaning-making and positive emotions reduce procrastination may be distinct. The effectiveness of meaning-making was primarily reflected in a reduction of negative emotions. Changing one's interpretations of an emotion-eliciting situation through meaning-making is a form of reappraisal. One underlying mechanism of this approach is that it helps individuals understand stressful situations in ways that are more consistent with their global meaning (Park & Kennedy, 2017). In this sense, people may typically experience better adjustment to the situations and

experience lower levels of negative emotions. This, in turn, may reduce procrastination that is driven by negative goal-related emotions. In contrast, the effectiveness of positive emotions may be due to two underlying mechanisms. First, increased positive emotions broaden individuals' thought-action repertoires (Fredrickson, 2001), allowing them to discard an entrenched behavioural pattern (i.e., regulating emotions through procrastination) and find new ways of acting. Second, positive emotions may extend individuals' temporal perspective (Sirois & Hirsch, 2015), allowing them to consider the future implications of the current delay choices.

4.5.1. Limitations and Future Research

The current findings have several limitations that warrant discussion. First, the present research employed a one-time manipulation which is unable to investigate whether the observed effects of meaning-making and positive emotions manipulation have relatively enduring effects on procrastination. Further emotion-based interventions that deliver multiple times over a longer period of time may better capture the long-lasting or sustainable effects of meaning-making or positive emotions on procrastination.

Second, it is unclear whether meaning-making and positive emotions interact to influence procrastination. Theory and empirical studies suggest that there is a positive reciprocal relationship between meaning-making and positive emotions (Fredrickson, 2000; King et al., 2006; Li et al., 2019). Finding meaning may trigger positive emotions, whereas the experience of positive emotions may facilitate access to cognitive networks involved in assessments of meaning, making it easier for people to find meaningful aspects about an intended goal. The current study did not find a significant improvement in positive emotions following the meaning-making

manipulation. This may be because a one-time meaning-making manipulation could not create the observed effect on positive emotions. Interventions designed to increase both meaning and positive emotions and delivered multiple times over a period of time may provide insight into whether there is an interaction between two variables and whether the interaction can produce larger and enduring effects on reducing procrastination (relative to the effects of each manipulation).

Third, only one subtype of reappraisal was examined in this study, namely reinterpreting a situation (or a goal) by searching for meaning. Other types of reappraisal may have distinct and complementary roles in reducing procrastination. Webb et al. (2012) outlined four subtypes of reappraisal, including changing emotional response in a particular manner, reappraising the emotional stimulus or situation, altering the impact of the emotional stimulus by adopting a third-person perspective, and a mixed strategy that includes the above three strategies. Prior research found that changing emotional response by instructing people to accept their negative emotions nonjudgmentally was beneficial for reducing academic procrastination (Glick & Orsillo, 2015). The effectiveness of different subtypes of reappraisal could be compared in future studies to identify the most effective way that reduces procrastination.

When interpreting the effects of manipulations, another factor to consider is that their effectiveness may be due to goal reflection. Specifically, relatively less amount of time spent procrastinating may be simply due to both manipulations directed participants' attention to their ongoing goals (participants in the control group were not asked to reflect on their goals, only to write about past activities.). In order to rule out the possibility that the effects of manipulations are not simply due to goal reflection, further research could add a second control group in which participants are

asked to think about their goal without being instructed to increase positive emotions or presented goal-related meaning.

In addition, one possibility worth considering is that the effects of positive emotions on reduced procrastination may be due to an increase in motivation. That is, asking participants to think about positive emotions that they might experience if they achieved the goal may promote them to be more motivated to strive for the desired outcome, thereby resulting in less procrastination. Ruling out the potential confounding effects of motivation on reduced procrastination is a challenge because emotions and motivation are closely related (Chiew & Braver, 2011). Emotions often have motivational properties of their own (e.g., Frijda, 1986). For example, positive emotions, such as happiness, can motivate a person to perform better.

Although positive emotions and an increase in motivation may be both causative factors, positive emotions serve a slightly different functional purpose than motivation. Positive emotions broaden individuals' thought-action repertoires and enhance personal resources. Also, it may "undo" the narrowing effects of negative emotions on attention, dampening the automatic responses associated with the attentional narrowing (Fredrickson, 2001). This, in turn, makes it easier for individuals to cope with negative emotions and reduce the need for procrastination as a mood repair strategy (Sirois & Pychyl, 2013).

Motivation and positive emotions may interact to facilitate self-regulation (e.g., less procrastination); however, one premise of this interaction is that people tend to pursue goals stem from their own interests and values (Werner & Milyavskaya, 2019). An experimental study by Isen and Reeve (2005) supports this argument. The researchers found that positive emotions enhanced individuals' intrinsic motivation

and task performance. However, this effect was not found when people were asked to perform uninteresting experimental tasks. In other words, the effects of positive emotions in fostering intrinsic motivation and facilitating self-regulation may be more likely to occur when people are faced with interesting goals. This is not the case for procrastination, as procrastination often occurs when goals are perceived as aversive or boring (Blunt & Pychyl, 2000). Future research examining motivation levels after the positive emotions manipulation, and interplay of these two variables on procrastination may provide more insight into these issues.

4.5.2 Conclusion

The present study provides preliminary evidence that providing positive meanings when performing an aversive goal and directly cultivating positive goal-related emotions were both effective in reducing procrastination. Regardless of downregulating negative or upregulating positive emotions, evidence from the present study adds to the theory and empirical evidence supporting that the inability to regulate emotions is a root cause of procrastination (Pychyl & Sirois, 2016; Sirois & Pychyl, 2013). From this perspective, the present study provides fertile ground for developing emotion-based interventions. Interventions designed to regulate emotions in a healthy and adaptive way may prove beneficial for those struggling with procrastination.

CHAPTER 5

GENERAL DISCUSSION

5.1 Chapter Overview

This concluding chapter summarises the main findings and contributions of the current research programme by discussing the implications for theoretical and practical developments on procrastination. Separate sections are devoted to each of these aspects. Section 5.2 briefly summarizes the main findings of cross-sectional, longitudinal and experimental studies. Section 5.3 discusses the implications of the findings for theoretical developments and practical applications of the findings. Section 5.4 presents the limitations and directions for future research. The final section (Section 5.5) brings the chapter and the thesis to a close with concluding remarks.

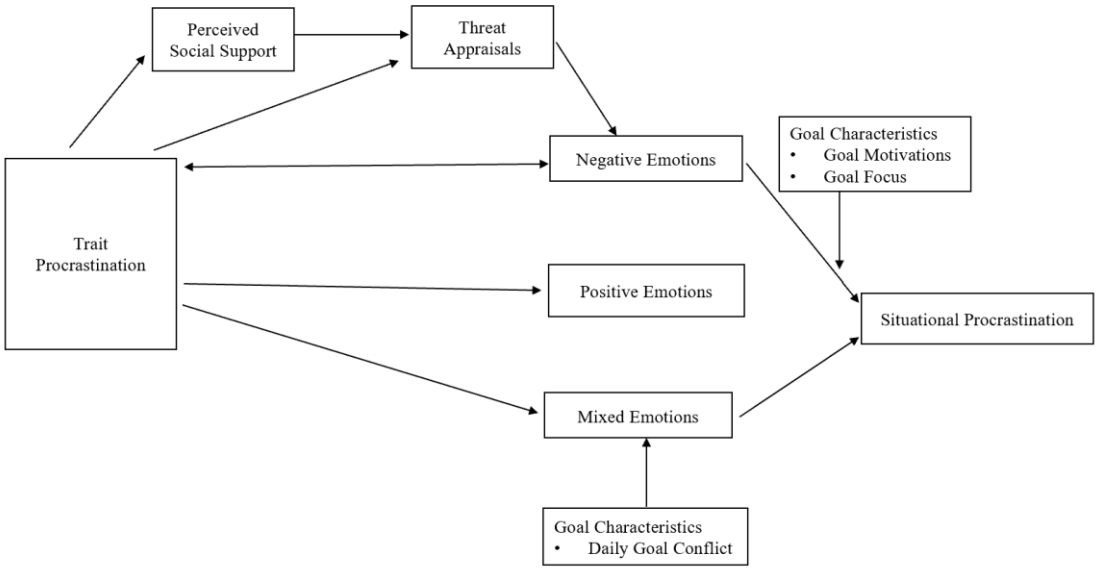
5.2 Overview of the Main Findings

Recent theoretical frameworks and a growing body of empirical research suggest that emotions play a pivotal role in procrastination (Pychyl & Sirois, 2016; Sirois & Pychyl, 2013; Tice & Bratslavsky, 2000). According to the mood-repair conceptualization of procrastination (Sirois & Pychyl, 2013), procrastination as a self-regulation failure is underpinned by the priority of short-term mood repair. In line with this, prior research has investigated the associations between procrastination and emotions (e.g. Fee & Tangney, 2000; Lay & Silverman, 1996; Sirois, 2014b). However, there are three notable limitations of previous research that warrant mention. First, although previous research pointed to the relationship between procrastination and negative emotions, the reasons why procrastinators experience negative emotions have not been fully explored. Second, relative to the negative

emotions, research on how positive and mixed emotions are associated with procrastination has been much more limited. Third, there has only been one intervention study to date that directly investigated whether bolstering emotion regulation skills can reduce procrastination (Eckert et al., 2016).

The aim of the current research was to extend theory and research on the relations between procrastination and emotions by assessing whether and how procrastination is linked to negative, positive and mixed emotions and which factors play a role in the links between procrastination and emotions. Figure 5.1 displays the main findings of the current research programme. This section discusses these findings, primarily focuses on how procrastination is linked to different types of emotions.

Figure 5.1 A diagram that presents the main findings of the current research programme.



The Consistent Positive Association Between Procrastination and Negative Emotions

The current research programme empirically examined the relationship between procrastination and negative emotions, and the ways in which procrastination may be linked to negative emotions. Chapter 2 (Study 1) presented the findings of a cross-sectional study, which found that when procrastination was measured as a trait, individuals high in procrastination reported high levels of negative goal-related emotions. This finding is consistent with previous research, which found that trait procrastination was positively associated with stress (Sirois, 2014b), anxiety and depression (Flett et al., 1995). However, the current study went further than the previous studies by identifying factors that explained why procrastinators experience negative goal-related emotions. Specifically, the findings indicated that less perceived social support and high levels of threat appraisals explained the link between trait procrastination and negative emotions. However, Study 1 was limited by its cross-sectional design, which did not permit a more dynamic assessment of the associations between procrastination and negative emotions.

To address this issue, Chapter 3 (Study 2) adopted an experience-sampling method to investigate whether and how situational procrastination is associated with momentary emotions. This study revealed that procrastination is positively related to momentary negative emotions. Furthermore, this dynamic association was moderated by the characteristics of goals. Specifically, individuals who were motivated by controlled reasons were more likely to experience negative emotions and procrastinated more. Those who focus more on the outcome of goal pursuit reported higher levels of negative emotions and more procrastination.

Chapter 4 (Study 3) presented the findings of an experimental study that examined whether regulating emotions in an adaptive and healthy manner can reduce the likelihood of procrastination. This study demonstrated that individuals who were instructed to reappraise their difficult goals through searching for goal-related meaning reported lower levels of negative emotions and spent less time procrastinating.

Inconsistent Findings of the Relationship Between Procrastination and Positive Emotions

The findings of whether procrastination is associated with positive emotions were inconsistent. Study 1 found that trait procrastination was negatively associated with positive emotions. Consistent with previous studies (e.g., Balkis & Duru, 2016; Sirois & Giguère, 2018), this finding suggests that chronic procrastinators were less likely to experience positive emotions when they were faced with difficult goals. However, the evidence presented in Chapter 3 (Study 2) demonstrated that positive emotions were not associated with situational procrastination. Given that the design of Study 2 did not allow for establishing temporal precedence of positive emotions and procrastination, it left open the possibility that positive emotions may occur *before*, *during* and *after* procrastination. If positive emotions are considered as an outcome of procrastination, then this non-significant result parallels the previous findings presented by Pychyl et al. (2000) and Pollack and Herres (2020). If positive emotions are viewed as an antecedent of procrastination, then the current findings suggest that whether people experience goal-related positive emotions did not affect subsequent situational procrastination. This finding is inconsistent with previous research that a lack of positive goal-related emotions prompts procrastination (Sirois & Giguère, 2018).

One possible explanation for this finding is that there are potential boundary conditions under which positive emotions may influence situational procrastination, as these two studies used different measures to assess positive emotions. That is, positive emotions in Study 2 were assessed using a composite measure of three items of eagerness, hope and confidence, whereas in Sirois and Giguère's (2018) study, positive emotions were assessed using the PANAS scale (Watson, Clark, & Tellegen, 1988). Eagerness, hope, and confidence are considered as positive anticipatory emotions, which are closely associated with the possibilities of future positive outcomes (Baumgartner et al., 2008), in comparison to general positive emotions as the PANAS assesses.

To further investigate the causal relationship between positive emotions and procrastination, the experimental study (Study 3) manipulated positive emotions to identify whether an increase in positive emotions affects subsequent procrastination. Results demonstrated that individuals who experienced higher levels of positive emotions regarding their focal goal reported less time spent procrastinating. Viewing the current findings from the reverse - people who experience lower levels of general positive emotions may be more likely to engage in procrastination. The current finding is consistent with the findings of Sirois and Giguère (2018), suggesting that people may "give in when feeling less good" (p. 407).

The Positive Association Between Procrastination and Mixed Emotions

The current research programme is the first to examine whether and how procrastination is linked to mixed emotions. Studies 1 and 2 demonstrated that procrastination, whether it be a trait or a state, was positively associated with mixed emotions. Specifically, the findings from Study 1 revealed that chronic procrastinators

reported higher levels of mixed emotions in the face of a goal that they struggle to meet. Study 2 demonstrated that the experience of mixed emotions explained in part why individuals procrastinated more when they were faced with an ambivalent situation in which multiple goals were conflicted.

One common instance of goal conflict is short-term hedonic goals conflict with long-term goals with larger rewards (Fishbach & Converse, 2010; Gillebaart, 2018; W. Hofmann et al., 2012). The assertation that procrastination is driven by a desire to regulate negative emotions at the cost of long-term goal pursuit (Sirois & Pychyl, 2013) depicts a conflict between hedonic and long-term instrumental goals. The evidence presented in the thesis suggests that mixed emotions elicited following goal conflict partly explained why people procrastinate. In the context of procrastination, mixed emotions may represent a state of disharmony between incompatible emotions (e.g., pleasure and guilt). Procrastination serves as an emotion regulation strategy (Pychyl & Sirois, 2016) that allows people to get rid of such incompatible and disharmonious emotional states.

5.3 Theoretical and Practical Implications

5.3.1 Theoretical Implications

Evidence from the current research programme has important implications for understanding the associations between procrastination and emotions. The findings presented in this thesis are consistent with the theories and prior research, suggesting that emotions play a key role in understanding procrastination (Sirois & Pychyl, 2013). Also, these findings extend on previous investigations by showing that a habitual appraisal style and the characteristics of goals could significantly influence the associations between procrastination and emotions. In light of the findings from

the current investigation, the following section discusses the theoretical implications in terms of negative, positive, mixed and conflicted emotions.

5.3.1.1 Negative Emotions

The findings from this research programme extend previous research on the relationship between procrastination and negative emotions in two ways. Initially, while previous research suggested the positive association between negative emotions and procrastination, the present research programme provides insight into the sources of negative emotions from the cognitive transactional perspective. Second, while prior research investigated situational and contextual factors that may influence procrastination, the present investigation is one of the few studies that assessed what goal characteristics could exacerbate the effect of negative emotions in prompting procrastination. The following section discusses these implications in more detail.

The Sources of Negative Goal-related Emotions

The current research programme sheds light on the sources of negative emotions associated with procrastination from the cognitive appraisal perspective. For procrastinators, their habitual appraisal style (i.e., appraise a goal as threatening) could be a self-generated source of negative emotions. Consistent with prior research, Lay, Edwards, Parker, and Endler (1989) found that students who were high on both trait procrastination and trait anxiety were prone to perceiving the upcoming examinations as a threat. Importantly, this appraisal style could be biased. In other words, procrastinators may evaluate a difficult goal as high in threat, but actually, they experience less threat once they are engaged in the goal. Mikulincer and Shaver (2007) suggest that the biased threat appraisals may perceptually heighten threatening aspects of a goal (even if the goal is fairly benign), attribute threat-related situations to

uncontrollable causes or inadequate personal resources, and hold negative beliefs about their coping ability. This appraisal style may lead to exaggerated negative emotions. This could be a reason why procrastinators frequently put things off, as they may be plagued by emotional distress associated with threat appraisals all the time.

The present findings demonstrated that less perceived social support might be a reason why procrastinators were prone to evaluating goals as a threat. Unlike less received social support, chronic procrastinators may tend to subjectively perceive support as inadequate, almost regardless of the amount or quality of available social support. This result parallels previous findings suggesting that procrastinators were dissatisfied with their social relationships (Ferrari et al., 1998). Negative self-evaluations may provide an explanation for this perception. Sirois et al. (2017) argue that individual differences in self-evaluations, including self-efficacy, can influence resources assessment during self-regulation. Negative self-evaluations could lead to a biased judgment that resources are insufficient for coping and the discrepancy between the current and desired state cannot be reduced given current resources. In this case, negative self-evaluations may make it easier for procrastinators to perceive environmental demands exceed available resources and coping ability, leading to threat appraisals.

In addition, less perceived social support and threat appraisals could be associated in a mutually reinforcing manner. That is, procrastinators who tend to perceive social support as inadequate may be more likely to evaluate a goal as threatening. When this appraisal becomes a more enduring tendency, it may bias procrastinators' assessment towards underestimating coping resources and overestimating the likelihood of loss and the negative consequences of anticipated

loss (D. Clark & Beck, 2010). This, in turn, may feedback into stress appraisals and amplify any associated negative emotional experience.

In summary, the above findings showed that for chronic procrastinators, the biased perception regarding available support engendered by negative self-evaluations prompted threat appraisals, which can be a source of negative emotions. These findings set a stage for analysing the dynamic interaction of the perceptions of coping resources and appraisals in the context of procrastination.

Goal Characteristics Affect the Procrastination and Emotions Links

The findings extend prior investigations by showing that certain goal characteristics can moderate the positive association between procrastination and negative emotions. First, controlled motivation may exacerbate the effect of negative emotions in prompting procrastination. This finding is in accordance with the findings reported in the previous studies, which suggest that controlled motivation was positively associated with procrastination behaviour (Senécal et al., 2003; Senécal et al., 1995), but extends previous findings by showing that pursuing a goal because of controlled reasons may heighten negative emotions and increase the likelihood of procrastination.

Controlled motivation reflects a low degree of self-determination (Deci & Ryan, 1985, 1991). Although there is evidence that controlled motivation can evoke required actions in the short term (Vansteenkiste, Lens, & Deci, 2006), the current findings indicate that this type of motivation may have detrimental effects on emotional experience and goal pursuit. These findings are in line with previous research, which found that controlled motivation was associated with poor task performance, and negative emotions explained this association (Gillet et al., 2013).

People motivated by controlled motivation may feel compelled to act. Therefore, their basic psychological needs for autonomy may be frustrated or at least not satisfied (Vansteenkiste et al., 2020). Prior research suggests that when basic needs are being thwarted, people may experience negative emotions, such as frustration and depression, which, in turn, cause them to seek alternative activities that can fulfil their needs (Bartholomew, Ntoumanis, Ryan, Bosch, & Thøgersen-Ntoumani, 2011).

The findings that controlled motivation and negative emotions interact to affect situational procrastination may challenge the recent argument that procrastination is simply due to a lack of motivation. Grund and Fries (2018) proposed a straightforward motivational explanation of procrastination, suggesting that procrastination often occurs when people pursue goals that are discordant with their basic needs and motives. Therefore, procrastination itself may even be considered as rational, or at least understandable, because goals are not self-determined. However, Pychyl (2019) argues that a more plausible explanation is that a mismatch between one's basic needs and goal pursuit may not be a direct cause of procrastination rather negative emotions. Specifically, a goal that is not consistent with one's basic needs and values is more likely to be perceived as aversive. Task aversiveness contributes to negative emotions, which is a root cause of procrastination (Blunt & Pychyl, 2000; Sirois & Pychyl, 2013). The interaction effect of controlled motivation and negative emotions shown in the current research programme is consistent with Pychyl's argument.

Second, the current findings demonstrated that focusing on the outcome of goal pursuit may also intensify the effect of negative emotion in prompting procrastination. One possible reason is that outcome focus may provide a clear standard for comparing the current state with the desired end state (Krause & Freund,

2014b). The sensed discrepancy may motivate goal-directed behaviour (Carver & Scheier, 1982, 1990); however, the current findings suggest that this may not be the case in the context of procrastination.

Focusing on the outcome of goal pursuit may exacerbate the "downward spiral" of negative emotions and procrastination. When one has delayed starting a goal (i.e., the early phase of goal pursuit), focusing on outcomes may remind them that the current goal progress is slower than expected. According to the control theory of self-regulation (Carver & Scheier, 1982, 1990), negative emotions arise if there is a negative discrepancy between the actual and expected rate of progress. Outcome focus may highlight the low rate of goal progress caused by past procrastination, heightening negative emotions. This, in turn, may prompt future procrastination.

Second, focusing on the outcome of a focal goal may draw one's attention to the possible negative consequences of failure. This may produce fear of failure (Krause & Freund, 2016) and increase the likelihood of procrastination (Haghbin, McCaffrey, & Pychyl, 2012). However, Haghbin et al. (2012) suggest that fear of failure may increase the likelihood of procrastination only for those with low levels of competence. In Study 2, participants were asked to evaluate the goals that they had difficulty achieving. It is likely that individuals are prone to perceiving a goal as difficult when they have a low perceived competence. In this regard, outcome focus highlights the potential failure of goal pursuit. As a result, fear of failure and a low perceived competence may produce the perception that failure is aversive. These irrational beliefs about failure may heighten negative emotions (Ellis & Knaus, 1977), which, in turn, prompt procrastination as a means of regulating emotions (Sirois & Pychyl, 2013). Future research could examine (i) whether outcome focus would cause fear of failure and then trigger task avoidance and (ii) whether this tendency is more

salient among those who feel incompetent at accomplishing their goals. By doing so, future research would provide more insights into how outcome focus is associated with procrastination and to what extent individual differences can influence this association.

Evidence that Regulating Emotions can Result in Less Procrastination

The current research demonstrated for the first time that reappraising aversive goals through enhancing goal-related meaning resulted in less procrastination. Presenting meaning can help people move beyond the "here and now", drawing their attention to the possibilities of future benefits of long-term goal pursuit (MacKenzie & Baumeister, 2014). For example, people may feel frustrated when they are struggling with a weight loss goal. At this point, the present need for emotional relief may be a priority, which enables people to postpone scheduled workouts and eat tasty but unhealthy foods. Presenting meaning may highlight the possible benefits of goal achievement (e.g., losing weight can reduce the risk of diabetes) and override the impulse of eating unhealthy foods. Connecting goals at hand and potential future benefits through presenting meaning may guide people's behaviour and help them override the impulse of mood repair for the present self.

Although outcome focus and presenting future benefits of goal achievement (e.g., increasing meaning) are both future-oriented, their role in procrastination seems to be different. Outcome focus appears to be maladaptive because focusing on consequences may highlight the negative discrepancy between the actual and desired rate of goal progress. Negative emotions arising from the awareness of this discrepancy can prompt procrastination and task avoidance (Sirois & Pychyl, 2013). In contrast, presenting meaning may be beneficial for reducing procrastination as

reinterpreting a stressful situation or an aversive goal through finding its meaning may contribute to lower levels of negative emotions. In terms of procrastination, this finding is consistent with the previous research, which suggests that adaptively regulating emotions may reduce the likelihood of procrastination (Eckert et al., 2016). The finding that a reduction of negative emotions is conductive to procrastination provides empirical evidence for the mood repair conceptualization of procrastination (Sirois & Pychyl, 2013). That is, the experience of negative emotions plays a central role in explaining why people procrastinate.

5.3.1.2 Positive Emotions

The evidence derived from Study 1 demonstrated that chronic procrastinators were less likely to experience positive emotions in terms of hope, confidence and eagerness. These emotions have been classified as anticipatory emotions (Folkman & Lazarus, 1985), which represent the possibilities of future desired consequences would occur (Baumgartner et al., 2008). For example, feelings of hope should be strongly associated with anticipating successful task completion. Low levels of positive goal-related emotions that procrastinators experience may reflect their low anticipation of goal achievement. Anticipation of positive outcomes plays a key role in motivating people to engage in goal-directed behaviour (Sherdell, Waugh, & Gotlib, 2012). Thus, low positive anticipatory emotions may explain why procrastinators are less likely to successfully follow through on intentions to realise their goals.

However, the evidence from Study 2 demonstrated that these positive anticipatory emotions were not associated with situational procrastination. It is possible that compared to non-procrastinators, low levels of positive anticipatory

emotions may be particularly detrimental for procrastinators. This potential difference may be due to procrastinators having a higher propensity to self-handicap (Ferrari, 1991c). That is, procrastinators may be delaying tasks unnecessarily in order to use the inadequacy of time as a "hindrance" to obscure their inability, protecting them from negative evaluations caused by failure (Ferrari, 1991b; Ferrari & Tice, 2000). Therefore, when low expectancies for success are low (i.e., low anticipatory positive emotions), procrastinators may be more likely to engage in procrastination as a self-handicapping strategy, whereas non-procrastinator would not. This speculation may encourage future research on the association between positive anticipatory emotions and procrastination to also consider to what extent personality factors (e.g., a higher proclivity to self-handicap) can influence this association.

Study 3 demonstrated that increased positive goal-related emotions reduced the likelihood of procrastination, which is inconsistent with the findings of Study 2 (i.e., positive emotions being not associated with situational procrastination). One possible explanation is that these positive emotions were of two different types. In Study 3, participants were instructed to imagine experiencing positive emotions in the future if they could follow through on intended goals. Unlike positive anticipatory emotions assessed in Study 2, these emotions could be classified as anticipated emotions. According to Baumgartner et al. (2008), anticipated emotions represent the predictions of future emotional states (if certain desirable events could occur), whereas anticipatory emotions are the current and real emotional experiences associated with the possibilities of success.

Previous research compared the motivational effects of these two types of positive emotions on goal-directed behaviour, showing that positive anticipated emotions, but not anticipatory emotions, affect desires to act (Baumgartner et al.,

2008). The finding of Baumgartner et al. may explain why increased positive anticipated emotions reduced procrastination in Study 3. Positive anticipated emotions and the underlying process of mental stimulation may foster a sense of connection to the future self and enable the present self to act follow through on intentions within a broader cognitive-affective scope (Mellers & McGraw, 2001; Perugini & Bagozzi, 2001). Given that a disjunction between the present and future self is a characteristic of procrastination (Sirois & Pychyl, 2013), vivid images of experiencing positive emotions may unite the present and future self. This may motivate people to close the gap between the current and desired end state and less engage in procrastination. This interpretation is consistent with previous intervention research by Blouin-Hudon & Pychyl (2017). The researchers found that compared to those in a present-focused meditation condition, participants who were instructed to imagine their future reported higher levels of affective empathy for the future self and future self-continuity. Affective empathy for the future self, in turn, contributed to a decrease in procrastination.

One possible alternative explanation is that positive emotions varied in intensity in Study 2 and 3. In Study 2, people may have experienced lower levels of positive emotions but higher levels of negative emotions when confronted with a difficult goal. Thus, their emotional state would be a combination of positive and negative emotions (i.e., mixed emotions), but negative emotions would be stronger than positive emotions. For example, when one's focal goal is to learn a new skill, they may be interested in this goal but more anxious about failing to meet a standard of performance. In this case, procrastination may be primarily driven by the desire to avoid negative emotions (e.g., performance anxiety) and seems not closely related to positive emotions (e.g., in the interest of learning a new skill). In Study 3, positive

emotions were experimentally induced. That is, participants in the positive emotions manipulation group have experienced more intense positive emotions. The increased positive emotions can broaden their thought-action repertoire (Fredrickson, 1998, 2001) and serve as a self-regulatory resource (Sirois, 2014a). These broadened mindsets and increased self-regulatory resources may help them to bounce back from negative emotional experiences associated with performing intended goals and find a new way to act. This, in turn, may reduce the need for procrastination as a typical way to regulate negative emotions (Sirois & Pychyl, 2013).

The inconsistent results in Study 2 and 3 extend the current understanding of the boundary conditions of positive emotions in procrastination. It is plausible to suggest that when procrastination is viewed as a personality trait, it is negatively associated with positive anticipatory emotions (e.g., hope and confidence). Furthermore, low levels of positive anticipatory emotions associated with intended goals may be particularly detrimental for procrastinators but not non-procrastinators. This indicates that personality characteristics may play a role in the effect of positive anticipatory emotions on situational procrastination. Lastly, whether positive emotions can affect procrastination may be based on either the emotional intensity or the types of emotions. These findings represent a preliminary attempt to explore the role of positive emotions in procrastination. Future research is needed to provide more insights into these issues.

Research using an experimental design could clarify which types of positive emotions can reduce procrastination more effectively than others. For example, participants could be randomly assigned into a present-oriented positive emotions condition (similar to positive anticipated emotions), a future-oriented positive emotions condition (similar to positive anticipatory emotions), and a control

condition. Participants in the present-oriented emotions condition can be instructed to read a “pride” story, whereas those in the future-oriented emotions condition can read a “hope” story. This approach has been found to be effective in manipulating specific positive emotions in previous research (Griskevicius, Shiota, & Nowlis, 2010; Winterich & Haws, 2011). A comparison of procrastination scores among various conditions could be used to examine whether there are changes and group differences as a result of the manipulation of the different positive emotions.

Furthermore, experimental work is needed to examine the optimal levels of positive emotions and their effects on procrastination. Intensity is a core element of emotional experience (Frijda, 1988). Sirois and Giguère (2018) found that low levels of positive emotions associated with performing a task explained why procrastinators were more susceptible to positive social temptations and procrastinated more. The current research programme showed that enhancing positive emotions (i.e., increasing the intensity of positive emotions) reduced procrastination. However, Gruber, Mauss, and Tamir (2011) found that experiencing very high degrees of positive emotions, such as being “extremely” happy, may have detrimental effects on academic and job performance as those feelings provide inappropriate information for action. This finding suggests that there may be an optimal level of positive emotions that is beneficial for reducing procrastination. From this perspective, future research could examine whether the same type of positive emotions but with different intensity levels are associated with procrastination. If so, what factors may contribute to achieving the optimal level, as it may vary depending on individual characteristics and situations.

5.3.1.3 Mixed Emotions

Evidence of the Emotional Complexity Associated with Procrastination

Evidence from Study 1 demonstrated for the first time that trait procrastination was positively associated with mixed emotions and goal-related conflicted emotions in particular. This finding suggests that compared to non-procrastinators, procrastinators may process mixed emotions differently. That is, procrastinators may tend to perceive mixed emotions as a disharmonious state rather than a meaningful and adaptive emotional response. Recent work supports this speculation, suggesting that high levels of mixed emotions that procrastinators experienced explained in part greater emotional distress (Yang and Sirois, in preparation). In contrast, for non-procrastinators, Berrios et al. (2018b) found that the experience of mixed emotions was related to greater eudaimonic well-being (i.e., a sense of meaning and purpose in life; Ryan, Huta, & Deci, 2008). Also, mixed emotions have been found to facilitate sense-making processes and problem-solving during stressful situations (J. Larsen et al., 2003).

Williams and Aaker (2002) found that individuals' ability to accept and synthesize contradictions may determine whether mixed emotions result in negative consequences. This finding may explain the distinct perceptions of mixed emotions existing in procrastinators and non-procrastinators. The experience of conflicts often leads to discomfort (Williams and Aaker, 2002). Those with a higher predisposition to accept contradictions may be less likely to be bothered by conflicts and feel less discomfort because they may perceive such conflicts as natural and common. In contrast, trait procrastination has been found to be negatively associated with the ability to tolerate aversive emotions (Eckert et al., 2016). These aversive emotions may arise from either an intended goal or an inner conflict between competing desires. In this case, it seems that procrastinators who have difficulty tolerating

aversive emotions may be more likely to be bothered by conflicts and perceive mixed emotions as disharmonious. Further research could compare differences in acceptance contradiction between procrastinators and non-procrastinators and examine whether this tendency plays a role in the link between procrastination and mixed emotions. By doing so, it would provide a deep understanding of why procrastinators are more likely to experience mixed emotions as emotional distress.

Study 2 demonstrated that there was a positive association between situational procrastination and momentary mixed emotions. This finding parallels Gadosey et al.'s (2021), which found that situational procrastination was related to the experience of two opposite emotions simultaneously. The experience-sampling study by Gadosey et al. used separate items to assess two specific positive and negative emotions with opposite valence (i.e., hope and anxiety). Their conclusion regarding the existence of mixed emotions during procrastination was based on the significant interaction effect between anxiety and hope. That is, the negative relation between hope and procrastination was weaker when exam-related anxiety was low. In this case, mixed emotions seem to be considered as the combination of anxiety and hope.

Conversely, Berrios, Totterdell, and Kellett (2015a) argue that mixed emotions are an integral experience and not merely a collection of independent emotions with opposite valence. Therefore, the current study used the direct measure of mixed emotions, which assessed mixed emotions as a whole. The benefits of this measure are it reflects the integrity of mixed emotions and would not limit mixed emotions in certain fixed combinations of opposite-valence emotions (Berrios et al., 2015a). Only if viewing mixed emotions as an integral experience, then it would be possible to apply the argument that people may feel mixed emotions while procrastination to a

broader level, rather than limiting the association between procrastination and mixed emotions to particular combinations of emotions.

Furthermore, the current research enhances the understanding of the role of mixed emotions in procrastination by demonstrating that mixed emotions explained the positive association between goal conflict and procrastination. Goal conflict often occurs when the pursuit of one goal inhibits the pursuit of another (Boudreaux & Ozer, 2013). Short-term, hedonic goals clash with long-term goals with larger rewards is a common instance of goal conflict (Fishbach & Converse, 2010; Gillebaart, 2018; W. Hofmann et al., 2012). The current findings support suggestions that individuals were more likely to feel mixed emotions in the face of conflicting goals (Berrios et al., 2015b). However, the finding that the experience of mixed emotions prompted procrastination is inconsistent with previous findings that mixed emotions facilitated self-control efforts to resist temptations (Berrios et al., 2018a).

The current finding that mixed emotions were negatively related to procrastination is consistent with the detrimental view of mixed emotions. That is, mixed emotions reflect a conflicting and distressing state (e.g., Carver et al., 2000; Mejía & Hooker, 2017; Van Harreveld, Van der Pligt, & de Liver, 2009) and have detrimental effects on well-being (King & Emmons, 1990). From this perspective, procrastination is a way that helps people avoid such conflicting emotional states. These findings extend the literature on the procrastination-emotion association, which has focused mainly on procrastination and negative emotions.

Although mixed emotions could be viewed as a distressing emotional state, mixed emotions and negative emotions are different. One primary distinction between mixed and negative emotions is that appraisals in mixed emotional situations are less

clear than those with a single emotion (Ruth, Brunel, & Otnes, 2002). Ruth et al. (2002) found that appraisals of mixed emotions were more ambiguous and showed less correspondence than one, single unblended emotion. In the face of conflicts involving hedonic and long-term goals, the experience of mixed emotions may be evoked by both positive and negative appraisals of competing goals. For example, appraisals of hedonic goals could be "eating chocolates make me happy", but it inhibits a goal of sticking to a diet, which may be accompanied by appraisals that a healthy diet goal helps maintain good health but is less enjoyable because there are many restrictions. These ambiguous appraisals may not occur simultaneously but may lead to a coactivation of positive and negative emotions in which one emotion may be stronger and eventually dominate the experience. In summary, although the current findings showed that mixed and negative emotions both have detrimental impacts on procrastination, they need to be distinguished from each other. The experience of mixed emotions reflects ambiguous appraisal patterns and emotional complexity associated with procrastination.

5.3.2 Practical implications

The current findings also have several practical implications, not least for interventions designed to reduce procrastination through regulating emotions. First, the findings that procrastination was associated with high threat appraisals and reappraisal was beneficial for procrastination may set a stage for future interventions aiming at changing threat appraisals. Guided threat reappraisal has been found to be effective in reducing negative states, which is more frequently used in the clinical domain. For example, a systematic review by Smits, Julian, Rosenfield, and Powers (2012) showed that threat-belief-based interventions effectively reduced anxiety symptoms. The core mechanism of threat reappraisal is to change biased appraisals of

the probabilities of harm and the negative consequences of anticipated harm (D. Clark & Beck, 2010). For procrastinators, interventions designed to replace their biased and exaggerated threat appraisals with more realistic ones would effectively reduce negative emotions and thus procrastination.

In light of the findings from Study 3, clinicians would be well served to deliver interventions targeting increasing positive emotions. A growing body of research indicates that positive emotions can be enhanced through training and interventions (e.g., Lindsay et al., 2018; Mayer, Allen, & Beauregard, 1995). For example, a mental imagery intervention that guided participants to imagine themselves in positive situations effectively increased positive emotions (Mayer et al., 1995). The effectiveness of mental imagery on increasing positive emotions has been replicated (e.g., Holmes, Lang, & Shah, 2009; Holmes, Mathews, Dalgleish, & Mackintosh, 2006). In a positive interpretation training programme, participants were guided to either imagine the given positive situations or concentrate on the verbal meaning of these same situations. Results revealed a significant group difference in positive emotions, with trends for an increase in the imagery group and a decrease in the verbal group (Holmes et al., 2006).

While many approaches have been shown to increase positive emotions, only a few studies have applied them to procrastination. The current research provides a basis for developing interventions and encourages exploring different approaches (e.g., mental imagery) to enhance positive emotions, thereby reducing procrastination.

Lastly, the current investigation extends the limited evidence regarding the role of mixed emotions in procrastination, which have implications for interventions designed to address procrastination caused by mixed emotions. Acceptance-based

interventions that focus on changing the emotional experience itself (S. Hayes et al., 1999) may provide far-reaching benefits. The core feature of this type of intervention is to instruct individuals to accept and embrace momentary experiences and thoughts without judging or avoiding them (S. Hofmann & Asmundson, 2008). These skills are the basis for increasing the ability to act on one's intentions despite experiencing undesired thoughts or feelings. Interventions based on acceptance and mindfulness methods have been found to be effective in reducing negative emotions and procrastination (Glick & Orsillo, 2015; Wang et al., 2017). In terms of mixed emotions, assisting people in accepting and tolerating mixed emotions in the face of self-control dilemmas may reduce their inner conflicts between competing desires (or goals). This, in turn, may reduce procrastination.

Furthermore, non-judgmental awareness as a key feature of acceptance-based interventions can promote one's acceptance of self-critical and negative thoughts (Evans, Baer, & Segerstrom, 2009). Conflicts between the desires for immediate pleasure and long-term goal pursuit is a ubiquitous part of daily life (Cavallo, Holmes, Fitzsimons, Murray, & Wood, 2012). Giving priority to hedonic choices, such as procrastination, may lead to self-criticism and negative self-evaluations (Flett et al., 1995), whereas non-judgmental awareness may lessen critical judgements of the self (Bishop et al., 2004; Evans et al., 2009). This, in turn, may allow individuals to approach present mixed emotions with acceptance and openness. Understanding the ways in which mixed emotions can be reduced is important for reducing procrastination associated with conflicting goals.

5.4 Limitations and Directions for Future Research

5.4.1 Limitations

Despite the contributions of the present research project, the present work has limitations that should be acknowledged. First, this research programme investigated the associations between procrastination and emotions; however, it is difficult to establish temporal precedence of situational procrastination and emotions. The links between emotions and procrastination can be reciprocal (Giguère, Sirois, & Vaswani, 2016; Pychyl & Sirois, 2016), suggesting the complex relations between procrastination and emotions. Negative emotions may arise from an important and difficult goal, which may precede procrastination. However, it could also be argued that the experience of negative emotions (e.g., feelings of guilt) is a result of behavioural procrastination as people are aware of the consequences of irrational delay (Sirois & Pychyl, 2013).

Second, whereas the current research programmes used three different measures to examine procrastination, attempting to provide a broad and deep understanding of the procrastination-emotions link, all of them were self-report measures. One common criticism of using self-reported measures is that the findings might be affected by social desirability bias (SDB). That is, participants may choose answers that are more socially acceptable rather than reflecting their true feelings and thoughts (Krumpal, 2013; Schwarz, 1999). Svartdal, Granmo, and Færevaag (2018) suggest that social desirability may occur when using self-report questionnaires to measure procrastination as participants may respond in a way (e.g., hide or mask procrastination behaviour) that prevents receiving negative evaluations from others. To minimise the potential bias caused by self-report measures, participants in the current research programme were informed that all responses would not match their personal information and would be kept confidential. It might be cautiously concluded that the risk of SDB in the current research is therefore limited. Despite this, SDB

may also exist. Future studies could integrate an SDB scale into the survey measures and then include the SDB index as an independent variable in the analysis to control the bias (Larson, 2019).

In addition, another limitation of self-report measures is participants may confuse delay with procrastination. Although there is widespread agreement that procrastination is inextricably associated with an act of delay, not all delays are deemed as procrastination (Anderson, 2016a; Haghbin, 2015; Pychyl, 2013). For example, in a work-related context, it may make sense to put off a task past an optimal starting time for completing when someone needs more information from co-workers. This intentional delay could be a rational strategy; thus, it should be not considered as procrastination. The present investigation used multiple approaches to reduce the likelihood of confusing delay with procrastination. In the experience-sampling study (Study 2), the e-MAPS (Wieland et al., 2018) was used to assess situational procrastination. This scale counts delay as procrastination only if this behaviour both fulfils the criteria of cognitive-affective appraisals and situational determinants. In the experimental study (Study 3), procrastination was assessed by a grid of time intervals. Participants were reminded that they could record a time slot as *Unavoidable*, rather than procrastination if they put off working on goals because circumstances were out of their control. These approaches can reduce the possibility that participants count all delays as procrastination to a certain extent. However, further research on the relationships between procrastination and emotions could explore whether similar results would be obtained if behavioural measures of procrastination are used.

Operationalizing behavioural measures of procrastination is a challenge as the use of these measures should consider multiple defining elements of procrastination.

For example, delay would count as procrastination if it is “needless”, “voluntary” and can cause “negative consequences” (e.g., Anderson, 2016b; Haghbin, 2015; Klingsieck, 2013b). These key elements are criteria for distinguishing procrastination from other forms of delay. However, using behavioural measures of procrastination, researchers may have difficulty identifying whether an observed delay is needless or whether people are aware that the delay will cause negative consequences.

Despite these inherent limitations, several methods have been used to measure the behavioural delay in prior research. For example, procrastinating behaviour has been assessed by asking participants to perform a specific task before a deadline. In one study, procrastination behaviour was examined by counting the number of days elapsed before returning a signed participant information sheet (Zuber et al., 2021). One challenge of this approach is that it is difficult to determine whether a delay in returning the required sheet is due to external obstacles. Scale-based measures of procrastination may be a convenient solution to address this issue. However, as mentioned earlier, self-report measures may be biased by social desirability concerns (Krumpal, 2013; Schwarz, 1999). Since both measures have pros and cons, researchers could use behavioural measures to assess delayed action while combining it with questionnaires to identify whether the delay is qualified as procrastination (e.g., ask participants whether a delay is caused by circumstances beyond their control). By doing so, future research would provide more compelling support for the relationships between procrastination and emotions suggested by the current findings.

5.4.2 Implications for Future Research

The current research provides empirical evidence showing how emotions function with respect to procrastination. However, there are unresolved questions in

this domain that provide promising routes for future investigation. This section elaborates on two areas of future research (i) future directions for developing theories of procrastination that mainly focus on the relationship between procrastination and emotions, and (ii) future empirical research on potential interventions for procrastination.

Future Directions for Developing Theories of Procrastination

Moving toward a more comprehensive understanding of the relationship between procrastination and emotions requires expanding the current findings to domain-specific forms of procrastination. Procrastination has been mostly studied in the academic domain (Klingsieck, 2013a) but received relatively little attention on other important life domains, such as health behaviour (Kroese, De Ridder, Evers, & Adriaanse, 2014). An important contribution in this regard was made by Sirois (2007), who provided novel evidence showing that procrastination was associated with less frequent dental and medical check-ups. In addition, Sirois et al. (2018) investigated how emotions are linked to a specific form of procrastination in the health domain (i.e., bedtime procrastination). They found that bedtime procrastination was positively associated with negative emotions. However, it is also unclear whether and how other types of emotions (e.g., mixed emotions) are linked to bedtime procrastination or procrastination in other domains. Therefore, replicating and expanding the findings suggested by the current research programme in various domains (e.g., health behaviour, finance, and career) may be beneficial for understanding procrastination in more nuanced and focused ways. This, in turn, may set a stage for addressing procrastination and its harmful effects in different important life-domains.

Future Empirical Research on Potential Interventions for Procrastination

Undertaking more fine-grained analyses of how effectively regulating emotions can reduce procrastination could be a promising direction for future research. The current research programme provides preliminary evidence that regulating emotions in an adaptive manner would be beneficial for reducing procrastination. However, in some situations, emotion regulation may run into difficulties. Webb, Schweiger Gallo, Miles, Gollwitzer, and Sheeran (2012) indicate that the failure to effectively regulate emotions can result from difficulties in (i) identification of the need to regulate, (ii) determination of whether to regulate and of an appropriate strategy to do so, and (iii) enactment of the selected strategy (when lacking regulatory resources). Given that procrastination is strongly associated with emotion regulation difficulties (Bytamar et al., 2020; Eckert et al., 2016; Pychyl & Sirois, 2016), addressing these problems of emotion regulation may offer new insights into procrastination interventions.

The effectiveness of implementation intentions (the use of a specific if-then plan) in regulating emotions has been substantiated through a meta-analysis by Webb, Schweiger Gallo, et al. (2012). Webb and colleagues indicate two underlying mechanisms of "implementation intentions" to explain why this approach is effective. First, the if-then plan specifying a situation (the "if") and intended responses (the "then") help to make the mental representation of the selected situation to be more salient and accessible. Second, the if-then format of the plan yields a mental association between the situation and the response. This means that when a "if" situation arises (e.g., If I am anxious about not achieving high standards of performance), then the intended responses (e.g., then I will tell myself that I don't need to be perfect) may come to mind in a relatively automatic manner. With this if-then format of the plan, people may be able to quickly and easily identify and seize

opportunities to regulate their emotions and enact the selected emotion regulation strategy (Webb, Schweiger Gallo, et al., 2012).

Theory and empirical evidence suggest that forming if-then plans can reduce procrastination (Valshtein, Oettingen, & Gollwitzer, 2020; Wieber & Gollwitzer, 2010). Two randomised trials showed that mental contrasting combined with implementation intentions (MCII) intervention effectively reduced the discrepancy between planned and actual bedtime (Study 1) and actual bedtime procrastination (Study 2; Valshtein et al., 2020). Based on empirical evidence of the effectiveness of implementation intentions in emotion regulation (Webb, Schweiger Gallo, et al., 2012) and procrastination (Valshtein et al., 2020), one promising way to advance procrastination interventions will be to integrate other self-regulation strategies (e.g., implementation intentions) with emotion regulation strategies. By doing so, individuals may be more likely to overcome difficulties in the process of emotion regulation, adaptively regulating emotions. This, in turn, may reduce the need for procrastination as a mood repair strategy (Sirois & Pychyl, 2013).

5.5 Conclusions

Using different measures of procrastination, the research presented in this thesis investigated whether and how procrastination is linked to negative, positive and mixed emotions. As hypothesized, the findings demonstrated a consistent association between procrastination and negative emotions. However, this research extends the literature by providing an in-depth look at *why* procrastination is associated with negative emotions via less perceived social support, high threat appraisals, controlled motivation and outcome focus. Furthermore, the present research programme provides

initial evidence that reappraising goals by searching for meaning may reduce negative emotions and thus procrastination.

The current research programme focused on two types of positive emotions: anticipatory and anticipated emotions in the context of procrastination. The former is experienced in the present and the likelihood that desired results will occur, whereas the latter is experienced based on prefactual thinking about imagined desired consequences (Baumgartner et al., 2008). The current findings showed that trait procrastinators were less likely to experience positive anticipatory emotions. However, this type of positive emotion was not associated with situational procrastination. In terms of positive anticipated emotions, imagining experiencing positive emotions associated with goal accomplishment was beneficial for reducing procrastination.

The research expands the scope of procrastination-related emotions by showing that procrastination, whether it be a trait or a state, was associated with higher levels of mixed emotions. Importantly, by assessing the role of mixed emotions, this research sheds light on the relations among goal conflict, mixed emotions and procrastination. That is, mixed emotions, as a state of disharmony between incompatible emotions, explained in part why conflicting goals may prompt procrastination.

The findings presented in the thesis provides a more comprehensive picture and a deeper understanding of (i) how procrastination is associated with different types of emotions and (ii) to what extent cognitive appraisals or the characteristics of goals affect these relationships. From a practical standpoint, the current findings set a stage for interventions designed to regulate different types of emotions associated

with procrastination. Regulating emotions in an adaptive and healthy manner is crucial, which may reduce the desire for short-term mood repair through procrastination.

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Appendix 2.1 Participant Information Sheet for Study 1

Participant Information Sheet

This research study aims to investigate individual differences in how people feel and think about projects that they are currently struggling with. Full-time employees or students who over 18 are invited to participate in this on-line study.

If you decide to participate you will be asked to list up to three projects that you are struggling with. You will also be asked to complete questions about your thoughts and feelings about one project, and measures of individual differences. The survey will take approximately 15 minutes to complete, although individual completion times may vary depending on your computer system.

There are no anticipated risks from participating in this research. Your responses will be anonymous, and the numerical data you provide will be aggregated with that of other respondents, to give the researcher an idea about general trends, rather than individuals. Your data may also be used by the researchers for subsequent studies, and if used will remain anonymous.

For participating you will be given a chance to win a £25 Amazon voucher after you complete the survey. Please note that the information you provide for the draw is not linked to your survey responses, and will be deleted after the draw takes place.

This research is being conducted by Sisi Yang, PhD students, under the supervision of Dr. Fuschia Sirois from the Department of Psychology at the University of Sheffield, and has received ethics approval from the Department of Psychology Ethics Committee at the University of Sheffield.

Appendix 2.2. Consent form for study 1

CONSENT FORM

	Please tick the appropriate boxes	**Yes**	**No**
	Taking Part in the Project		
1	I understand the nature of the survey		
2	I understand that understand that your data may be used in other research projects.		
3	I understand that understand that taking part is entirely your choice.		
4	I understand that understand that you can cease your participation at any time during the survey, but only up until the time that you click the "submit the survey" button at the end of the survey as submitted surveys are not identifiable for removal.		
5	I fully consent to participate		

Do you wish to continue? To acknowledge that you have read and understood this information and would like to continue with the research study, please click on "I agree".

I Agree **No, Thank you**

Appendix 2.3. Questionnaires for Study 1

Personal Project Analysis

Part 1: Project Elicitation Listing Module

Instructions: Please list up to three projects that you are currently struggling with in the boxes below and rank in order of importance (1 = the highest importance).

Project	Project Description	Importance
1.		
2.		
3.		

Part 2: Personal Project Rating Matrix

Goal-related Appraisals

Instructions: Please rate what you **think** about this most important project by dragging a slider handle from 0 (*no at all*) to 10 (*the highest level of that dimension*) on the series of dimensions listed below.

What do think about your **most important** project that you are currently struggling with recently?	Importance	Difficulty	Control	Time Adequacy	Outcome (Likelihood of Success)	Other's View of Importance	Positive Challenge	Support	Competence	Autonomy

Goal-related Emotions

Instructions: Please rate how you **feel** about the project that you are struggling with by entering a number score from 0 (*no at all*) to 10 (*the highest level of that dimension*) on the series of dimensions listed along the top of the page. If you feel a dimension is not relevant to a project, you may put an X in the space instead of a number, but please try to rate each project on all dimensions wherever possible.

What do **feel** about your **most important** project that you are currently struggling with recently?	Worried	Stressed	Anxious	Time Adequacy	Uncomfortable	Confused	Conflicted	Confident	Eager	Hopeful

In the following section of this questionnaire is a list of these dimensions and a more detailed explanation of what each one means. Please refer to this list as needed while you rate your projects.

Dimension Definitions

1. Importance
How important is this project to you?

2. Difficulty
How difficult do you find it to carry out this project?

3. Control
How much do you feel you are in control of this project?

4. Time Adequacy
How adequate is the amount of time you spend working on this project?

5. Outcome (Likelihood of Success)
How successful do you believe this project will be?

6. Others' View of Importance
How important is this project seen to be by those people who are important to you (e.g. your boss/ supervisor)?

7. Positive Challenge
How this project challenge you in a positive way?

8. Support
To what extent do you feel this project is supported by other people? Support may come in different forms, e.g., emotional (encouragement, approval), financial (money,

material possessions) or practical (active assistance).

9. Competence
To what extent do you feel competent to carry out this project?

10. Autonomy
How much is this project one which you feel you are pursuing autonomously, that is, you are engaged of your own free will in the project, not because anyone else wants you to do it.

The General Procrastination Scale-9

Instructions: Please be as honest and accurate as you can throughout. Try not to let your response to one statement influence your responses to other statements. There are no "correct" or "incorrect" answers. Answer according to your own feelings, rather than how you think "most people" would answer. Please rate the items from 1 (*False*) to 5 (*True*)

1. I often find myself performing tasks that I had intended to do days before.	1 2 3 4 5
2. Even with jobs that require little else except sitting down and doing them, I find they seldom get done for days.	1 2 3 4 5
3. I generally delay before starting work I have to do.	1 2 3 4 5
4. In preparing for some deadlines, I often waste time by doing other things.	1 2 3 4 5
5. I often have a task finished sooner than necessary.	1 2 3 4 5
6. I usually buy even an essential item at the last minute.	1 2 3 4 5
7. I usually accomplish all the things I plan to do in a day.	1 2 3 4 5
8. I am continually saying I'll do it tomorrow.	1 2 3 4 5
9. I usually take care of all the tasks I have to do before I settle down and relax for the evening.	1 2 3 4 5

DUKE-UNC Functional Social Support Questionnaire

Instructions: Here is a list of some things that other people do for us or give us that may be helpful or supportive. Please indicate the extent to which you agree or disagree with each of the statements

1. I have people who care what happens to me	1 2 3 4 5
2. I get love and affection	1 2 3 4 5
3. I get chances to talk to someone about problems at work or with my housework	1 2 3 4 5
4. I get chances to talk to someone I trust about my personal and family problems	1 2 3 4 5
5. I get chances to talk about money matters	1 2 3 4 5
6. I get invitations to go out and do things with other people	1 2 3 4 5
7. I get useful advice about important things in life	1 2 3 4 5
8. I get help when I'm sick in bed	1 2 3 4 5

Mixed Emotions Scale

Instructions: Please circle the number that represents to what extent do you feel about the most important project that you are currently struggling with.

1. I'm feeling contrasting emotions	1 2 3 4 5
2. I'm feeling a mixture of emotions	1 2 3 4 5
3. I'm feeling different emotions at the same time	1 2 3 4 5
4. I'm feeling a combination of different emotions at the same time.	1 2 3 4 5

Appendix 3.1. Participant information Sheet for Study 2

Participant Information Sheet

The Daily Subjective Experiences of Goal Pursuit

Thank you for your interest in our study. Before you decide whether you would like to take part, it is important for you to understand why the research is being done and what it will involve. Please read the following information carefully to decide whether or not you wish to take part.

What is the project's purpose?

This research study aims to understand people's daily experiences with their goals, and the role of different emotions in goal pursuit. This research will contribute to a doctoral dissertation.

Why have I been chosen?

Anyone is working on an important goal over next 7 days, can access the internet on their mobile phones and is 18 and over is eligible to participate.

Do I have to take part?

It is entirely up to you whether you choose to participate or not. Additionally, you can choose to withdraw from the study within 2 weeks after participating, by contacting the researchers and asking for your data to be deleted.

What will happen to me if I take part? What do I have to do?

If you decide to take part, you will receive a 4-digit unique identification number via text. Be assured that all answers you provide will be kept secretly confidential, you will need to provide this number every time when you access the survey. You will be asked to list one important goal that you are working on over next 7 days and to complete questions about yourself and your experience with the chosen goal. The goal should be one that is important to you or others and that you expect to make progress with but not necessarily complete within the next 7 days. The questionnaire will take approximately 15 minutes to complete, although individual completion times may vary depending on your computer system.

For the next seven days (from Monday to Sunday) you will be sent a text containing a web-link to enable you to complete the measures at three time-points during the day between the hours of 9 a.m. and 10 p.m. These questions will ask you to report your thoughts, feelings, and behaviours relating to your chosen goal. They will take approximately 5 minutes to complete each time.

What are the possible disadvantages and risks of taking part?

There are no expected problems arising from participating in the study. However, if participation makes you aware of any problems we advise you to withdraw from the study and consult your GP.

What are the possible benefits of taking part?

Although you yourself are unlikely to gain any advantages from taking part, you will be helping us conduct research that improves our understanding of the feelings people experience during goal pursuit.

Will my taking part in this project be kept confidential?

All of the information that is collected for this study will be kept confidential and stored in password protected files. Your data will only be accessible to members of the research team. You will not be able to be identified in any reports or publications unless you have given your explicit consent for this. If you agree to us sharing the information you provide with other researchers, then your personal details will not be included unless you explicitly request this.
You will be asked to provide your mobile phone number so that we can send you a web-link to the survey. You will be provided a unique identification number to access the survey. All your survey responses will be linked to the identification number only. The information you provide, including your mobile number, will be stored in a secure and separate file until such time as it is no longer needed (i.e., after the draw takes place and your surveys are matched). At that point it will be electronically deleted.

What is the legal basis for processing my personal data?

According to data protection legislation, we are required to inform you that the legal basis we are applying in order to process your personal data is that 'processing is necessary for the performance of a task carried out in the public interest' (Article 6(1)(e)). Further information can be found in the University's Privacy Notice https://www.sheffield.ac.uk/govern/data-protection/privacy/general.

What will happen to the data collected, and the results of the research project?

Your data will only be accessible to members of the research team. The results of the study will be written up and submitted as a doctoral thesis. Furthermore, the study will be submitted for publication in a social science or psychology journal. You will not be identifiable from any reports or publications of the study. The anonymised data will not be destroyed, and it is possible it will be made available to further research and other researchers.

Who is the Data Controller?

The University of Sheffield will act as the Data Controller for this study. This means that the University is responsible for looking after your information and using it properly.

Who has ethically reviewed the project?

This research has received ethics approval from the Department of Psychology Ethics Committee at the University of Sheffield.

What if something goes wrong and I wish to complain about the research?

If you encounter a problem or you wish to make a complaint, please email the research supervisor, Dr. Fuschia Sirois (f.sirois@sheffield.ac.uk) and Prof. Peter Totterdell (p.totterdell@sheffield.ac.uk)

If the complaint relates to how the participants' personal data has been handled, please find further information in the University's Privacy Notice: https://www.sheffield.ac.uk/govern/data-protection/privacy/general

Contact for further information

This research is being conducted by Sisi Yang, doctoral researcher. If there is anything that you are unsure of, or if you would like any more information, please contact Sisi Yang via email syang37@sheffield.ac.uk, or leave a telephone massage with the Department of Psychology on: +44 (0)114 222 6517, asking Sisi Yang to contact you.

Appendix 3.2. Consent Form for Study 2

CONSENT FORM

Please tick the appropriate boxes	**Yes**	**No**
Taking Part in the Project		
I have read and understood the project information sheet dated 20/06/2018 (If you will answer No to this question please do not proceed with this consent form until you are fully aware of what your participation in the project will mean.)		
I have been given the opportunity to ask questions about the project.		
I agree to take part in the project. I understand that taking part in the project will include completing a questionnaire.		
I agree to take part in the project. I understand that taking part in the project will be sent a text containing a web-link to complete the measures at three time-points during the day between the hours of 9 a.m. and 10 p.m.		
I understand that my taking part is voluntary and that I can withdraw from the study up to 2 weeks after participating; I do not have to give any reasons for why I no longer want to take part and there will be no adverse consequences if I choose to withdraw.		
How my information will be used during and after the project		
I understand my personal details such as name, phone number, address and email address etc. will not be revealed to people outside the project.		
I understand and agree that my words may be quoted in publications, reports, web pages, and other research outputs. I understand that I will not be named in these outputs unless I specifically request this.		
I understand and agree that other authorised researchers will have access to this data only if they agree to preserve the confidentiality of the information as requested in this form.		
I understand and agree that other authorised researchers may use my data in publications, reports, web pages, and other research outputs, only if they agree to preserve the confidentiality of the information as requested in this form.		
I give permission for the data that I provide to be deposited in the Dept. of Psychology at the University of Sheffield so it can be used for future research and learning		
So that the information you provide can be used legally by the researchers		
I agree to assign the copyright I hold in any materials generated as part of this project to The University of Sheffield.		

Do you wish to continue? To acknowledge that you have read and understood this information and would like to continue with the research study, please click on "I agree".

I Agree **No, Thank you**

Project contact details for further information:
This research is being conducted by Sisi Yang, PhD student, under the supervision of Dr. Fuschia Sirois (f.sirois@sheffield.ac.uk) and Prof. Peter Totterdell (p.totterdell@sheffield.ac.uk) from the

Department of Psychology at the University of Sheffield (address: Cathedral Court, The University of Sheffield, 1 Vicar Lane, Sheffield S1 2LT). If you would like any more information, please contact Sisi Yang via email syang37@sheffield.ac.uk.
If you feel that your complaint has not been handled to your satisfaction following this, please contact Dr Thomas Webb, Chair of the Department Ethics Subcommittee, Email: T.Webb@sheffield.ac.uk

Appendix 3.3. Questionnaires for Study 2

Goal Focus Scale

Instructions: Please click the number that represents how you think about your chosen goal from 1 (not at all) to 7 (very much).

1. Over the past day, how much did you think about what you have to do to achieve your goal?	1 2 3 4 5 6 7
2. Over the past day, how much did you think about what achieving your goal would be like?	1 2 3 4 5 6 7
3. To what extent is the pursuit of this goal a priority for you?	1 2 3 4 5 6 7
4. To what extent is the attainment of this goal a priority for you?	1 2 3 4 5 6 7

Goal Motivation Scale

Instructions: Listed below are a number of statements about reasons for pursuing your goal. Think about your chosen goal and decide whether you agree or disagree on a rating scale from 1 (Strongly disagree) to 9 (Strongly agree)

1. Because somebody else wants you to, or because you'll get something from somebody if you do	1 2 3 4 5 6 7 8 9
2. Because you would feel ashamed, guilty, or anxious if you didn't—you feel that you ought to strive for this	1 2 3 4 5 6 7 8 9
3. Because you really believe that it is an important goal to have — you endorse it freely and value it wholeheartedly	1 2 3 4 5 6 7 8 9
4. Because of the fun and enjoyment which the goal will provide you—the primary reason is simply your interest in the experience itself	1 2 3 4 5 6 7 8 9

Experimental-sampling Measures

The Ecological Momentary Assessment of Procrastination Scale

Instructions: Please think about the important goal that you listed in the previous survey and select True or False for the following statements (0 = False; 1 = True)

1. If I'm honest, putting off this goal is unnecessary	0 1
2. I'm putting off working on my chosen goal because another important goal arose that took priority.	0 1
3. Putting off this goal is due to circumstances that are beyond my control.	0 1
4. It is basically irrational to put off working on this goal.	0 1
5. It I think about it, putting off this goal makes me feel rather uncomfortable.	0 1

The Momentary Emotions Scale

Instructions: Please rate how you feel right now for each of the following emotions from 1 (*not at all*) to 5 (*Very much*)

Stressed	1 2 3 4 5
Worried	1 2 3 4 5
Anxious	1 2 3 4 5
Hopeful	1 2 3 4 5
Confident	1 2 3 4 5
Eager	1 2 3 4 5

The Mixed Emotions Scale

Instructions: Please circle the number that represents to what extent do you currently feel each of the following emotions in relation to the important goal that you listed in the previous survey. Please rate the items 1 (*not at all*) to 5 (*Very much*)

1. I'm feeling contrasting emotions	1 2 3 4 5
2. I'm feeling a mixture of emotions	1 2 3 4 5
3. I'm feeling different emotions at the same time	1 2 3 4 5
4. I'm feeling a combination of different emotions at the same time.	1 2 3 4 5

The Goal Conflict Scale

Instructions: Please rate the extent to which you agree with the following statements. Please rate the items 1 (*not at all*) to 5 (*Very much*).

1. Your current activity is having harmful effects on the chosen goal you are trying to achieve	1 2 3 4 5
2. Your current activity is competing for your time or resources to accomplish your chosen goal.	1 2 3 4 5
3. Your current activity is conflicting with your chosen goal.	1 2 3 4 5

Appendix 4.1. Participant Information Sheet for Study 3

Participant Information Sheet

Thank you for your interest in our study. Before you decide whether you would like to take part, it is important for you to understand why the research is being done and what it will involve. Please read the following information carefully to decide whether or not you wish to take part.

What is the project's purpose?

This research study aims to understand the role of thoughts, feelings, and behaviours during goal pursuit. This research will contribute to a doctoral dissertation.

Why have I been chosen?

Anyone is 18 and over and working towards an important goal over next 7 days is eligible to participate. Goals can be big or small, such as losing 5Lbs or writing an important paper or report.

Do I have to take part?

It is entirely up to you whether you choose to participate or not. Additionally, you can choose to withdraw from the study any time after participating, by contacting the researchers and asking for your data to be deleted.

What will happen to me if I take part? What do I have to do?

If you decide to take part, you will be asked to list one important goal that you are working on over next 7 days and to complete questions about yourself and your experience with the chosen goal. The goal should be one that is important to you or others and that you expect to make progress with but not necessarily complete within the next 7 days. The initial questionnaire will include questions about you and your personality and well-being, and take approximately 15-20 minutes to complete, although individual completion times may vary depending on your computer system.

36-48 hours after the initial survey, you will be emailed a web-link to the follow-up survey, and asked to report your thoughts, feelings, and behaviours relating to your chosen goal.

What are the possible disadvantages and risks of taking part?

There are no expected problems arising from participating in the study. However, if participation makes you aware of any problems, we advise you to withdraw from the study and consult your GP.

What are the possible benefits of taking part?

You will be given a chance to win 50 pounds Amazon Voucher after you successfully complete the initial survey and the follow up surveys. Furthermore, you will be helping us conduct research that improves our understanding of the role of thoughts, feelings, and behaviours that people experience during goal pursuit.

Will my taking part in this project be kept confidential?

Your data will only be accessible to members of the research team. Before you begin the experiment, you will be required to state your email address. We will use this email address to contact you and to match your responses to both experiments. The information you provide, including your email, will be kept confidential and stored in password protected files until such time as it is no longer needed (i.e. up to two weeks of final experiment and your surveys are matched). At that point it will be electronically deleted. We will then anonymise your data so that your responses cannot be traced back to you. As your data will be anonymised after your responses have been linked, you will not be able to be identified in any reports or publications that come from this data.

If you win the prize draw for this study, then you will be asked to electronically sign a form confirming that you have received this prize when you collect it. This form will be kept securely in a locked cabinet or as a digital copy for at 7 years after the end of the project, accessible by the University finance and administrative staff for reference in the event of a financial audit.

Can I withdraw at any time?

Your participation in this study is voluntary and you have the right to withdraw your data at any time up to two weeks after completing the second set of questionnaires, by contacting the researchers and asking for your data to be deleted. You can also withdraw before submitting your responses by closing your Internet browser.

What is the legal basis for processing my personal data?

According to data protection legislation, we are required to inform you that the legal basis we are applying in order to process your personal data is that 'processing is necessary for the performance of a task carried out in the public interest' (Article 6(1)(e)). Further information can be found in the University's Privacy Notice https://www.sheffield.ac.uk/govern/data-protection/privacy/general.

What will happen to the data collected, and the results of the research project?

Your data will only be accessible to members of the research team. The results of the study will be written up and submitted as a doctoral thesis. Furthermore, the study will be submitted for publication in a social science or psychology journal. You will not be identifiable from any reports or publications of the study. The anonymised data will not be destroyed, and it is possible it will be made available to further research and other researchers.

Who is the Data Controller?

The University of Sheffield will act as the Data Controller for this study. This means that the University is responsible for looking after your information and using it properly.

Who has ethically reviewed the project?

This research has received ethics approval from the Department of Psychology Ethics Committee at the University of Sheffield.

What if something goes wrong and I wish to complain about the research?

If you encounter a problem or you wish to make a complaint, please email the head of department, Professor Glenn Waller (g.waller@sheffield.ac.uk).

If the complaint relates to how the participants' personal data has been handled, please find further information in the University's Privacy Notice: https://www.sheffield.ac.uk/govern/data-protection/privacy/general

Contact for further information

This research is being conducted by Sisi Yang, a doctoral researcher. If there is anything that you are unsure of, or if you would like any more information, please contact Sisi Yang via email syang37@sheffield.ac.uk

Appendix 4.2. Consent Form for Study 3

CONSENT FORM

Please tick the appropriate boxes	**Yes**	**No**
Taking Part in the Project		
I have read and understood the project information sheet dated 30/06/2018 (If you will answer No to this question, please do not proceed with this consent form until you are fully aware of what your participation in the project will mean.)		
I have been given the opportunity to ask questions about the project.		
I agree to take part in the project. I understand that taking part in the project will include completing a questionnaire.		
I agree to take part in the project. I understand that taking part in the project will be sent an email after 36-48 hours after initial survey, containing a web-link to report my activities during a day.		
I understand that my taking part is voluntary and that I can withdraw from the study any time after participating; I do not have to give any reasons for why I no longer want to take part and there will be no adverse consequences if I choose to withdraw.		
How my information will be used during and after the project		
I understand my personal details such as name, address and email address etc. will not be revealed to people outside the project.		
I understand and agree that my words may be quoted in publications, reports, web pages, and other research outputs. I understand that I will not be named in these outputs unless I specifically request this.		
I understand and agree that other authorised researchers will have access to this data only if they agree to preserve the confidentiality of the information as requested in this form.		
I understand and agree that other authorised researchers may use my data in publications, reports, web pages, and other research outputs, only if they agree to preserve the confidentiality of the information as requested in this form.		
I give permission for the data that I provide to be deposited in the Dept. of Psychology at the University of Sheffield so it can be used for future research and learning		
So that the information you provide can be used legally by the researchers		
I agree to assign the copyright I hold in any materials generated as part of this project to The University of Sheffield.		

Do you wish to continue? To acknowledge that you have read and understood this information and would like to continue with the research study, please click on "I agree".

I agree **No, Thank you**

Project contact details for further information:
This research is being conducted by Sisi Yang, a doctoral researcher, under the supervision of Dr. Fuschia Sirois (f.sirois@sheffield.ac.uk) and Prof. Peter Totterdell (p.totterdell@sheffield.ac.uk) from

the Department of Psychology at the University of Sheffield (address: Cathedral Court, The University of Sheffield, 1 Vicar Lane, Sheffield S1 2LT). If you would like any more information, please contact Sisi Yang via email syang37@sheffield.ac.uk.
If you feel that your complaint has not been handled to your satisfaction following this, please contact Dr Thomas Webb, Chair of the Department Ethics Subcommittee, Email: T.Webb@sheffield.ac.uk

Appendix 4.3 Questionnaires for Study 3

The General Procrastination Scale-9

Instructions: Please be as honest and accurate as you can throughout. Try not to let your response to one statement influence your responses to other statements. There are no "correct" or "incorrect" answers. Answer according to your own feelings, rather than how you think "most people" would answer. Please rate the items from 1 (*False*) to 5 (*True*)

1. I often find myself performing tasks that I had intended to do days before.	1 2 3 4 5
2. Even with jobs that require little else except sitting down and doing them, I find they seldom get done for days.	1 2 3 4 5
3. I generally delay before starting work I have to do.	1 2 3 4 5
4. In preparing for some deadlines, I often waste time by doing other things.	1 2 3 4 5
5. I often have a task finished sooner than necessary.	1 2 3 4 5
6. I usually buy even an essential item at the last minute.	1 2 3 4 5
7. I usually accomplish all the things I plan to do in a day.	1 2 3 4 5
8. I am continually saying I'll do it tomorrow.	1 2 3 4 5
9. I usually take care of all the tasks I have to do before I settle down and relax for the evening.	1 2 3 4 5

The 15-item Multidimensional Perfectionism Scale

Instructions: Listed below are a number of statements concerning personal characteristics and traits. Please read each item and decide whether you agree or disagree and to what extent. Please rate the items from 1 (Strongly Disagree) to 5 (*Strongly Agree*)

1. One of my goals is to be perfect in everything I do.	1 2 3 4 5 6 7
2. It doesn't matter when someone close to me does not do their absolute best.	1 2 3 4 5 6 7
3. Anything I do that is less than excellent will be seen as poor work by those around me.	1 2 3 4 5 6 7
4. I strive to be as perfect as I can be.	1 2 3 4 5 6 7
5. I do not have very high standards for those around me.	1 2 3 4 5 6 7
6. I do not expect a lot from my friends.	1 2 3 4 5 6 7
7. I am perfectionistic in setting my goals.	1 2 3 4 5 6 7
8. I feel that people are too demanding of me.	1 2 3 4 5 6 7
9. Although they may not show it, other people get very upset with me when I slip up.	1 2 3 4 5 6 7
10. My family expects me to be perfect.	1 2 3 4 5 6 7
11. People expect nothing less than perfection from me.	1 2 3 4 5 6 7
12. I set very high standards for myself.	1 2 3 4 5 6 7
13. I must always be successful at school or work.	1 2 3 4 5 6 7
14. It does not matter to me when a close friend does not try their hardest.	1 2 3 4 5 6 7
15. I seldom expect others to excel at whatever they do.	1 2 3 4 5 6 7

Personal Meaning Scale

Instructions: Please take a moment to think about the goal that your listed previously and respond to the following statements as truthfully and accurately as you can. Please rate the items from 1 (Absolutely Untrue) to 5 (*Absolutely Ture*)

1. I understand my goal's meaning.	1 2 3 4 5 6 7
2. My goal has a clear sense of purpose.	1 2 3 4 5 6 7
3. I have a good sense of what makes my goal meaningful.	1 2 3 4 5 6 7
4. I have discovered a satisfying goal purpose.	1 2 3 4 5 6 7
5. My goal has no clear purpose	1 2 3 4 5 6 7

The Positive and Negative Affect Schedule

Instructions: Below is a list of different feelings and emotions. Please indicate to what extent you are currently experiencing each feeling or emotion about your goal listed above from 1 (*not at all*) to 5 (*very much*) on the series of dimensions listed below.

1. Afraid	1 2 3 4 5
2. Upset	1 2 3 4 5
3. Nervous	1 2 3 4 5
4. Scared	1 2 3 4 5
5. Distressed	1 2 3 4 5
6. Inspired	1 2 3 4 5
7. Alert	1 2 3 4 5
8. Excited	1 2 3 4 5
9. Enthusiastic	1 2 3 4 5
10. Determined	1 2 3 4 5

Appendix 4.4 Experimental Manipulation for Study 3

Experimental Manipulation

Meaning-making Group

For this next task, we would like you to think about the meaningful aspects of your goal, that is the ways your goal may have value for you. Please complete one or more of the following statements listed below about your goal, thinking about how meaningful different aspect are. In completing these statements, please write as much as you can about the personal meaning of your goal. A good answer should include at least 1-2 sentences per statement.

1. Completing this goal will be valuable to how I see myself, because _____
2. Completing this goal will be valuable to how others see me, because _____
3. Completing this goal will be valuable to my personal growth, because _____

Positive Emotions Manipulation Group

For this next task, we would like you to think about the aspects of your goal that make you happy. Please complete one or more of the following statements listed below about your goal, thinking about how the goal can make you happy. In completing these statements, please write as much as you can about the positive feelings of your goal. A good answer should include at least 1-2 sentences per statement.

1. Completing this goal will make me feel happy, because _____
2. Completing this goal will improve my mood, because _____
3. Completing this goal will make me feel more energized, because _____

Control Group

For this next task, we would like you to think about what you did yesterday.
Please complete one or more of the following statements listed below about how you spent your time yesterday. Please write as much as you can about what you did yesterday. A good answer should include at least 1-2 sentences per statement.

1. I woke up to an alarm clock at_____
2. I went outside to_____
3. I ate _____

Appendix 4.5. Follow-up Survey for Study 3

The Measure of Procrastination Behaviour

Instructions: We are interested in how you spent your time over the past day. Please complete the following grid that divides your previous day into 20-minute time intervals from **9am to 11pm.** Please indicate what you were doing during each interval, and whether you were putting off or avoiding doing something you had intended to do towards achieving your goal. It's fine to write in "asleep" if you are not awake during a particular interval. Also, you could record "U" in the time slot if you put off working on your goal because of circumstances that were "Unavoidable" (i.e., completely out of your control).

For example:

Time	Current Activity	Put off? Y/N/U
9:00-9:20	Watching TV	N

Time	Current Activity	Put off? Y/N/U	Time	Current Activity	Put off ? Y/N/U
9:00-9:20			9:20-9:40		
9:40-10:00			10:00-10:20		
10:20-10:40			10:40-11:00		
11:00-11:20			11:20-11:40		
11:40-12:00			12:00-12:20		
12:20-12:40			12:40-13:00		
13:00-13:20			13:20-13:40		
13:40-14:00			14:00-14:20		
14:20-14:40			14:40-15:00		
15:00-15:20			15:20-15:40		
15:40-16:00			16:00-16:20		
16:20-16:40			16:40-17:00		
17:00-17:20			17:20-17:40		
17:40-18:00			18:00-18:20		
18:20-18:40			18:40-19:00		
19:00-19:20			19:20-19:40		
19:40-20:00			20:00-20:20		
20:20-20:40			20:40-21:00		
21:00-21:20			21:20-21:40		
21:40-22:00			22:00-22:20		
22:20-22:40			22:40-23:00		