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Giving in When Feeling Less Good:

Procrastination, Action Control, and Social Temptations

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Abstract

Emotion-regulation perspectives on procrastination highlighting the primacy of short-term mood-regulation focus mainly on negative affect. Positive affect, however, has received much less attention, and has not been considered with respect to social temptations. To address this issue we examined how trait procrastination was linked to positive and negative affect in the context of social temptations across two prospective studies. Action Control Theory, Personality Systems Interactions Theory, and a mood-regulation theory of procrastination served as guiding conceptual frameworks. In Study 1, moderated mediation analyses revealed that low positive affect explained the link between trait procrastination and time spent procrastinating on academic tasks over a 48-hour period in a student sample ($N = 142$), and this effect was moderated by the presence of social temptations. Parallel results for goal enjoyment assessed at Time 2 were found in Study 2 with a community sample ($N = 94$) attempting to make intended health behaviour changes over a six-month period. Our findings indicate that procrastinators are at risk for disengaging from intended tasks when social temptations are present and positive task-related affect is low.

Keywords: Procrastination; social temptations; positive affect; negative affect; motivation; action control

Introduction

Procrastination is a problematic and ubiquitous form of self-regulation failure that has important negative consequences across multiple life domains including academics (Ferrari, Parker, & Ware, 1992; Hen & Goroshit, 2014), work life (Ferrari, 1992; Van Eerde, 2000), and health (Sirois, 2004, 2007). Whether conceived of as a situationally bound lapse in volition or as a chronic and trait-like tendency, procrastination is generally defined by researchers as the voluntary delay of important, necessary, and intended action despite knowing there will be negative consequences for this delay (Ferrari & Tice, 2000; Sirois & Pychyl, 2013). Behaviourally, procrastination often takes the form of disengaging from intended tasks which may have immediate costs (e.g., are difficult, boring or aversive) yet distant gains, to engage in activities that are more immediately rewarding.

Recent theoretical models highlight the role of emotions in procrastination. According to mood regulation models of procrastination (Pychyl & Sirois, 2016; Sirois & Pychyl, 2013; Tice & Bratslavsky, 2000), the temporal “trade-off” that occurs when people unnecessarily delay intended tasks reflects the prioritization of short-term mood regulation over long-term goal achievement. In short, choosing to engage in pleasurable activities rather than the intended task helps to regulate negative, or less positive, task-related mood (Sirois & Pychyl, 2013), or as some researchers have suggested, “we give in to feel good” (Tice & Bratslavsky, 2000). Consistent with this view, researchers have noted that people tend to procrastinate on tasks perceived to be aversive (Blunt & Pychyl, 2000; Pychyl, Lee, Thibodeau, & Blunt, 2000), and that procrastination is associated with avoidant coping (Sirois & Kitner, 2015).

This theory and research highlight that procrastination, whether it be momentary or habitual, is underpinned by a focus on regulating immediate mood. Much research has documented the links between procrastination and task-related negative affect (Ferrari, 1991;

Sirois, 2016; Solomon & Rothblum, 1984), and task frustration in particular (Blunt & Pychyl, 2000, 2005; McCown, Blake, & Keiser, 2012). Turning to positive emotions provides a novel view point for understanding when and why people procrastinate. The limited research on procrastination and positive emotions suggests that procrastination is linked to lower levels of positive affect (Balkis & Duru, 2015; Sirois, 2014b). Accordingly, when opportunity arises to experience positive emotions, people prone to procrastination may opt for that state, as opposed to the negative emotions associated with the intended task. Such processes may be particularly likely to occur the more people have the opportunity to engage in tempting activities. This may provide insight into how trait procrastination materializes in actual procrastinatory behaviour, as a function of positive affect, particularly when temptation is present.

A key advance in understanding procrastination may be then to distinguish the role of negative and positive affect leading frequent procrastinators to procrastinatory behaviour. In the present research we aimed to address this issue by investigating how trait and behavioural procrastination are associated with positive and negative task-related mood in the context of positive temptations. We also examined whether the presence of social temptations, which are opportunities to experience positive affect, would exacerbate the effect of positive affect in motivating procrastinatory behaviour. In addition to Sirois and Pychyl's (2013) temporal mood regulation model of procrastination, our research was informed by Kuhl's (1984) Action Control Theory and Personality Systems Interactions theory (PSI; Kuhl, 2000), which suggest that positive and negative affect have distinct but complementary roles in determining whether an individual is successful in shielding intended actions from competing action tendencies such as temptations.

A Mood-Regulation Perspective on Procrastination

From the perspective of a mood-repair conceptualization of procrastination (Sirois & Pychyl, 2013), regulation of immediate mood is prioritized over taking instrumental action towards achieving distal goals. Present self benefits from the immediate mood repair by “giving in to feel good” (Pychyl & Sirois, 2016; Tice & Bratslavsky, 2000), whereas the future self bears the burden of needless task delay because the intended goal is not reached. Negative mood is a common focus of this temporal trade-off; the source of this negative mood may, however, vary. For example, negative affective states can arise from the anticipation of having to complete an aversive task (G. L. Flett, Stainton, Hewitt, Sherry, & Lay, 2012; Solomon & Rothblum, 1984), or more generally from the negative self-evaluations and cognitions that are pervasive with procrastination (A. L. Flett, Haghbin, & Pychyl, 2016; McCown et al., 2012; Sirois, 2014c), and which may become heightened in the context of having to complete an undesirable task.

In terms of positive mood, Sirois and Pychyl (2013) argue that loss of positive mood regarding the task may promote procrastination. Recent evidence from a meta-analysis supports this notion, with findings that suggest low levels of state positive affect may narrow the temporal perspective of procrastinators and make it difficult for them take into account the future implications of their current behaviour choices, especially in the context of high levels of negative affect (Sirois, 2014b). This finding is consistent with the assertion that when we procrastinate, the present self does not anticipate the emotional consequences to future self (Sirois & Pychyl, 2013; Tappolet, 2010). Affect-driven short-sightedness, combined with a mindset that encourages becoming “absorbed in the moment” with pleasurable distractions as a means to escape from negative mood (Sirois, 2014a), may therefore heighten procrastinators’ sensitivity and responsiveness to goal-derailing situational temptations. This in turn permits them to make a hedonic shift from the negative affect associated with a task to the positive affect they

expect to experience by giving in to such temptations (Pychyl & Sirois, 2016).

Action Control, Mood-Regulation and Procrastination

According to Kuhl's (1984) Action Control Theory, successful translation of an intention into action depends on the control strategies used to bolster the intention and inhibit competing action tendencies. Among the different control processes involved in action control, two affect-related action control strategies are particularly relevant for understanding the role of affect in procrastination. The strategy of *motivation control* (promoting enjoyment of intended actions) can bolster resistance to situational temptations by increasing self-motivation for the intended task via increased positive affect. In contrast *emotion control* (disengaging from negative affective states that may interfere with acting on intentions) is posited to improve resistance to competing action tendencies by controlling the negative states that can monopolize energy and focus, and thereby reduce the allure of mood-repairing temptations. From an Action Control Theory perspective (Kuhl, 1984), poor motivation and emotion control can increase susceptibility to distractions from competing action tendencies and thus threaten the successful completion of intended action.

Theoretical and empirical accounts support the notion that procrastination is associated with poor motivation and emotion control. According to Kuhl (1985), individuals who are state oriented tend to become pre-occupied with past, present or future states, and accordingly have difficulty controlling the negative emotions associated with a difficult task. This orientation makes them more susceptible to giving in to less aversive or more enjoyable competing action tendencies, especially when motivation control is low (Kuhl, 2000). Not surprisingly, state orientation is associated with trait procrastination and perceptions of task aversiveness (Blunt & Pychyl, 1998, 2005). Indeed, experimental evidence indicates that state-oriented individuals tend

to delay or fail to initiate acting on intentions when levels of positive affect are low (Kazén, Kaschel, & Kuhl, 2008), a finding that is consistent with PSI theory (Kuhl, 2000) and the proposition that low positive affect is the main reason why state-oriented individuals fail to enact their intentions. There is also evidence that procrastinators become “absorbed in the moment” with more pleasurable tasks as a means to cognitively escape negative states (Sirois, 2014a). Taken together, this theory and research supports our proposition that procrastination may be linked to poor motivation and emotion control in the completion of intended tasks, and accordingly increase susceptibility to distractions from competing action tendencies.

Extending Action Control Theory, Kuhl’s (2000) PSI theory further proposes that biased activation of affect can influence key cognitive processes, such as intention memories, and the subsequent follow-through and implementation of intentions. From this perspective, positive affect facilitates intentions and especially the maintenance of intentions that are difficult because they cannot be carried out immediately, as well as their enactment. When levels of positive affect are low, it will therefore be difficult to follow-through with intentions that are difficult. Down-regulation of negative affect is also critical for enacting intentions, as negative affect interferes with access to extension memory networks. These networks are proposed to help people make connections between their goals and semantic networks that provide access to the meaningfulness, options for action, and personal values associated with a goal to facilitate flexible enactment under difficult circumstances (Kuhl, 2000). Thus, when negative affect is high, people may find it difficult to find meaning in their goal, and have difficulty finding different ways to cope with goal obstacles.

There are several points of convergence between an Action Control and PSI theory view (Kuhl, 1984; 2000) and a mood-regulation perspective (Sirois & Pychyl, 2013) of

procrastination. Each highlights a role for positive and negative affective states in procrastination, and support the notion that misregulation of mood, whether by failing to upregulate positive affect or down-regulate negative affect, can increase susceptibility to goal-derailing temptations. However, a mood regulation model of procrastination also suggests that a temporal perspective is needed to more fully understand the intra-personal processes underlying the prioritization of immediate mood over the consequences for the future self that characterize procrastination (Sirois & Pychyl, 2013). In effect, the disengagement from intended tasks which serves as a means to correct or improve immediate mood provides only temporary relief that can contribute to a continued cycle of making poor intertemporal choices with respect to tempting activities. Moreover, the high levels of negative and low levels of positive affect associated with procrastination may contribute to a present-orientated bias (Sirois, 2014b). Thus, both general and task specific affective states may make procrastinators more susceptible to choosing positive activities over intended tasks.

Procrastination and Positive Social Temptations

From the perspective of a mood-regulation theory of procrastination (Sirois & Pychyl, 2013), competing action tendencies, or temptations, serve a mood-regulating function that provides immediate relief from negative states associated with a challenging or aversive task. A necessary quality of these temptations, therefore, is that they offer an opportunity to alter mood either by providing escape or relief from current negative mood or by possibly providing a chance to experience a more positive mood than what is associated with the intended task. In the former situation, such temptations are consistent with research suggesting that people “give in to feel good” as a means to regulate negative mood (Tice & Bratslavsky, 2000; Tice, Bratslavsky, & Baumeister, 2001), whereas the latter instance reflects the notion that people “give in when

feeling less good”. Although this distinction may appear arbitrary, from an Action Control perspective (Kuhl, 1984) “giving in to feel good” is consistent with poor emotion control, whereas “giving in when feeling less good” may reflect poor motivation control to the extent that the individual is unable to evoke positive, motivating feelings for engaging in an action tendency. From a PSI theory perspective (Kuhl, 2000), low positive mood maintains intention memory and makes it difficult to take action to fulfill the intention, thus increasing susceptibility to intuitive behaviour control, such as conditioned responses to external cues (i.e., temptations), whereas high negative mood interferes with finding meaning and value in ongoing difficult goals, making alternative activities that provide more immediate meaning (i.e., temptations) more attractive. From a temporal mood regulation perspective (Sirois & Pychyl, 2013), both instances reflect prioritization of immediate mood at the expense of the future self.

The limited research available suggests an important role for temptation in procrastination. Dewitte and Schouwenburg (2002) found that although academic procrastinators did not intend to study less or postpone studying until just before exams, they nonetheless did, and the primary reason was a susceptibility to temptations, especially those of a social nature. Other research has documented that procrastinators tend to use social media such as Facebook as a means to disengage from the negative affect associated with unpleasant tasks (McCown et al., 2012). However, in one study trait procrastination levels were unrelated to resistance to temptations among students (Schouwenburg & Groenewoud, 2001), suggesting that there may be boundary conditions that limit the association between procrastination and temptations

The Current Research

Collectively, current theory and research suggest that affective states play a central role in

explaining why procrastinators have difficulty following through with an intended task (Blunt & Pychyl, 2000; Kuhl, 1984, 2000; Sirois, 2014a, 2014b; Sirois & Pychyl, 2013), and that procrastinators are susceptible to goal-derailing temptations (Dewitte & Schouwenburg, 2002). What is missing from extant research is a more complete understanding of how procrastinators' affective states, and especially positive affective states, may contribute to delaying an intended task, particularly in the presence of tempting positive social alternatives. Action Control Theory (Kuhl, 1984) suggests that the mood-regulation difficulties that characterize procrastination are reflective of poor emotion and motivation control, and that shielding action tendencies from goal-derailing temptations will be compromised under such circumstances. PSI theory (Kuhl, 2000) further suggests that failure to up-regulate positive affect and down-regulate negative affect can interfere with enacting intentions, and especially those that may be difficult because they cannot be immediately acted upon. Similarly, a mood-regulation model of procrastination highlights the cyclic nature of poor intertemporal choices that are driven by the prioritization of present mood over future outcomes (Sirois & Pychyl, 2013). However, these perspectives on the role of positive and negative affect in procrastination have not been previously tested with respect to both trait and situational procrastination.

The aim of the current research was to extend theory and research on the role of affect in procrastination by testing these hypotheses across two prospective studies of procrastination of intended tasks using Kuhl's (1984) Action Control Theory, PSI theory (Kuhl, 2000), and a mood-regulation view of procrastination (Sirois & Pychyl, 2013) as guiding conceptual frameworks. In both studies we examined the potential explanatory roles of emotion and motivation control in procrastination as a function of the presence of positive social temptations with tests of the indirect effects of trait procrastination on situational procrastination through

positive affect (motivation control) and negative affect (emotion control; see Figure 1). Consistent with previous research, we expected that trait procrastination would be associated with high negative affect (i.e., poor emotion control), and low positive affect (i.e., poor motivation control), particularly when the presence of positive social temptations is increased. We hypothesised that this poor action control in the face of temptation would explain procrastination in an academic context over a period of 24 hours (Study 1), and in a health behavioural change context over 6 months in a community sample (Study 2). These predictions align with Action Control Theory (Kuhl, 1984), PSI theory (Kuhl, 2000), and a temporal mood-regulation model of procrastination (Sirois & Pychyl, 2013), which suggest that the presence of situational temptations would strengthen the proposed associations of trait procrastination with poor motivation and emotion control, and therefore contribute to a greater tendency to procrastinate on intended tasks. In accord with previous research on procrastination and temptations (Dewitte & Schouwenburg, 2002), we tested the moderating role of positive social temptations for the links between procrastination and affect.

Study 1 - Academic Procrastination

In Study 1 we assessed the roles of general positive and negative affect as outlined by our model (see Figure 1) for procrastination of a short-term task. The prolific rates of procrastination among student populations and for academic tasks (Steel, 2007) make this an appropriate population for examining the role of affect in procrastination. Examining our hypothesized models with respect to an academic task provided several advantages. Academic tasks tend to be shorter in duration, have an expected timeline to assess delay, and can be considered necessary and important tasks with negative consequences if delayed. This latter point is especially important for distinguishing situational procrastination from other forms of strategic delay

(Pychyl, 2013). In accord with a temporal mood-regulation model of procrastination (Sirois & Pychyl, 2013), we examined general negative and positive affect as each are proposed to narrow the temporal focus of procrastinators (Sirois, 2014b), and thus encourage making poor intertemporal choices with respect to engaging in intended tasks and resisting temptations.

Methods

Participants and procedure. After receiving ethical clearance for the data collection from the Institutional Review Board, 154 students were recruited to participate in this study (53 percent male; mean age 20.42, SD = 4.08). Participants were asked to recall the most recent time they delayed working on a project/task to do something else for more than 15 minutes and to describe this event in an open-ended format. Following this description, participants completed closed-ended items pertaining to the event they had just described. Participants were contacted approximately 36-48 hours following their completion of the original questionnaire via e-mail and were asked to complete a short online survey, which included a measure that assessed their procrastination during the day following their participation in the first part of the study.

Measures. Descriptive information for each of the scales appear in Table 1.

General procrastination. General procrastination was assessed using the Lay procrastination measure (GPS; Lay, 1986), a 20-item scale that assesses global tendencies towards procrastination across a variety of tasks (e.g., In preparing for some deadlines, I often waste time by doing other things.) Participants rated their agreement with each item on a 5-point Likert scale (1 = *strongly disagree* to 5 = *strongly agree*). The items are averaged into a single score with high values indicating a higher tendency to procrastinate. The GPS has demonstrated good internal consistency previously (alpha = 0.82; Lay, 1986).

Positive and negative affect. State positive and negative affect were assess using the

PANAS scale (Watson, Clark, & Tellegen, 1988). Ten adjectives were used to assess positive affect (e.g., Enthusiastic) and 10 adjectives were used to assess negative affect (e.g., Upset). Participants rated the items on a 5 point Likert-type scale (1 = *not at all* to 5 = *extremely*). The items were averaged to create measures of positive and negative affect. Greater values are indicative of a greater momentary positive and negative affect.

Social temptations. Social temptations were assessed at Time 2 using 3 items (I avoided schoolwork to spend time with friends; I avoided schoolwork to party with friends; I avoided schoolwork to socialize online (e.g., Facebook)). Participants rated their agreement with each item on a 7-point Likert scale (1 = *strongly disagree* to 7 = *strongly agree*). The items were averaged to create a measure of social temptations. Greater values are indicative of greater experienced social temptations.

Situational procrastination. At Time 2 participants completed a grid that divided their day in 20-minute time intervals. Participants then were asked to indicate what they were doing during each interval. Once completed, participants were presented with the information and asked to indicate if at that time they were delaying or avoiding doing something they had intended to do. These 20 minute intervals were counted as procrastination intervals and summed into an index reflecting the number of minutes spent procrastinating.

Analyses

12 cases missing 20 percent or more on any of the key variables were removed using a listwise deletion prior to analyses. Thus, the final sample analysed was 142.¹ Correlation

¹ We conducted a post-hoc power analysis to determine $1 - \beta$ (power) for a multiple regression model as a function of α , population effect size parameter and the sample size. α was set at 0.05. We estimated the effect size parameter by reviewing previous research examining the relationship between trait procrastination and procrastinatory behaviors (e.g., Lay & Schouwenburg, 1993), as well as trait procrastination, affect and procrastinatory behavior (e.g., Sirois, 2004; Sirois, 2014). Past research suggested a range of effect sizes falling generally within the lower and upper boundaries of what is typically considered medium effect sizes based on Cohen (1988). Thus, we selected

analyses were first conducted to assess the interrelationships among the study variables. To investigate the role of emotional states for understanding the link between trait procrastination and situational procrastination, as well as the moderating influence of temptation tests of the indirect effects through positive affect (motivation control) and negative affect (emotion control) were conducted following the Preacher and Hayes (2008) procedure. The moderated mediation analyses were conducted using the SPSS macro PROCESS (Hayes, 2013) with 10,000 bootstrapping resamples, bias corrected 95 percent confidence intervals, and centering of all continuous variables.

Results

Descriptive results. Correlation analyses revealed that trait procrastination was significantly associated with spending more time procrastinating and reporting a greater number of social temptations (see Table 1). Both trait and situational procrastination were associated with lower levels of positive affect, but neither were significantly related to negative affect. The orthogonality of positive and negative affect was also demonstrated by their non-significant correlation.

Moderated mediation. The test of the mediation model found that higher general procrastination scores at Time 1 were significantly associated with lower levels of positive affect, which in turn was associated with a greater amount of time spent procrastinating at Time 2 (see Table 2). However, general procrastination was not significantly linked to levels of negative affect. Negative affect was also not associated with the time spent procrastinating. The test of the indirect effects of general procrastination on situational procrastination through positive

a medium effect size; specifically, $f^2 = 0.15$ in line with Cohen (1988). As a reminder number of predictors to test the moderated-mediation was 5. Results of the analysis suggested a $1 - \beta$ (power) estimate of 0.9568.

affect and negative affect, was significant for positive affect, but not for negative affect (see Table 2). The direct effect of general procrastination on situational procrastination was not significant after accounting for the contributions of the mediators ($b = 10.99$, $SE = 6.93$, 95 % CI: -2.72 , $.24.70$), supporting mediation via positive affect.

For the moderator, social temptation, scores were not significantly associated with either positive affect or negative affect (Table 2). However, the interaction of general procrastination and social temptations was significant for positive affect but not for negative affect (see Table 2). This indicated that as perceived social temptations increased, the association between general procrastination and low positive affect increased.

Estimates for the conditional indirect effects of general procrastination on situational procrastination through positive and negative affect by the degree of social temptation (-1SD, mean and +1SD) were generated using bootstrapping (10 000 resamples) with the PROCESS macro (Hayes, 2013). The significance of the conditional indirect effects was assessed with the index of moderated mediation (IMM; Hayes, 2015). The IMM for the conditional indirect effects of general procrastination on situational procrastination was significant for positive affect, $IMM = 4.69$, $SE = 1.94$, $[1.64, 9.67]$, but not for negative affect, $IMM = -.55$, $SE = 1.23$, $[-4.94, .66]$.

As can be seen in Table 3, positive affect mediated the effect of general procrastination on the time spent procrastinating only when perceived social temptation levels were high and moderate, but not when social temptation was low. The largest effects were seen when levels of social temptation were high. However, the indirect effects of general procrastination on situational procrastination were not significant at any level of social temptations.

Study 2 – Health Behaviour Procrastination

In this study we sought to replicate and extend the findings from Study 1 in several ways.

First we tested our hypothesized models with task-specific positive and negative affective states – enjoyment and frustration – rather than the general negative and positive affect we examined in Study 1. From the perspective of Action Control Theory (Kuhl, 1984) goal-specific affect is particularly important in understanding whether intended actions are shielded from competing distractions through the processes of emotion control (reducing negative affect) and motivation control (enhancing positive affect for the intended goal). We also focused on a long-term goal rather than a short term task by examining the procrastination of intended health behaviours over a six-month period in a community sample. Health behaviour procrastination at Time 2 was therefore operationalised as failing to successfully follow-through with the intended health behaviours stated at Time 1. Health behaviour changes are goals that people commonly procrastinate on as demonstrated by the poor rates of adherence to self-set diet and exercise goals (Dishman, 1991; Knäuper, Cheema, M., & Borten, 2005). Moreover, trait procrastination is consistently linked to the practice of fewer health-promoting behaviours (Sirois, 2004, 2007; Sirois, Melia-Gordon, & Pychyl, 2003), making health behaviours a very relevant focus for testing our model. Although Study 1 did not find support for the role of negative affect in procrastination of a short-term task, we expected that, in the context of a longer term goal, which from a PSI theory (Kuhl, 2000) perspective necessarily involves enacting difficult intentions, negative affect may be more disruptive to goal completion. In addition, failure to engage in health-promoting behaviours may be more threatening than failure to engage in academic tasks, and therefore make negative affect more disruptive to goal completion.

Methods

Participants and procedure. A total of 210 adults (67 % female) aged 16 to 73 (Mean age = 34.2, SD = 14.3) were enrolled in the two-part study at Time 1. See Table 3 for a complete

listing of the demographic characteristics of those who participated at both time points, as well as those who did not complete the follow-up study. Participants were recruited using convenience sampling from the community with flyers, newspaper ads, and a recruitment booth set up at the local mall. Recruitment continued until a minimum of 200 participants had been screened and enrolled in the study, to account for possible attrition at time 2. Ethical clearance for the data collection was obtained from the Institutional Review Board prior to data collection. The data analysed in this study was part of a larger research study examining predictors of health behaviours. Only the measures relating to the *a priori* hypotheses are listed.

Procedure

Potential participants were first screened to ensure that they were planning on making one or more health behaviour changes in the next six months, that they had not already started to make these changes, and that they were local residents. Eligible participants were given a mail-in survey package (by mail or in person depending on the point of initial contact). The Time 1 (T1) survey included questions about the participants' intended healthy changes, and a measure of trait procrastination. Participants who returned the survey package at T1 received a \$15 mall gift card. Those who indicated at T1 that they were interested in being contacted for a possible Time 2 participation were contacted approximately 6 months later.

For the follow-up study, 94 people agreed to participate. A post hoc power analysis using the T2 sample with an expected medium effect size (see Study 1 rationale), and 5 predictors for the moderated mediation model suggested a $1 - \beta$ (power) estimate of 0.9813. Reasons for non-participation included contact details changing due to moving, and non-response. The Time 2 (T2) measures were completed either in person via interview and survey, or by mail survey in the event that a mutually convenient participation time could not be

arranged, or if the participant had moved out of town. The survey included measures of social temptations, goal-specific emotions, and participants were interviewed about their success in making their intended healthy changes. Those who participated in person received a \$30 gift card and those who participated by mail survey received a \$20 gift card.

Measures. Table 5 provides an overview of the measure descriptives and psychometric properties.

Health procrastination. At Time 1 participants listed up to three different health behaviour changes that they intended to make in the next six months and ranked these behaviours from most important (1) to least important (3). At Time 2 participants rated their success in making the healthy changes they had listed at Time 1 on a Likert-type scale ranging from 1 for *not at all successful* to 10 for *very successful*. An index was created by taking the mean of the success ratings across the three healthy changes. For ease of interpretation this score was reverse keyed such that *higher values indicated less success in making the intended healthy changes and therefore reflected health-related procrastination*. This operationalisation of health procrastination is consistent with current definitions of procrastination that highlight that procrastination is not simply delay or lack of success, but rather failing to follow through with an *intended* important task (Ferrari & Tice, 2000; Steel, 2007). Because the health behaviour changes were ones that the participants' themselves stated that they intended to change within the 6-month time frame of the study, failing to follow-through with them can be considered health procrastination.

Trait procrastination. At Time 1 participants completed Lay's General Procrastination scale (GPS; Lay, 1986).

Intentions for healthy change. At Time 1 participants rated the strength of their intentions

to make each of their healthy changes on a 9-point scale from 1 (*No intention, not likely at all that I will follow through*) to 9 (*Very strong intentions, I am certain that I will follow through*). Each of the three intention ratings was then averaged to form an overall mean healthy change intention score which was controlled for in the analyses.

Positive social temptations. Positive social temptations relevant to making healthy changes were assessed at Time 2 with a scale adapted from the Situational Temptations Inventory (STI; Velicer, Diclemente, Rossi, & Prochaska, 1990). The STI measures temptations during smoking cessation attempts but has also been successfully adapted to assess temptations associated with dietary changes (Rossi et al., 2001). For the purposes of this study we adapted four items from one of the three STI subscales relevant for general health behaviours and related to the source of temptations, positive social temptations, to reflect temptations that could be encountered while making healthy changes in general rather than being specific to smoking behaviour. All items begin with the stem “While trying to make my healthy behaviour change(s), I am tempted...” followed by specific situations related to positive social situations (“When I’m out having a good time celebrating with friends”). Response options range from 1 for *not at all tempted* to 5 for *extremely tempted*.

Task-specific emotions. How participants felt about the healthy changes they were trying to make were assessed at Time 2 using Little’s (1983) Personal Project rating matrix. Participants listed their three healthy change projects and assigned each a score for an emotion ranging from 0 (if they did not feel the emotion at all), to 10 (if they felt the emotion very strongly). We were interested in the ratings for two task-specific emotions that corresponded to Kuhl’s (1984) Action Control Theory: a negative emotion - frustration (emotion control), and a positive emotion - enjoyment (motivation control). An index for each was created by averaging

the ratings for all three projects.

Analyses

Prior to conducting the main analyses, potential differences between the Time 2 responders and non-responders on the demographic variables and trait procrastination were conducted using Fisher's Exact test, 2 sided, independent sample *t*-tests, and Pearson chi-square test, 2 sided, as appropriate. Correlational analyses were again conducted on the study variables. To investigate the role of action control for understanding the link between trait procrastination and health procrastination, tests of the indirect effects through task enjoyment (motivation control) and task frustration (emotion control) were conducted following the same procedures used in Study 1. For this study, however, the Time 1 intentions to make the healthy changes index was added as a covariate in the models to control for potential differences in goal intentions, as differences in intentions can account for differences in actual health behaviour changes (Ajzen, 1998). Moderation of the action path between trait procrastination and goal enjoyment and frustration were each tested using the same moderated mediation approach (PROCESS model 7; Hayes, 2013) as in Study 1 with Time 1 goal intentions added as a covariate.

Results

Preliminary analyses. Analyses to determine if those who agreed to participate at Time 2 differed from those who did not participate found no significant differences on any of the demographic characteristics, or with trait procrastination (see Table 4).

Participants listed a variety of intended healthy changes, the majority of which focused on two related themes: eating healthier and becoming more physically active. A small number of participants also listed quitting smoking as their health goal.

Descriptive results. Correlation analyses revealed the expected positive associations between trait procrastination, health procrastination, and goal-specific frustration (see Table 5). Procrastination was also negatively correlated with task-specific enjoyment, which was in turn negatively correlated with health procrastination, positive social temptations, and task-specific frustration. The behavioural intention index was not significantly correlated with any of the other study variables. Nonetheless, it was retained as a covariate in the models tested.

Moderated mediation. Consistent with our hypotheses, higher trait procrastination scores at Time 1 were significantly associated with lower levels of goal enjoyment and higher levels of goal frustration at Time 2, which in turn were each associated with a greater degree of procrastination on a self-selected health goal at Time 2 (see Table 6). The tests of the indirect effects of trait procrastination on health procrastination through goal enjoyment and goal frustration, controlling for Time 1 goal intentions, were significant for both mediators (Table 6). In addition, the direct effect of trait procrastination on health procrastination was not significant after accounting for the contributions of the two mediators ($b = .28$, $SE = .27$, 95 % CI: $-.25$, $.82$), supporting mediation via goal enjoyment and goal frustration.

With respect to the moderator, social temptation, scores at Time 2 were negatively associated with goal enjoyment at Time 2, but were not significantly associated with goal frustration at Time 2 (Table 6). Accordingly, the interaction of trait procrastination and social temptations was significant for goal enjoyment, but not for goal frustration (Table 6), indicating that as perceived social temptations increased, the association between trait procrastination and lower goal enjoyment increased.

Estimates for the conditional indirect effects of trait procrastination on health procrastination through goal enjoyment and goal frustration as a function of the degree of

perceived social temptation (-1SD, mean and +1SD) were generated using bootstrapping (10 000), using the Hayes (2013) macro PROCESS. Results revealed a significant index of moderated mediation (IMM), $IMM = .17$, $SE = .10$, $[.03, .40]$, for goal enjoyment. The coefficients for the conditional indirect effects revealed that low goal enjoyment mediated the effect of trait procrastination on health procrastination when perceived social temptation was high and moderate, but not when social temptation was low (see Table 7), with the largest effects for high levels of social temptation.

For goal frustration (see Table 7), at high and moderate levels of social temptations, the indirect effects of trait procrastination on health procrastination were significant. However, the IMM for goal frustration was not significant, $IMM = .07$, $SE = .06$, $[-.01, .24]$, indicating that the indirect effects through goal frustration did not differ significantly according to the level of social temptation.

Following the guidelines proposed by Simmons and colleagues (Simmons, Nelson, & Simonsohn, 2011) for reducing the rate of false positive findings, the above models were also run without the covariate, goal intentions. The results were similar to those that included the covariate. The indirect effects through goal enjoyment remained significant ($b = -.27$, $SE = .07$, 95 % CI: $-.41, -.14$), whereas the indirect effects through goal frustration were not significant ($b = -.27$, $SE = .07$, 95 % CI: $-.41, -.14$). The interaction between procrastination and social temptations also remained significant ($b = -.69$, $SE = .29$, 95 % CI: $-1.27, -.11$). The test of moderated mediation was significant for goal enjoyment, $IMM = .19$, $SE = .10$, $[.04, .44]$, but not for goal frustration, $IMM = .05$, $SE = .05$, $[-.01, .22]$.

Discussion

Across two prospective studies examining different types of procrastination over different

periods of times, we replicated our expected patterns of results that low positive affect mediates procrastinators' unnecessary delay of intended short-term and long-term tasks. In Study 1, trait procrastination was associated with low levels of positive affect for intended study related tasks, and these low levels of positive affect were associated with greater amount of time spent procrastinating among students. In Study 2, lack of enjoyment in making intended health behaviour changes explained why procrastinators were less successful in making healthy changes over a six-month period. More importantly, both studies also revealed that the presence of social temptations, which enhances the opportunity to experience positive affect for a task other than the intended one, moderated the effect of positive affect. This replicated finding provides a clear pattern of results supporting the notion that people will “give in when feeling less good”. This finding is consistent with a mood-regulation perspective of procrastination (Sirois & Pychyl, 2013), Action Control Theory (Kuhl, 1984), and to some degree PSI theory (Kuhl, 2000), and to the best of our knowledge, demonstrates for the first time that social temptations may be a particular threat to task completion for procrastinators when positive affect for a task is low. This research expands on other conceptualisations of procrastination as an irrational decisional trade-off focused on the utility of immediate versus distal rewards (Ainslie, 1975; Steel, 2007), by highlighting the additional importance of affect, and positive affect in particular, for understanding procrastination.

With respect to positive and negative affect, our findings are in accord with the proposed role of affective states in action control (Kuhl, 1984), and in facilitating/inhibiting access to cognitive networks involved in assessments of meaning (Kuhl, 2000). Low levels of positive affect, whether in general or specifically related to an intended task, may be particularly problematic for procrastinators possibly because the allure of competing activities may be that

much brighter when it is difficult to find something enjoyable or meaningful about a task that needs to be completed. In this regard, procrastination may be understood not just as an instance of “giving in to feel good” when negative affect is high (Tice & Bratslavsky, 2000), but also as “giving in when feeling less good” when task positive affect is low relative to other more positive activities. If we consider also that the self-motivation needed to up-regulate positive affect is itself an executive function, and that temptation can impair executive functioning (Hofmann, Friese, & Roefs, 2009), then this may also explain why the links between procrastination and affect were stronger under conditions of high social temptation. Nonetheless, each of these perspectives reflect the short-term mood regulation difficulties proposed to contribute to procrastination (Sirois & Pychyl, 2013), although our findings suggest a more prominent role for low positive affect than high negative affect in task completion.

There are several reasons why negative affect explained situational procrastination in Study 2, but did not in Study 1. One interpretation is that there are potential boundary conditions under which poor emotion control may contribute to procrastination. The findings from Study 2 suggest that difficulty regulating task-related frustration in particular, as opposed to negative affect more generally (Study 1), may be key for understanding the role of negative affect, and thus, poor emotion control in procrastination. This interpretation is consistent with previous research which found that task frustration was a key component of task aversiveness that was also associated with procrastination (Blunt & Pychyl, 2000). Similarly, one study found that a composite measure of five forms of negative affect over a five day period was unrelated to procrastination (Pychyl et al., 2000). Alternatively, it may be that poor control of negative affect may not be such a liability for procrastinators engaged in short-term tasks, as negative affect may be more adaptive in this situation in that it orients focus towards immediate concerns (Sirois,

2014b). For long-term tasks where a focus on the future is adaptive; however, low levels of positive affect and high levels of negative affect may be particularly detrimental for procrastinators. To the extent that negative affect orients one's focus to more immediate rather than distal concerns and low positive affect narrows the temporal focus away from the future (Sirois, 2014b), these affective states may disrupt the focus on the future actions necessary for successful action control and completion of long-range tasks (Kuhl, 2000). This proposition is also consistent with PSI theory (Kuhl, 2000), which suggests that low positive affect and high levels of perseverative negative affect disrupt one's ability to access cognitive networks that can provide a meaningful, "big picture" perspective on one's goals, and the action options available to successfully follow-through on intentions to realise these goals. Finally, the nature of the goals may have played a role, and not simply the time to achieve the goal. As noted previously, the threats associated with not achieving health goals (e.g., increase risk for disease, loss of self-esteem due to body image concerns, lack of energy, etc.) can be viewed as more threatening than not following through with academic tasks.

Nonetheless, theory and research also suggest that it is frustration in the context of a longer range task that can threaten task completion for procrastinators. Kuhl's (1984) Action Control Theory suggests that continuous frustrations with completing a difficult task can lead to rumination focused on task-irrelevant emotions that can interfere with taking instrumental action towards intended tasks. Research supports this proposition as one study found that task frustration was the key negative emotion reported across each action stage of procrastinators projects (Blunt & Pychyl, 2000). Moreover, a temporal mood-regulation perspective of procrastination (Sirois & Pychyl, 2013) together with findings from a meta-analysis of procrastination and time perspective (Sirois, 2014b), indicate that negative affect orients

procrastinators' focus towards the immediate and away from the future outcomes of their actions. Further research examining specific negative affective states over both short and long term tasks is needed to provide insights into these issues. In addition, future studies could directly test the role of temporal focus in relation to affect and procrastination with respect to goal intentions and attempts to act on these intentions to provide stronger support for a temporal mood regulation view of procrastination (Sirois & Pychyl, 2013) suggested by the current findings.

From the lens of PSI theory (Kuhl, 2000) it could also be argued that frustration reflects *inhibition* of positive affect rather than being a negative affective state. Indeed, Kuhl has suggested that when an individual is confronted with unexpected failure, there can be an inhibition of positive affect that arises as a result of the associated frustration. This view would suggest that the findings from Study 2 better support a low/inhibited positive affect explanation of procrastination, and together with the Study 1 results, suggest less of a role for negative affect. However, we would argue that frustration is nonetheless a negative and aversive affective state, despite the proposition that it contributes to the inhibition of positive affect, and therefore procrastination (Kuhl, 2000).

In the current studies we examined social temptations, and therefore it is not clear whether other types of temptations may have a similar moderating effect on the procrastination-low positive affect relationship we found. For example, Kuhl and Fuhrman (1998) distinguish between motivational and attentional temptations, with the former having a greater ability to distract due to their meaning and therefore requiring volitional or pre-frontal cortical intervention in order to resist. If we consider social temptations as meaningful, motivational temptations, and that procrastination is linked to poor executive functioning (Gustavson, Miyake, Hewitt, & Friedman, 2015; Rabin, Fogel, & Nutter-Upham, 2011), then it is not surprising that the lure of

socially-based activities strengthened the relationship between procrastination and poor motivation control across both studies. In addition to being abundant, social temptations may be particularly difficult to resist because they offer opportunities to increase positive affect both through social interaction and through engaging in desirable alternative activities. It is also possible then that other motivationally-based temptations, that is, competing action tendencies that hold some personal meaning, may similarly disrupt motivation control for procrastinators' intended tasks.

Strengths, Limitations, and Future Directions

The current research has several strengths and limitations that warrant mention. Testing the role of general and specific positive and negative affect in procrastination across two prospective studies, with student and community samples, and short and long-term intended tasks are clear strengths. The longitudinal design in Study 2 permitted an examination of the role of affect and social temptations in unsuccessful attempts at making intended healthy changes among a community sample of adults who knew they had a six-month window of opportunity in which to make these changes. Consonant with the definition of procrastination as a voluntary failure to completed important and intended tasks (Lay, 1986), we viewed this lack of success as a proxy for health procrastination. However, there are a number of reasons why people may not have been successful in their attempts to follow-through with their health goal intentions. In this respect our assessment of health procrastination is a conservative and crude estimate that may underestimate the associations between trait procrastination, affect, and health procrastination. Future research focusing on the voluntary reasons for health goal non-completion would provide a more accurate account of the associations suggested by the current research.

The high attrition rate over the six months of the study resulted in a reduced sample size

at T2 which may have limited the power to detect significant associations among the study variables, such as the possible moderating role of social temptations in the procrastination-frustration relationship. Moreover, task-related affect was rated only once at the six-month follow-up which did not permit a more dynamic assessment of the proposed roles of affective states for strengthening or weakening resistance to temptations while participants were engaged in trying to make their healthy change. Nonetheless, recent longitudinal research suggests that daily affect is surprisingly stable over a two-year period, due in part to associations with trait-like qualities (Hudson, Lucas, & Donnellan, 2016). An important future research objective would be to assess affective states at multiple time points to clarify their stability in terms of how they interact with temptations as individuals struggle to follow through with their intended goals. As previously noted, examining how other specific positive and negative affective states are linked to procrastination for short and longer term tasks is needed to more fully understand their roles. Finally, future research may also explore whether similar results would be obtained if the action and state-orientations suggested by Action Control Theory (Kuhl, 1984) were used in place of trait procrastination.

Conclusion

Whereas previous theory and research has conceptualized procrastination as an instance of “giving in to feel good” (Tice & Bratslavsky, 2000; Tice et al., 2001), the current findings are novel by suggesting a key role for positive task-related affect in procrastination and “giving in when feeling less good”. To our knowledge, this research demonstrates for the first time that procrastinators are particularly at risk for disengaging from intended tasks when social temptations are present and positive affect for a task is low. Consistent with Action Control and Personality Systems theories (Kuhl, 1984; 2000), and a temporal mood regulation view of

procrastination (Sirois & Pychyl, 2013), focusing on the aspects of ongoing tasks that cultivate enjoyment and positive affect may increase motivation and broaden procrastinators' temporal perspective to help shield their tasks from tempting social activities that might otherwise derail intended actions towards successful completion of short-term and long-term tasks.

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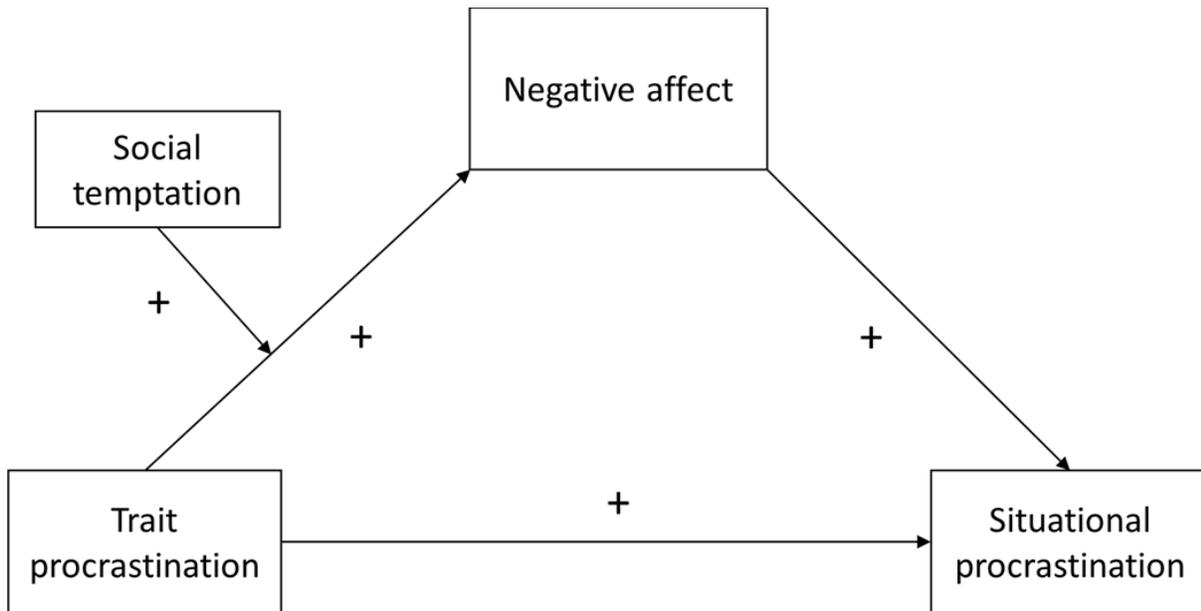
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Panel A



Panel B

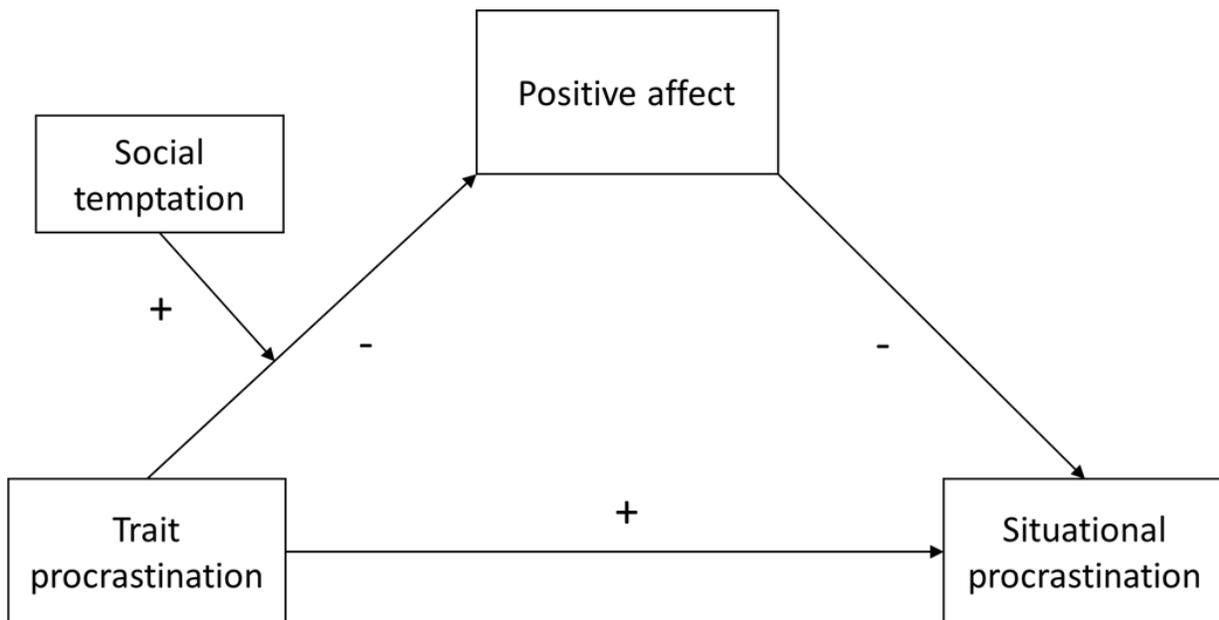


Figure 1. Conceptual models of the proposed relationships among procrastination, negative affect (Panel A), positive affect (Panel B), and social temptations.

Table 1

Pearson Correlations among Procrastination, Social Temptations, and Affective States for Study 1 (N = 142).

Variable	1	2	3	4	5
1. Trait procrastination	---				
2. Academic procrastination	.23**	---			
3. Positive social temptations	.17*	.00	---		
4. Positive affect	-.31**	-.37**	-.10	---	
5. Negative affect	.13	-.01	-.06	-.10	---
Mean	3.16	83.80	4.17	2.35	2.44
Standard deviation	0.58	48.6	1.28	0.87	0.96
Cronbach's alpha	.85	---	.66	.90	.92

*Note: *p < .05, **p < .01*

Table 3

Model Coefficients for the Conditional Indirect Effects of General Procrastination on Situational Procrastination for Positive Affect (PA) and Negative Affect (NA) as a Function of Degree of Social Temptation (ST)

Mediator: Positive Affect		Indirect Effect			
		Estimates		95% CI	
Social temptation		Effect	Boot SE	Lower	Upper
Low (-1SD)	-1.28	-0.05	4.12	-6.56	9.50
Mean	0.00	5.93	3.42	1.11	14.56
High (+1SD)	1.28	11.91	4.33	4.89	22.18

Mediator: Negative Affect		Indirect Effect			
		Estimates		95% CI	
Social temptation		Effect	Boot SE	Lower	Upper
Low (-1SD)	-1.28	0.33	1.50	-1.18	6.31
Mean	0.00	-0.37	1.03	-4.12	0.71
High (+1SD)	1.28	-1.07	2.20	-8.62	1.31

Note: 95% CI = Bias Corrected and accelerated 95 percent confidence intervals; SD = Standard deviation; Boot strapping analyses was conducted with 10,000 resamples; SE and CI generated through bootstrapping.

Table 4

Study 2 Demographic Characteristics of Time 1 and 2 Responders and Non-responders

Characteristic	Responders		Non-responders	<i>p</i> (*)
	T1 <i>N</i> = 210	T2 <i>N</i> = 94	T2 <i>N</i> = 115	
Sex (% female)	67.6	70.2	65.2	0.46 (1)
Age (SD)	34.2 (14.3)	36.9 (14.9)	32.2 (13.6)	0.30 (2)
Range	16 - 73	18 - 73	16 - 72	
Ethnicity (% Caucasian)	65	62.6	70.6	0.14 (1)
Employment status (%)				
Full-time	36.8	39.4	35.1	0.46 (3)
Part time	25.8	23.4	28.1	
Unemployed / retired	31.6	33.0	29.8	
Disabled	5.7	4.3	7.0	
Education (%)				
High school or less	19.6	20.2	23.0	0.69 (3)
University	67.5	64.9	69.1	
Graduate school	12.8	14.9	11.5	
Relationship status (%)				
Married/Living with significant other	51.7	59.1	45.6	0.25(3)
Separated/divorced /widowed	12.5	10.8	14.1	
Never married	35.9	30.1	40.4	

Note. *SD* = standard deviations; T1 = Time 1; T2 = Time 2

*(1) Based on Fisher's Exact test, 2 sided, (2) based on an independent sample *t*-test, (3) based on a Pearson chi-square test, 2 sided.

Table 5

Pearson Correlations among Procrastination, Behaviour Intentions, Temptations, and Affective States, Study 2 (N = 95).

Variable	1	2	3	4	5	6
1. Trait procrastination	---					
2. Health procrastination	.26**	---				
3. T1 Behavioural intentions	-.04	-.11	---			
4. Positive social temptations	.22*	.11	-.17	---		
5. Goal-specific frustration	.20*	.31**	-.18	.09	---	
6. Goal-specific enjoyment	-.29**	-.47**	.11	-.42**	-.27**	---
Mean	2.38	5.68	6.99	3.09	4.29	5.12
Standard deviation	.63	1.75	.93	.94	2.41	2.40
Cronbach's alpha	.88	.35	.54	0.81	.59	.66

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

Table 6

Model Coefficients for the Indirect and Conditional Effects of Trait Procrastination (PRO) on Health Procrastination (HP) Through Goal Enjoyment (GE) and Goal Frustration (GF) as a Function of Social Temptations (ST), Controlling for Time 1 Goal Intentions, for Study 2.

Antecedent	Consequent											
	Goal enjoyment				Goal frustration				Health procrastination			
	Estimates		95% CI		Estimates		95% CI		Estimates		95% CI	
	<i>b</i>	<i>SE</i>	Lower	Upper	<i>b</i>	<i>SE</i>	Lower	Upper	<i>b</i>	<i>SE</i>	Lower	Upper
PRO	-.91	.34	-1.57	-.24	1.14	.40	.34	1.94	.35	.27	-.18	.88
GE	--	--	--	--	--	--	--	--	-.27	.07	-.41	-.13
GF	--	--	--	--	--	--	--	--	.08	.06	.05	.20
ST	-.80	.24	-1.26	-.33	.54	.28	-.03	1.11	--	--	--	--
PRO x ST	-.68	.29	-1.23	-1.01	.51	.35	-.18	1.20	--	--	--	--
Constant	5.10	2.04	1.03	9.16	7.49	2.26	3.01	11.98	7.29	1.28	4.76	9.83
	$R^2 = .245$				$R^2 = .150$				$R^2 = .247$			
	$F(4, 89) = 8.65, p < .0001$				$F(4, 89) = 6.18, p < .001$				$F(4, 89) = 9.52, p < .0001$			

Note: Boot strapping analyses was conducted with 10,000 resamples; SE and CI were generated through bootstrapping

Table 7

Model Coefficients for the Conditional Indirect Effects of Trait Procrastination (PRO) on Health Procrastination (HP) for Goal Enjoyment (GE) and Goal Frustration (GF) as a Function of Social Temptations (ST) for Study 2.

Mediator: Goal Enjoyment		Indirect Effect			
		Estimates		95% CI	
Social temptation		Effect	Boot SE	Lower	Upper
Low (-1SD)	-1.03	.05	.11	-.20	.27
Mean	0.00	.23	.11	.07	.50
High (+1SD)	1.03	.40	.17	.15	.84

Mediator: Goal Frustration		Indirect Effect			
		Estimates		95% CI	
Social temptation		Effect	Boot SE	Lower	Upper
Low (-1SD)	-1.03	.08	.09	-.02	.37
Mean	0.00	.15	.10	.01	.40
High (+1SD)	1.03	.22	.13	.02	.56

Note: 95% CI = Bias Corrected and accelerated 95 percent confidence intervals; SD = Standard deviation; Boot strapping analyses was conducted with 10,000 resamples.