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Out of Sight, Out of Time? A Meta-Analytic Investigation of Procrastination and Time Perspective

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Abstract

Recent theory suggests that trait procrastination is a form of temporal self-regulation failure that reflects a disjunction between the present and future self. Yet research to date is sparse and inconsistent regarding the nature of the associations of procrastination with time perspective. The current study aimed to meta-analytically summarize the evidence to date to address the question of how procrastination is linked to future and present time perspective, and to test whether stress and positive affect explained the link between procrastination and future time perspective. A search of the available literature yielded six published studies and three unpublished studies which were combined with five unpublished data sets for a total of fourteen samples with 4,312 participants. The meta-analysis revealed that procrastination had a moderate and significant negative association with future time perspective, and a small but significant positive association with present time perspective. Mediation analyses across two of the samples found that high stress and low positive affect explained in part the association between procrastination and future time perspective. Overall, these findings support the notion that procrastinators focus less on the future and highlight the dynamic interrelations of affect and cognition that underlie procrastinators' intertemporal choices.

Keywords: procrastination, time perspective, meta-analysis, stress, positive affect.

As a temporally bound behaviour, procrastination involves a breakdown in self-regulation that has consequences not only for the present self, but also the future self (Sirois & Pychyl, 2013). Yet mounting evidence suggests that procrastinators are less concerned with the future than they are with the present (Díaz-Morales, Ferrari, & Cohen, 2008; Ferrari & Díaz-Morales, 2007), despite the considerable consequences of this short sightedness for their health and well-being (Sirois, 2007). Indeed, research suggests that taking a balanced time-perspective and focusing on the past, present, and future equally, may be optimal for health and well-being (Boniwell, Osin, Linley, & Ivanchenko, 2010; Drake, Duncan, Sutherland, Abernethy, & Henry, 2008). This lack of considering the future is akin to having low levels of future time-perspective, that is, less tendency to consider the future implications of present choices (Zimbardo & Boyd, 1999). Less clear are the reasons for procrastinators' lack of considering the future during the volitional breakdown which leads them to unnecessarily delay previous intentions to start or complete important and necessary tasks. This is intriguing because on the surface considering the negative future consequences of procrastinating would seem a reasonable way to curtail the poor intertemporal choices that result in needless delay. However, if procrastination is viewed as resulting primarily from problems related to short-term mood regulation, then it is possible that the cognitive shifts in focus arising from the negative affective states associated with procrastination may interfere with taking a broader, more future-oriented view of current pending tasks.

The current paper addresses the question of how and why trait procrastination is linked to time perspective by first meta-analytically summarizing the evidence to date regarding the magnitude of the associations between trait procrastination and both future and present time perspectives. Next, the possible role of two affective states, perceived stress and low positive

affect, for explaining these effects with respect to future time perspective are explored. As will be discussed, neuroscience perspectives on the effects of stress on cognition (Davis & Whalen, 2001; LeDoux, 2000) and theoretical accounts of the role of positive emotions in undoing the effects of stress by broadening thought-action repertoires (Fredrickson, 2001), converge to support this proposition.

Procrastination and Time Perspective

Procrastination can be conceptualized as the voluntary delay of important and necessary tasks despite knowing that one will be worse off for doing so (Lay, 1986; Steel, 2007), that involves prioritizing the regulation of present mood at the expense of future mood and consequences (Sirois & Pychyl, 2013). The temporal aspects of procrastination become more evident when we consider that procrastination is most likely to occur for tasks that have distal rewards or that are unpleasant, challenging, or tedious and therefore elicit negative emotions (for a review see Sirois & Pychyl, 2013). Task avoidance when combined with poor self-control becomes a way of regulating current mood by escaping the negative affect or lack of positive rewards associated with current tasks and replacing these tasks with more pleasurable and enjoyable ones. When this form of temporal self-regulation failure becomes a frequent way of responding to tasks that are viewed as difficult (Pychyl, Lee, Thibodeau, & Blunt, 2000) or without immediate reward (Schouwenburg & Groenewoud, 2001), procrastination can be viewed as a relatively stable behavioural tendency with trait-like qualities.

Given the temporal nature of procrastination it is reasonable to expect that procrastination may be differentially associated with individual differences in cognitive time frames or time perspectives. Zimbardo and Boyd (1999) propose that time perspectives (past, present, and future) reflect non-conscious processes involving how the flow of experiences are assigned

temporal categories to create order, structure, and meaning to these events. When an individual develops a tendency to emphasize one temporal frame over others repeatedly and habitually while making decisions, the favoured temporal frame can become a cognitive temporal bias. Continued and chronic overuse of this time frame can become a dispositional style that guides daily decisions across a number of domains. According to this view of time perspective, a present oriented time perspective can also have a negative (fatalistic) or positive (hedonistic) affective valence, with the latter reflecting a focus on present pleasure seeking with less concern for the future consequences of this hedonistic orientation (Zimbardo & Boyd, 1999). If we view procrastination as an instance of self-control failure and task avoidance driven by short-term mood regulation or “giving in to feel good” (Tice & Bratslavsky, 2000), then a focus on immediate rewards and pleasures or having a present hedonistic time orientation seems likely. Although future time perspective is not simply the inverse of a present time perspective (Zimbardo & Boyd, 1999), waiting until the last minute to try and complete important tasks along with a disregard for the implications of such actions for one’s future self (Sirois & Pychyl, 2013) are clear indicators that procrastinators may be less likely to use a future time orientation to guide their decisions and actions.

The few published studies on the links between procrastination and time perspective support the notion that trait procrastination is characterized by a disjunction between the present and the future with respect to cognitive temporal focus. Using the Zimbardo Time Perspective Inventory (ZTPI; Zimbardo & Boyd, 1999), three studies have found that procrastination is positively associated with a present-hedonistic time orientation, and negatively associated with a future time orientation (Díaz-Morales et al., 2008; Ferrari & Díaz-Morales, 2007; Jackson, Fritch, Nagasaka, & Pope, 2003). However, a fourth study using the Temporal Orientation Scale

(Jones, Banicky, Lasane, & Pomare, 1996) which assesses the three basic time orientations – past, present, and future – found the expected negative association with future time orientation but failed to find a significant association between procrastination and present time-orientation (Specter & Ferrari, 2000). Similarly, a study using a short version of the ZTPI found that procrastination was negatively associated with future time orientation but was unrelated to a present hedonistic time perspective (Gupta, Hershey, & Gaur, 2012). Finally, a study using the consideration of future consequences scale (CFC; Strathman, Gleicher, Boninger, & Edwards, 1994), a measure of future time orientation, found the expected negative association with procrastination (Sirois, 2004b).

Taken together, this research suggests a link between procrastination and low levels of future time perspective, but that the links between procrastination and present time perspective are less consistent. Measurement issues regarding the way present time perspective and procrastination are measured may partially explain the inconsistencies. For example, among the studies noted above, two different time perspective and three different trait procrastination scales were used. Moreover, there is considerable variability in the magnitude of the associations between procrastination and both future and present time perspective in the published studies to date suggesting that measurement and sampling issues may impact these effects. Understanding the extent to which procrastination is linked to time perspective as well as the factors that may explain these links can have important implications for conceptualizing and designing interventions for addressing the temporal issues associated with procrastination. Taking a more comprehensive view of the links between procrastination and time perspective also addresses the call by researchers to better understand the role of personality factors in time perspective (Zacher & de Lange, 2011).

The Role of Stress and Positive Affect in Time Perspective

The question of why procrastinators have less concern for the future than they do for the present may be answered by considering the role of stress. A growing body of research indicates that procrastination is associated with high levels of stress (Flett, Blankstein, & Martin, 1995; Rice, Richardson, & Clark, 2012; Sirois, 2007; Sirois, Melia-Gordon, & Pychyl, 2003; Tice & Baumeister, 1997), and that this stress may be partially self-generated (Sirois, 2013a). Procrastinators have difficulty detaching from negative feelings and take a judgmental, critical, self-blaming approach to their own inadequacies which exacerbates their stress (Sirois, 2013a; Sirois & Stout, 2011; Sirois & Tosti, 2012). In addition, these negative self-evaluative thoughts can resemble rumination and lead to a pre-occupation with personal flaws and past procrastination that can contribute to both increased stress (Flett, Stainton, Hewitt, Sherry, & Lay, 2012) and perhaps a lack of concern for the future because their focus is directed to other temporal frames. For example, acute stress initiates a cascade of neurophysiological responses that includes activation of brain areas involved in attentional, emotional, and behavioural changes which function to redirect resources to promote adaptation to the perceived threat (Davis & Whalen, 2001; McEwen, 2007). Among these, the amygdala plays a central role by increasing moment to moment vigilance towards threatening stimuli and in the experience of threat-related fear and anxiety (Davis & Whalen, 2001). In effect, this stress response orients one's focus away from distal and towards immediate concerns and threats to initiate coping efforts (LeDoux, 2000). For the procrastinator this may mean focusing on more pleasurable present alternatives regardless of their future consequences as a way to avoid pending challenging tasks and the negative self-evaluations that they elicit.

Alternatively, low positive affect may also explain why procrastination is associated with less focus on the future time. According to the broaden and build model of positive emotions (Fredrickson, 1998), positive emotional states such as joy, enjoyment, and contentment undo the narrowing of focus function of stress and negative emotions by broadening an individual's momentary thought-action repertoire. In short, positive emotions serve to broaden the scopes of attention and cognition and may therefore be conducive towards taking a more future oriented perspective. In support of this notion, future time perspective is associated with higher levels of positive affect and well-being (Zimbardo & Boyd, 1999). Although procrastination has been primarily examined with respect to its links with negative affective states such as anxiety and depression (Ferrari, 1991; Haycock, McCarthy, & Skay, 1998; Lay, Edwards, Parker, & Endler, 1989; Martin, Flett, Hewitt, Krames, & Szanto, 1996; Senecal, Koestner, & Vallerand, 1995), there is some evidence that trait procrastination is associated with low levels of positive affect which in turn can promote procrastination. For example, in a longitudinal study of adults trying to make intended healthy changes, trait procrastination was associated with lower levels of positive affect about making the healthy changes which in turn predicted being less likely to succeed in following through making the changes (Sirois & Giguère, 2013). Taken together, this research provides some basis for the proposition that procrastinators' low levels of positive affect may make shifting their cognitive orientation from a narrow, present-oriented focus into a broader, more future oriented perspective a challenge.

The Current Research

Theory and research to date support the notion that trait procrastination is associated with less focus on the future and more focus on the present. There is need, however, for a more fine grained investigation of these associations and their magnitude especially given the

inconsistencies in the links between procrastination and present time-orientation. Also important is understanding why procrastinators do not emphasize the future when making decisions about taking action towards their goals. Such insights can point towards possible strategies and interventions (reducing stress, increasing positive affect) that may help procrastinators shift from their present-oriented focus to a more future oriented focus.

The current study took a two-step approach to address the questions of how and why procrastination is linked to time perspective. The first step involved assessing the magnitude and nature of the associations between procrastination and present and future time perspective by searching the published and unpublished literature to find papers reporting relevant effects. These papers were then supplemented with additional unpublished data sets that contained measures of procrastination and time perspective, and the papers and data sets were meta-analyzed to estimate the size of the effects and identify the factors that may account for possible heterogeneity in the effects between studies. A moderator analysis was conducted with four potential moderators to identify sources of heterogeneity in the effects sizes: the publication status of the study, whether a student or adult sample was used, the scale used to measure time perspective, and the scale used to measure procrastination. The second step involved probing the nature and magnitude of the association between procrastination and future time perspective. Consistent with research on the effects of stress on cognitive focus, and theory on the broadening cognitive effects of positive affective states, the hypothesis that stress and positive affect would explain, at least in part, the proposed link between procrastination and future time perspective was tested by conducting a series of mediation analyses across two independent samples. In each analysis, the proposed mediators, stress and positive affect, were first tested individually and if significant, together in a multiple mediator model to get a better understanding of how each may

account for the lack of future temporal orientation associated with trait procrastination.

Methods

Literature Search and Coding

An online database (PsycINFO and PsycARTICLES, 1985-2013) search was conducted to identify empirical studies that may be included in the meta-analysis. The keyword “procrastination” was combined with words related to time perspective (e.g., time-orientation, time perspective, future consequences, future orientation, present orientation). This formal literature search yielded a total of 26 potentially eligible papers. After removing duplicates and papers that did not include analyses of the associations between procrastination and future or present time perspective, a total of six papers were identified. This initial search was supplemented by a search of informal channels including Google scholar and professional papers and presentations from conferences that focused on time perspective and procrastination. Forward and backward searching of the relevant papers identified from the initial search of formal and informal channels were conducted to complement the database searches and ensure the relevant literature was identified. Informal channels included personal emails and conversations with several prominent procrastination researchers. Combined, these search strategies yielded an additional four unique papers including two theses, one unpublished data set, and one conference paper. One thesis was excluded because the corresponding author did not respond to the request for necessary information. In total nine useable papers and data sets were found.

Essential information for the meta-analyses and planned moderator analysis was recorded for each of the nine eligible data sets obtained from the search. The zero-order correlation (r) was used as the effect size as it was the metric most commonly reported in the studies. All but

one study provided the effect between procrastination and time perspective as an r value; the F value in this study was converted to a r value to maintain the same metric. Moderator information recorded included the scales used to measure procrastination and time perspective, the sample population (community adults versus students), and the publication status of the data. The nine independent data sets retrieved from the literature search ($N = 2,442$) were supplemented by an additional five unpublished data sets ($N = 1,855$) described in the next section, for which the same moderator information was recorded. The total sample size across all the data sets was 4,297.

Participants and Procedure

Of the five additional data sets, three were collected as part of a larger program of research investigating the links between self-regulation, stress, and well-being, and two (Samples 1 and 5) were from published papers that did not analyze the association of procrastination with time-perspective (Sirois, 2007, 2013b). All samples consisted of adults recruited from the community. Sample 1 completed the survey and returned it by mail whereas Samples 2 through 5 completed an online survey. A dedicated university-based web page for each study directed participants to the online survey housed on a secure university server. Consent to participate was indicated by clicking an “I agree” button on the online consent form. Participants in Samples 1 and 2 were paid \$15 for completing the survey and the participants in the remaining samples were given the opportunity to enter a draw for certificates to an online bookstore for their participation. Table 1 summarizes the demographic characteristics and relevant measures completed for each of the five samples.

Measures

A summary of the scale means and reliabilities across each of the five samples is presented in

Table 2.

Procrastination. Across the five independent samples two different measures of trait procrastination were used. Samples 1 through 5 completed Lay's General Procrastination scale (GPS; Lay, 1986), a 20-item measure of procrastination in general across a range of tasks. Items such as "I generally delay before starting work I have to do" are scored on a 5-point Likert-type scale ranging from 1 (false of me) to 5 (true of me) The GPS includes 10 reverse-scored items, and the sum of all items yields a single score with high values indicating a greater tendency to procrastinate. The GPS has demonstrated good internal consistency previously ($\alpha = .82$; Lay, 1986). Sample 5 completed the revised Adult Inventory of Procrastination (AIP-R; McCown & Johnson, 2001), a 15-item measure that assesses trait procrastination in adults. The 7 positively and 8 negatively keyed items such as "I am not very good at meeting deadlines" are scored on a 7-point Likert-type scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree). After reverse scoring the negative items all 15 items are summed with higher scores reflecting a greater tendency towards procrastination. Also included are five distracter items as recommended by the scale creators. The AIP-R has demonstrated good internal consistency ($\alpha = .84$, $N = 984$; McCown & Johnson, 2001).

Time Perspective. Two different measures of time perspective were completed among the 5 samples. Samples 4 and 5 completed a short version of the Zimbardo Time Perspective Inventory (ZTPI-S; D'Alessio, Guarino, De Pascalis, & Zimbardo, 2003) and the remaining three samples completed the Consideration of Future Consequences Scale (CFC; Strathman et al., 1994). The ZTPI-S (D'Alessio et al., 2003) is a 22-item measure that assess both future and present (hedonistic and fatalistic) time perspective. For the current study the present hedonistic scale was examined. The future subscale included 9 items such as "I believe that a person's day

should be planned ahead each morning” and the present hedonistic subscale included 7 items such as “I feel that it is more important to enjoy what you are doing than to get the work done on time.” rated on a 5-point scale ranging from 1 (Very uncharacteristic of me) to 5 (Very characteristic of me).

The CFC (Strathman et al., 1994) is a 12-item measure that assesses individual differences in the extent to which immediate versus distant consequences of behavior are considered. Unlike the ZTPI, the 12 item CFC is a unidimensional measure of future time perspective and therefore does not assess present time perspective separately. Individuals who are high in CFC consider the future consequences of their behavior and endorse statements such as “I consider how things might be in the future, and try to influence those things with my day-to-day behavior” and “I am willing to sacrifice my immediate happiness or well-being in order to achieve future outcomes”. The CFC scale has demonstrated good internal consistency in previous studies with Cronbach alphas ranging from .80 to .86 (Strathman et al., 1994).

Stress. Samples 1 and 4 also completed the 10-item version of the Perceived Stress Scale (PSS; Cohen & Williamson, 1988). This widely used empirically established index of general stress measures the perceived stressfulness of events experienced within the past month. Items such as “In the last month, how often have you felt nervous and stressed” are rated on a 5-point scale with response options ranging from “never” to very “often”. The PSS has demonstrated adequate internal consistency (Cohen & Williamson, 1988). The PSS demonstrated good internal consistency in Sample 1 (Cronbach alpha = .84) and Sample 4 (Cronbach alpha = .88).

Positive Affect. A measure of positive affect was completed by Samples 1 and 4. The positive affect subscale of the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) was used for the current study. The PANAS consists of 20 items

consisting of words describing different feelings (e.g., happy, upset), with 10 items for each of the positive and negative affect scales. Respondents rate the extent to which they are currently experiencing each of these feelings on a 5-point Likert scale ranging from 1 for *very slightly or not at all* to 5 for *extremely*. In Sample 4 an expanded version of the PANAS was completed, the PANAS-X (Watson & Clark, 1994) which consisted of 36 items. In addition to the 10 basic positive affect descriptors three extra items were added: happy, joyful, and relaxed. The reliabilities of the 10-item and 13 item positive affect scales were very good (Cronbach alpha = .85 and .93, respectively).

Results

Meta-analyses of Procrastination and Time Perspective

The correlations between trait procrastination and future time perspective and trait procrastination and present-time perspective were meta-analyzed using the Comprehensive Meta-analysis, Version 2 software (Borenstein, Hedges, Higgins, & Rothstein, 2005). The correlations, study coding, and results of the meta-analyses are presented in Table 3. As expected, procrastination was negatively associated with future time perspective across all fourteen samples, whereas it was positively associated with present time perspective in all but two of the eight samples which included this measure. The meta-analyses of these effects revealed that the average r was $-.45$ ($k = 14$; $p < .001$) for the associations between procrastination and future time perspective, and $.15$ ($k = 8$; $p < .01$) for the associations between procrastination and present time perspective.

The heterogeneity statistic, Q , which reflects the degree of variability among the pool of effects sizes, was significant for the meta-analysis of procrastination and future time perspective ($Q(13) = 52.70$, $p < .001$), and present time perspective ($Q(7) = 31.58$, $p < .001$). Credibility

intervals were also calculated for the meta-analyses to assess the degree to which unexplained variance in the effect sizes might be accounted for by moderators (Whitener, 1990). If the credibility intervals include zero or are large, then this suggests that the population includes subpopulations which is consistent with the notion that moderators exist. The credibility interval for the meta-analyses with future time perspective was large [-.59, -.31], and the credibility interval for present time perspective crossed zero and was large [-.01, .29]. Together these indices indicated that moderator analyses to identify the sources of this variability were warranted.

Moderators of Procrastination and Future Time Perspective

To test whether the effect sizes for the associations between procrastination and future time perspective differed as a function of publication status, a moderator analysis was conducted to compare the variability in effects between the published ($k = 6, n = 1,603$) and unpublished ($k = 8, n = 2,709$) studies. The effects sizes for the published studies ($\rho = -.43, 95\% \text{ CI} = [-.52, -.34]$) were not significantly different from those obtained from the unpublished studies ($\rho = -.45, 95\% \text{ CI} = [-.53, -.38], Q(1) = .10, ns$). Similarly, a moderator analysis of the sample characteristics found no differences in the effects sizes from studies conducted with students ($k = 6, n = 1,422; \rho = -.40, 95\% \text{ CI} = [-.49, -.31]$) compared to those in studies conducted with adult community samples ($k = 8, n = 2,890; \rho = -.47, 95\% \text{ CI} = [-.54, -.39], Q(1) = 1.17, ns$). The test of whether the effect sizes differed as a function of the procrastination scale focused solely on a comparison of the General Procrastination Scale (GPS; Lay, 1986) and the revised Adult Inventory of Procrastination (AIP-R; McCown & Johnson, 2001) as these were the two most commonly used scales in the studies. This moderator analysis was also non-significant ($Q(1) = 1.10, ns$), indicating that the effects obtained using the GPS ($k = 9, n = 3,106; \rho = -.46, 95\% \text{ CI} =$

[-.53, -.39]) were not significantly different from those obtained using the AIP-R ($k = 4, n = 981; \rho = -.41, 95\% \text{ CI} = [-.47, -.34]$). Finally, the moderator analysis of the time perspective scale used was significant ($Q(1) = 10.54, p < .001$) for the 13 samples that used ZTPI (Zimbardo & Boyd, 1999) or the CFC scale (Strathman et al., 1994). The effect sizes obtained using the ZTPI ($k = 8, n = 2,148; \rho = -.50, 95\% \text{ CI} = [-.56, -.44]$) were larger than those obtained using the CFC scale ($k = 5, n = 1,949; \rho = -.38, 95\% \text{ CI} = [-.42, -.34]$).

Moderators of Procrastination and Present Time Perspective

The moderator analyses of the link between procrastination and present time perspective focused on the same moderators as the tests run for future time perspective, with the exception that there was no test of the influence of time perspective scale on the magnitude of the effect sizes as the ZTPI was used for all but one of the 8 studies. The moderator analysis of publication status ($Q(1) = 2.09, ns$) revealed that the effects sizes obtained from the published studies ($k = 5, n = 1,382; \rho = .11, 95\% \text{ CI} = [-.02, .23]$) were not significantly different than those obtained from the unpublished studies ($k = 3, n = 903; \rho = .21, 95\% \text{ CI} = [.13, .29]$). The effect sizes obtained from the student samples ($k = 4, n = 1,351; \rho = .15, 95\% \text{ CI} = [-.04, .26]$) were also not significantly different for those obtained from the adult samples ($k = 4, n = 934; \rho = .14, 95\% \text{ CI} = [.03, .30]; Q(1) = .02, ns$). Finally, the moderator analysis of the procrastination scale used was non-significant ($Q(1) = .78, ns$) indicating that the effect sizes from the five studies using the GPS ($n = 1,414; \rho = .15, 95\% \text{ CI} = [.03, .27]$) were not any different from those obtained from the two studies that used the AIPR ($n = 724; \rho = .06, 95\% \text{ CI} = [-.08, .21]$).

Mediation Analyses of the Procrastination-Future Time Perspective Link

To address the issue of why trait procrastination may be associated with low levels of future time orientation, mediation analyses were conducted with the two samples (Samples 1 and

4) that included both measures of perceived stress and positive affect. The correlations among the mediation model variables are presented in Table 4. All model variables were significantly correlated in the expected directions in both samples. Specifically, procrastination was positively correlated with stress which in turn was negatively correlated with future time perspective, and was negatively correlated with positive affect which was positively correlated with future time perspective.

Mediation of the effects of procrastination on future time perspective through perceived stress and positive affect in each sample was tested following the Preacher and Hayes (2008) procedure which uses bootstrapping rather than Sobel tests to estimate the significance of indirect effects. This procedure involves drawing bootstrapped samples from the data in order to estimate the indirect effect for each of the resampled data sets (Preacher & Hayes, 2004; Shrout & Bolger, 2002). The single and multiple mediation analyses were conducted using the Preacher and Hayes macro INDIRECT (Preacher & Hayes, 2008) which permits simultaneous testing of two mediators. Table 5 presents a summary of the mediation analyses and indirect effects analyses for Samples 1 and 4 which used 5000 bootstrapping resamples and bias corrected 95 percent confidence intervals.

In Sample 1 the single mediator analysis for the indirect effect of procrastination on future time perspective through perceived stress was significant, but for positive affect it was non-significant. In Sample 4 the single mediator analyses for both perceived stress and positive affect were significant. A multiple mediator analyses was therefore conducted to determine if the effects overlapped or were unique. Only the indirect effect of positive affect was significant when the two mediators were tested simultaneously. In each of the analyses the direct effects of procrastination on future time perspective remained significant suggesting that the perceived

stress and positive affect only partially mediated the link between procrastination and future time perspective.

Discussion

Consistent with current theory on procrastination as a form of temporal self-regulation failure that involves a disjunction between the present and future self (Sirois & Pychyl, 2013), procrastination was associated with low levels of future time-perspective, and high levels of present time-perspective across fourteen diverse samples and using several different measures. The associations of procrastination to present time perspective did not differ as a result of sample type, procrastination measure, or publication status. However, the magnitude of the associations between procrastination and future time perspective did vary depending upon the measure used for time perspective, with smaller effects found using the consideration of future consequences scale (Strathman et al., 1994) in comparison to those found using the Zimbardo Time Perspective Inventory (Zimbardo & Boyd, 1999).

This is the first study to meta-analytically summarize the available research to date on the links between procrastination and time perspective, and also probe the possible reasons why procrastination is associated with low levels of future time perspective. Following Cohen's (1988) guidelines, procrastination had a moderate sized negative association with future time perspective across the fourteen samples, but only a small positive association with present time perspective. There are several factors that may explain the difference in effects sizes. In one sense, future oriented thinking can be viewed as a form of mental simulation whereby the future is envisioned as being contingent upon current actions and circumstances, thus guiding current choices and actions. This type of future oriented thought is adaptive inasmuch as it can inform current intentions and behaviour. Thus, it may be functionally analogous to upward

counterfactual thoughts, thoughts about how things could have been better had choices and actions in response to failed goals been different that can be instrumental in correcting behaviours that may impede future success (Epstude & Roese, 2008; 2011). Not surprisingly, procrastination is associated with a tendency to make fewer of these adaptive, future oriented upward counterfactuals about what might have been in response to unnecessary delay (Sirois, 2004a), indicating a general tendency to avoid thinking about the future in an adaptive manner.

Zimbardo and Boyd (1999) suggests that future and present time perspective are not conceptual opposites and therefore scoring low on one temporal orientation does not imply scoring equally high on the other. For example, one study found that having a balanced time perspective, that is scoring equally high on all dimensions of the Zimbardo Time Perspective Inventory, was the most prevalent time perspective profile (Drake et al., 2008). As well, focusing on the present may be more of a temporary strategy to help procrastinators reduce dissonance about not completing important but aversive tasks on time or to escape negative self-evaluative thoughts. The modest association of procrastination with present time perspective found may be a reflection of this. Recent research on procrastination and mindfulness, a particular type of present-centered awareness, supports this view. In a sample of students, procrastination was associated with low levels of mindfulness suggesting that procrastinators may be lost in the moment by engaging in stress-provoking judgmental, self-critical, and reactive thoughts about their own behaviour (Sirois & Tosti, 2012).

The results of the tests of the indirect effects provided some support for the proposed role of perceived stress and positive affect in explaining the link between procrastination and future time perspective. Consistent with the research and theory on the effects of stress on cognitive focus (McEwen, 2007), perceived stress partially explained why procrastination was associated

with less focus on the future in both samples. The results for the role of positive affect were less clear. In Sample 4 positive affect was a significant mediator both alone and when considering the effects of perceived stress. This finding may be explained in light of the proposed role of positive affect for undoing the narrowing effects of stress on attention and cognition (Fredrickson, 1998). Although high levels of stress may bring attention to more focal concerns, positive emotions arising from adaptive coping strategies may counteract this pre-occupation with current concerns by broadening the temporal focus to include the future. But with low levels of positive affect the narrowing effects of stress on cognitive focus can persist and there is less attention given to the future and plans that may overcome current difficulties. However plausible, this explanation should be considered with caution until further replicated as the analyses with Sample 1 did not find indirect effects through positive affect. Moreover, the size of the effects for both mediators was small indicating that each may only play a minor explanatory role and that future research should focus on other factors to shed light on the reasons why procrastinators focus less on the future. It is possible that other qualities or traits linked to procrastination such as impulsivity, could also explain the limited and unbalanced temporal perspective associated with procrastination.

Limitations, Strengths, and Future Directions

The cross-sectional nature of the data meta-analyzed and available for the mediation analyses preclude any causal conclusions about the nature of the relationships between procrastination and time perspective. Because each can be viewed as an individual difference, both directions are possible; that is trait procrastination may over time lead to the development of a temporal bias to focus less on the future, or having a temporal bias to not focus on the future may increase the tendency to procrastinate habitually. In the current study the former view was

tested for several reasons. As noted by Steel (2007), there is evidence suggesting that 22 percent of the variance in procrastination is linked to genetic factors, and when measured as a trait, procrastination shows good stability over a 10 year period. Zimbardo and Boyd's (1999) account of the development of time perspective as an individual difference that emerges from the chronic overuse of non-conscious processes that favour one temporal frame over another further suggests that not favouring a future time frame may arise from stable tendencies such as procrastination. Nonetheless, it is also possible that the associations between procrastination and time perspective involve synergistic and dynamic processes whereby one tendency feeds into the other, making each more consistent over time. Future longitudinal and experimental work is needed to help bring clarity to these issues. Finally, it is possible that there are other unpublished data sets or theses on procrastination and time perspective that exist but were not identified by the search strategies as all procrastination researchers were not contacted. However, even if it was possible to contact all procrastination researchers, and such data sets did exist, this would not ensure that they would cooperate and provide the needed correlations for this meta-analysis.

A clear strength of the current study was the use of several samples gathered from a variety of published and unpublished sources. This approach resulted in a large pooled sample of over 4,300 participants to meta-analytically test the nature of the associations between procrastination and time perspective. It also provided an opportunity to replicate the results not just across samples but also across different measures of each construct and therefore address some of the . The associated moderation analyses also provided evidence that how future time perspective is measured may impact the sizes of the effects obtained, a finding that can help inform researchers in their choice of measures for future work in this area. This multiple sample approach also provided an opportunity for a preliminary test across two samples of the

hypotheses that stress and positive affect explained in part the association between procrastination and time perspective through mediation analyses. Future research is needed to further investigate other states and traits that might also account for this association.

This research also makes a contribution to the research on temporal views of procrastination by outlining how enduring temporal perspectives rather than temporal-framing of tasks are associated with procrastination. Other research using temporal frameworks such as Construal Level Theory (Trope & Liberman, 2003) focuses on how viewing tasks as more temporally close and concrete rather than distant and abstract is linked to task procrastination (McCrea, Liberman, Trope, & Sherman, 2008). Similarly, Temporal Motivation Theory outlines how temporal framing of the rewards expected from engaging in a task can motivate decisions to procrastinate (Steel & Konig, 2006). In contrast, the current research focuses on how not having a general temporal orientation towards the future is a common feature of trait procrastinators.

The current findings highlight several possible avenues for future investigations to better understand the dynamic interrelations of affect and cognition that underlie procrastinator's intertemporal choices. Apart from having beneficial effects on well-being, reducing procrastinators' stress, the current findings suggest that stress reducing interventions may have the added benefit of broadening and balancing their temporal focus, thereby providing an opportunity to consider the consequences of not acting in a timely manner. Similar to the functional effects of upward counterfactual thinking (Epstude & Roese, 2008; 2011), mentally simulating the future outcomes of procrastination may function to highlight corrective action to avoid unnecessary delay. Finding ways to increase positive affect may lead to similar outcomes, as positive affect can counteract the cognitive narrowing associated with stress (Fredrickson,

1998), and may also have a more direct effect on reducing procrastination given the central role of emotions in procrastination proposed by Sirois and Pychyl (2013).

Conclusion

The current study contributes to the growing body of research focused on the science of procrastination by demonstrating that trait procrastination was associated with a lower future time orientation and higher present time orientation across fourteen different samples. In addition the moderation analyses of the effects highlighted measurement issues with respect to time orientation. Evidence from two samples further indicated that procrastinators' tendency to focus less on the future may be due to in part to their high levels of stress and low levels of positive affect which can constrain cognitive focus towards more focal rather than distal concerns. Further experimental and longitudinal research is needed confirm these findings and to elucidate the nature of the dynamic interrelations of affect and cognition involved in the disjunction between the present and future self that characterizes procrastination.

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Table 1.

Demographic Characteristics and Measures Used for Each Sample

Sample	N	Percent Female	Age (years)		Measures
			M	SD	
1	210	67.5	34.28	14.32	GPS, CFC, PSS, PANAS
2	980	36.3	32.60	9.94	GPS, CFC
3	283	74.2	26.95	11.43	GPS, ZTPI-S
4	140	67.5	33.02	16.73	AIP-R, ZTPI-S, PSS, PANAS-X
5	257	70.4	33.79	12.33	GPS, AIP-R, CFC

Note: GPS = General Procrastination scale; AIP-R = Adult Inventory of Procrastination, revised; CFC = Consideration of Future Consequences scale; ZTPI-S = Zimbardo Time Perspective Inventory, short form; PSS = Perceived Stress scale; PANAS = Positive and Negative Affect Schedule.

Table 2

Summary of the Characteristics of the Study Variables for the Five Independent Samples

	Sample 1 N = 210			Sample 2 N = 980			Sample 3 N = 283			Sample 4 N = 140			Sample 5 N = 257		
	M	(SD)	α	M	(SD)	α	M	(SD)	α	M	(SD)	α	M	(SD)	α
Procrastination - GPS	2.47	(.62)	.88	2.71	(.69)	.91	2.84	(.67)	.91	2.60	(.67)	.88	---	---	---
Procrastination – AIP-R	---	---	---	---	---	---	---	---	---	---	---	---	3.12	(.97)	.88
Future time perspective – ZTPI-S	---	---	---	---	---	---	3.36	(.74)	.85	3.39	(.74)	.94	---	---	---
Future time perspective - CFC	3.44	(.67)	.83	3.34	(.67)	.87	---	---	---	---	---	---	3.39	(.58)	.83
Present time perspective	---	---	---	---	---	---	2.75	(.65)	.68	2.86	(.65)	.68	---	---	---
Perceived Stress	2.91	(.61)	.84	---	---	---	---	---	---	2.73	(.73)	.89	---	---	---
Positive affect - PANAS	3.06	(.74)	.85	---	---	---	---	---	---	3.03	(.92)	.93	---	---	---

Note: GPS = General Procrastination scale; AIP-R = Adult Inventory of Procrastination, revised; CFC = Consideration of Future Consequences scale; ZTPI-S = Zimbardo Time Perspective Inventory, short form; PSS = Perceived Stress scale; PANAS = Positive and Negative Affect Schedule. All means are based on a 5-point scale, except for the AIP-R which is based on a 7-point scale.

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Table 3.

Meta-Analyzed Bivariate Correlations Between Procrastination, Present and Future Time Perspective Across Fourteen Samples (Total N = 4,312).

Study	N	Sample	Procrastination scale	Time perspective scale	Bivariate correlations	
					Future time perspective	Present time perspective
1. Unpub. data set	210	Adults	GPS	CFC	-.422	---
2. Unpub. data set	980	Adults	GPS	CFC	-.386	---
3. Unpub. data set	283	Adults	GPS	ZTPI-S	-.625	.310
4. Unpub. data set	140	Adults	GPS	ZTPI-S	-.489	.132
5. Unpub. data set	257	Adults	AIP-R	CFC	-.360	---
6. Dutta & Deshano (2013), unpub. data	281	Students	GPS	CFC	-.358	---
7. Deyling (2008) unpub. thesis	78	Students	APS	FTOS	-.368	---
8. Nedeljkovic & Kostic (2013) unpub. conference paper	480	Students	GPS	ZTPI	-.508	.193
9. Diaz-Morales et al. (2008)	509	Adults	AIP-R	ZTPI	-.46	.13
10. Ferrari & Diaz-Morales (2007)	275	Adults	AIP-R	ZTPI	-.53	.14
11. Gupta et al. (2012)	236	Adults	GPS	ZTPI-S	-.365	-.087
12. Jackson, et al. (2003)	147	Students	TPS	ZTPI	-.53	.31
13. Sirois (2004)	221	Students	GPS	CFC	-.348	---
14. Specter & Ferrari (2000)	215	Students	AIP-R	TOS	-.37	-.02
Meta-analysis results				Average r (k)	-.448 (14)	.145 (8)
				N	4,312	2,285
				95% CI	[-.50, -.40]	[.06, .23]

Note: GPS = General Procrastination scale; AIP-R = Adult Inventory of Procrastination, revised; APS = Aitken Procrastination Scale; TPS = Tuckman Procrastination Scale; CFC = Consideration of Future Consequences scale; ZTPI-S = Zimbardo Time Perspective Inventory, short form; FTOS = Future Time Orientation Scale; TOS = Time Orientation Scale

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Table 4.

Bivariate Correlations Among the Mediation Model Variables in Samples 1 and 4

Variable	1	2	3	4
1. Procrastination	---	-.49**	.35**	-.27**
2. Future time perspective	-.42**	---	-.36**	.43**
3. Perceived stress	.31**	-.26**	---	-.38**
4. Positive affect	-.27**	.20**	-.22**	---

Note: Correlations for Sample 1 ($N=210$) are below the diagonal and correlations Sample 4 ($N=140$) are above the diagonal; * $p < .05$, ** $p < .01$.

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Table 5

Indirect Effects of Procrastination (PRO) on Future Time Perspective (FTP) Through Perceived Stress (PS) and Positive Affect (PA) Across Two Samples

N	Path	B (SE)	t	Indirect effects			Model R ²	F (df)
				Data (SE)	Bootstrapping (SE)	BCA CIs		
210	PRO – PS (a)	.31 (.07)	4.73**				.19	24.10** (2,207)
	PS – FTP (b)	-.15 (.07)	-2.07*					
	PRO – FTP (c)	-.44 (.07)	-6.58**					
	PRO – PS – FTP (c')	-.40 (.07)	-5.65**	.04 (.02)	.04 (.02)	-.10; -.01		
	PRO – PA (a)	-.32 (.08)	-4.01**				.18	22.79** (2,207)
	PA – FTP (b)	.09 (.06)	1.45					
	PRO – FTP (c)	-.44 (.07)	-6.58**					
	PRO – PA – FTP (c')	-.42 (.07)	-5.96**	-.03 (.03)	-.03 (.03)	-.07; .01		
140	PRO – PS (a)	.35 (.08)	4.31**				.27	25.79** (2,137)
	PS – FTP (b)	-.21 (.08)	-2.55*					
	PRO – FTP (c)	-.53 (.08)	-6.58**					
	PRO – PS – FTP (c')	-.45 (.08)	-5.42**	-.07 (.03)	-.07 (.04)	-.17; -.02		
	PRO – PA (a)	-.34 (.10)	-2.27**				.32	31.75** (2,137)
	PA – FTP (b)	.24 (.06)	3.95**					
	PRO – FTP (c)	-.53 (.08)	-6.58**					
	PRO – PA – FTP (c')	-.44 (.08)	-5.61**	.08 (.03)	.08 (.04)	-.18; -.03		
	PRO – PS (a)	.35 (.11)	4.31**				.33	21.95** (3,136)
	PRO – PA (a)	-.35 (.08)	-3.27**					
	PS – FTP (b)	-.12 (.09)	-1.39					
	PA – FTP (b)	.21 (.07)	3.26**					
	PRO – FTP (c)	.31 (.05)	6.12**					
	PRO-PS, PA-FTP (c')	-.41 (.08)	-5.05**	-.11 (.04)	-.11 (.04)	-.21; -.04		
	PS			-.05 (.03)	-.05 (.03)	-.13; .02		
PA			-.07 (.03)	-.07 (.03)	-.17; -.02			

Note: BCA CI = Bias Corrected and accelerated 95 percent confidence intervals; Boot strapping analyses was conducted with 5,000 resamples; ^ap = .06; *p < .05, **p < .001.