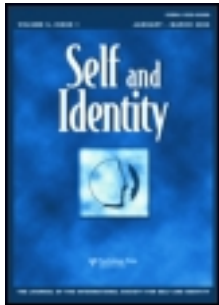


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Procrastination and Stress: Exploring the Role of Self-compassion

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Although previous research has demonstrated that procrastinators experience high levels of stress, less is known about why procrastination is linked to stress. This study is the first to investigate self-compassion as a mediator of the relationship between trait procrastination and stress. Across four samples (145 undergraduates, 339 undergraduates, 190 undergraduates, and 94 community adults) trait procrastination was associated with lower levels of self-compassion and higher levels of stress. A meta-analysis of these effects revealed a moderate negative association of procrastination with self-compassion. In all four samples, self-compassion mediated the relationship between stress and procrastination. These findings suggest that lower levels of self-compassion may explain some of the stress experienced by procrastinators and interventions that promote self-compassion could therefore be beneficial for these individuals.

Keywords: Procrastination; Self-Compassion; Stress; Self-regulation.

Described as the quintessential form of self-regulation failure (Steel, 2007), procrastination is a common and pervasive problem that can take a toll on not only psychological but also physical health and well-being (Flett, Blankstein, & Martin, 1995; Sirois, Melia-Gordon, & Pychyl, 2003; Tice & Baumeister, 1997). Theoretical explanations for the links between chronic procrastination and health implicate stress as an outcome of poor self-regulation that negatively impacts health outcomes through both direct physiological and indirect behavioral routes (Friedman, 2000; Sirois et al., 2003). Although there is some support for the proposed role of stress in explaining the poor health-related outcomes associated with procrastination (Sirois, 2007; Sirois et al., 2003; Sirois & Tosti, 2012), the ways in which procrastination may be linked to increased stress have not been fully explored.

From a behavioral perspective, rushing around at the last minute to complete important and necessary tasks can be stressful as can the consequences of not meeting deadlines on time. Yet, there is emerging evidence that the stress associated with procrastination may also arise from the intra-personal processes linked to the negative self-judgments that procrastinators inflict upon themselves when dealing with difficult tasks as well as during the aftermath of unnecessary delay (Flett, Stainton, Hewitt, Sherry, & Lay, 2012; Sirois &

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Stout, 2011; Sirois & Tosti, 2012). Self-compassion—taking a kind and understanding stance toward oneself in instances of pain or failure rather than being harshly self-critical (Neff, 2003b)—is an adaptive quality that may promote effective self-regulation, reduce the stress associated with self-blame, and provide a buffer against negative reactions to self-relevant events (Leary, Tate, Adams, Allen, & Hancock, 2007; Terry & Leary, 2011). The purpose of this study was to explore the possible role of having less self-compassion for explaining the stress associated with trait procrastination.

Procrastination and Stress

Defined as voluntarily delaying an intended task despite expecting to be worse off for doing so (Lay, 1986; Steel, 2007), procrastination has been conceptualized as a state and as a trait. The latter view of procrastination is often taken when unnecessary delay becomes a frequent response to tasks that are perceived to be difficult (Pychyl, Lee, Thibodeau, & Blunt, 2000), aversive (Blunt & Pychyl, 2000; Lay, 1992), or lacking immediate reward (Schouwenburg & Groenewoud, 2001). Further support for the view that frequent procrastination is a behavioral tendency with trait-like qualities comes from research establishing the links between procrastination and higher order personality factors such as the Big Five personality factors. Two meta-analyses indicate that Conscientiousness is consistently, robustly, and negatively linked to procrastination when measured as a trait (Steel, 2007; Van Eerde, 2003). Perhaps the most compelling argument that procrastination is sufficiently consistent over time to be considered a trait is provided by Steele's (2007) review in which he outlines twin studies showing that 22% of the variance in procrastination was linked to genetic factors, and that measures of trait procrastination show good test–retest reliability ($r = 0.77$) over a 10-year period.

Whether defined as a state or a trait, procrastination is well known to have negative consequences for psychological well-being. Procrastination is associated with anxiety and depression (Ferrari, 1991; Haycock, McCarthy, & Skay, 1998; Lay, Edwards, Parker, & Endler, 1989; Martin, Flett, Hewitt, Krames, & Szanto, 1996; Senecal, Koestner, & Vallerand, 1995), as well as feelings of shame (Fee & Tangney, 2000), guilt (Blunt & Pychyl, 2005), and poor mental health (Stead, Shanahan, & Neufeld, 2010). Researchers have also begun to address the possible negative consequences of procrastination for physical well-being and have noted that stress may play a key role (Sirois et al., 2003; Tice & Baumeister, 1997). For example, research with both student and adult populations provide support for the notion that stress mediates the link between procrastination and poor health outcomes (Sirois, 2007; Sirois et al., 2003). Expanding on the findings of these initial cross-sectional studies at least two longitudinal studies have examined the links between trait procrastination and stress over time. In the first study trait procrastination was prospectively linked to stress initially and at each of the two four-month follow-up surveys administered to a large sample of college students (Sirois, Voth, & Pychyl, 2009). In the second study, which used a cross-panel design, procrastination was cross-sectionally correlated to a related construct, psychological distress, at each of the three points of assessment across the academic term (Rice, Richardson, & Clark, 2012). Understanding the procrastination–stress relationship is therefore essential for the development of interventions to help reduce the negative consequences procrastination may have for health and well-being.

Although these longitudinal studies provide some support for the argument that stress is an outcome of procrastination, it could also be argued that the direction of causality is reversed, with procrastination being an outcome of experiencing increased stress. For example, Tice, Bratslavsky, and Baumeister (2001) have demonstrated that a negative

mood induction can result in more time spent procrastinating as a way to restore positive mood, supporting the notion that procrastination has to do with the primacy of short-term mood repair over long-term goal pursuit (Sirois & Pychyl, in press). However, this alternate explanation of the direction of causality only holds if procrastination is conceived of as a single act. When procrastination is defined as a trait-like ongoing behavioral style that is reasonably stable over time it is more difficult to view procrastination as an outcome of transitory perceived stress. Instead it is more plausible that trait procrastination is associated with characteristic ways of thinking such as negative self-evaluative thoughts, which contribute to the stress that procrastinators experience.

A growing body of evidence supports the view that procrastinators' self-evaluative thoughts are central for understanding the stress associated with trait procrastination. Recalling past procrastinating behavior can increase feelings of anxiety (Lay, 1994), and emotional upset (Milgram, Gehrman, & Keinan, 1992), and trying to follow through with previously delayed tasks can contribute to worry and anxiety (Ferrari, 1991; Solomon & Rothblum, 1984), and negative self-evaluations (Flett et al., 1995). As well, chronic procrastinators will judge others who procrastinate more harshly than those who do not suggesting that they also view their own procrastination negatively (Ferrari, 1992).

Findings from several studies illustrate the nature of the negative self-evaluative thoughts that procrastinators engage in and how they may be linked to stress. In a prospective study conducted by McCown and colleagues (McCown, Blake, & Keiser, 2012) procrastinators logged into a website and recorded their thoughts during actual instances of procrastination. Using an empirically-based, computer-scored content analysis of the irrational thoughts associated with procrastination, students scoring high on trait procrastination were found to make a greater number of self-depreciating statements compared to non-procrastinators. Statements such as, "I'm thinking now that I'm simply too stupid to benefit from more studying, so I'll just hang out on Facebook" (McCown et al., 2012) exemplify the type of negative self-evaluations that were made. In addition to these self-depreciating statements, there is evidence that procrastinators also engage in negative automatic thoughts as they think about past procrastination and/or their difficulty in completing upcoming tasks. Stainton and colleagues (Stainton, Lay, & Flett, 2000) have proposed that trait procrastinators engage in a specific type of negative automatic thought, procrastinatory cognitions, that resembles rumination over past procrastination behavior. Moreover, these thoughts are posited to occur frequently, and therefore may reflect a relatively stable tendency to engage in negative automatic thoughts about the self. Consistent with incompleteness theories of cognition (Gold & Wegner, 1995), Stainton et al. (2000) suggested that this type of ruminative thought, which includes self-blame and brooding about past procrastination, arises when there is difficulty in performing instrumental behaviors that would help one complete one's goals. Across two studies trait procrastination was associated with procrastinatory thoughts (Stainton et al., 2000). Moreover, these negative procrastination-related thoughts mediated the link between procrastination and negative affect in the first study, and were prospectively associated with distress and actual procrastination in the second study. Similarly, Flett and colleagues (2012) found that negative automatic thoughts related to procrastination were associated with elevated levels of stress and distress. Together this research provides support for the notion that procrastination-related negative self-evaluations may contribute to the stress associated with trait procrastination.

Self-compassion and Stress

Self-compassion is one quality that may provide additional insight into the stress associated with trait procrastination as well as possible ways to reduce procrastination-related stress and perhaps even procrastination tendencies. In contrast to self-criticism and negative self-evaluations, self-compassion involves taking a kind, compassionate and accepting stance towards oneself in instances of suffering due to forces beyond one's control as well as when the suffering is due to personal failings (Neff, 2003b). However, it is not simply the inverse of self-criticism as self-compassion has been found to predict depression and anxiety even after controlling for self-criticism (Neff, 2003a). Instead, self-compassion is proposed by Neff (2003b) to be comprised of three main components: self-kindness, being kind rather than critical towards oneself in difficult times; common humanity, recognizing imperfection and suffering as a common human experience rather than something that is isolating; mindfulness, taking a balanced non-judgmental approach to one's emotions rather than becoming over identified with negative thoughts and feelings. Given these dimensions it is not surprising that self-compassion is linked to enhanced psychological well-being, and decreased anxiety, depression, and rumination (Neff, Rude, & Kirkpatrick, 2007). Self-compassion may play a role in adaptive self-regulation by reducing the negative emotional states and self-blame that can derail successful self-regulation (Terry & Leary, 2011). Self-compassion is also associated with the use of adaptive coping strategies such as cognitive restructuring, which may help reduce stress (Allen & Leary, 2010), and is negatively associated with avoidance-oriented coping strategies (Neff, Hsieh, & Dejjitrat, 2005).

Procrastination and Self-compassion

Current research indicates that evaluating oneself in an unkind, critical, and judgmental manner may be one way that procrastinators contribute to the stress they experience. If we conceptualize less self-compassion as taking a negative evaluative stance towards oneself then having less self-compassion may be one quality that explains the procrastination–stress relationship. Although self-compassion has not been examined as potential mediator of the procrastination–stress link, there is some evidence that this may be the case. First, one study of undergraduate students found that procrastination scores were the highest for students who had moderate to low levels of self-compassion (Williams, Stark, & Foster, 2008).

There have been two studies that tested the role of qualities associated with lower levels of self-compassion in explaining the procrastination–stress relationship. In a study of nurses' health behaviors, trait procrastination was associated with measures of stress and health-related self-blame including whether the nurses felt they were taking care of their health as well as they should be (Sirois & Stout, 2011). Structural equation analyses revealed that procrastination was associated with self-blame for not engaging in the health behaviors they should, and that self-blame further explained the link between procrastination and perceived stress. In another investigation a component of self-compassion, mindfulness, and its relations with trait procrastination, stress and health was examined in a large sample of undergraduate students (Sirois & Tosti, 2012). Procrastination was associated with stress, low levels of mindfulness and less frequent practice of mindfulness promoting activities such as yoga and meditation. More importantly, mindfulness mediated the association between stress and procrastination. Because self-compassion includes not only mindfulness but also self-kindness and common humanity (Neff, 2003b), the lack of which could be considered being self-critical

and self-blaming, it is plausible that lower levels of self-compassion are similarly linked to trait procrastination.

Given the stability of trait procrastination (Steel, 2007), a final issue in proposing that self-compassion may mediate the procrastination–stress relationship is the question of why procrastination may be associated with the development of a habitual lack of self-compassion. Indeed Neff (2003a) has noted a three-week test–retest reliability of 0.93 for the Self-compassion Scale, suggesting that self-compassion may be a relatively stable quality. One potential explanation involves the nature of the cognitions associated with chronic procrastination. As noted previously, individuals who habitually procrastinate are prone to engaging in ruminative thoughts about past procrastination behavior because they are unable to engage in instrumental behaviors to move them closer to their goals (Stainton et al., 2000). Over time these frequent negative self-evaluations may foster a more generalized tendency towards self-blame, self-criticism, as well as difficulty in disengaging from their ruminative self-judgments. Consistent with this notion, McCown and colleagues' (2012) content analysis of trait procrastinators' self-referent cognitions revealed a generalized tendency to be critical and unkind to oneself with statements such as, "I'm simply too stupid . . .," which is akin to having a lack of self-compassion.

The Current Study

Overall, research and theory suggests that trait procrastinators may not treat themselves with self-compassion, and this may contribute to the stress they experience. Yet, to date the role of self-compassion in explaining the stress associated with procrastination has not been investigated. The objectives of this study were therefore to investigate the links between trait procrastination and self-compassion, as well as the indirect effects of procrastination on stress through self-compassion. Accordingly, the focus was not on demonstrating the links between self-compassion and reduced stress levels that have been reported in other studies (Allen & Leary, 2010; Neff & McGehee, 2009), but rather to explore how low levels of self-compassion might account for the stress associated with trait procrastination. By bringing together these two literatures the results from this study may help provide insight into to understand the stress associated with trait procrastination and how it may be reduced, as well as highlight a negative behavioral style associated with low levels of self-compassion.

Methods

Participants and Procedure

The present study included data from four independent samples that was collected as part of a larger program of research investigating the links between self-regulation, stress, and health. Samples 1 through 3 ($N = 145$, $N = 339$, $N = 190$) consisted of undergraduate student samples from a University in South-western Ontario, and Sample 4 ($N = 94$) consisted of community-dwelling adults from this same region. For Samples 1 through 3 the data analyzed for the current study was obtained with a single collection, whereas for Sample 4 prospective data was collected at two time points, six months apart. The data collection for all samples spanned a period of four years from 2006 to 2010, and the combined sample size was 768. The data from Sample 2 ($N = 339$) has been previously analyzed with respect to procrastination and health but did not involve an analysis of self-compassion (Sirois & Tosti, 2012). As outlined in Sirois and Tosti (2012), 11 participants were removed from the original sample of 350 due to excessive missing data or poorly

TABLE 1 Demographic Characteristics and Measures Used for Each Sample

Sample	<i>N</i>	Percent female	Age (years) <i>M (SD)</i>	Percent Caucasian	Measures
1	145	74.5	21.27 (3.92)	59.3	GPS, AIP-R, SCS, PSS
2	339	81.7	21.68 (4.93)	78.6	GPS, SCS, PSS
3	190	74.2	22.41 (5.89)	73.2	GPS, SCS, PSS
4	94	67.5	34.28 (14.32)	80.5	GPS, AIP-R, SCS (T2), PSS(T2)

Notes: GPS = General Procrastination scale; AIP-R = Adult Inventory of Procrastination; SCS = Self-compassion scale; PSS = Perceived Stress scale; T2 = administered at Time 2.

completed surveys. For the remaining three samples any cases missing 20% or more on any of the key variables were removed from the data using a listwise deletion prior to analyses.

Table 1 summarizes the demographic characteristics and relevant measures completed for each of the four samples. The three undergraduate samples were recruited through a participant pool and received course credit for their participation. The participants for Sample 1 completed a paper survey in the lab, Sample 2 completed an online survey hosted on a secure university server, and Sample 3 completed an online survey in the lab. The community adult sample was recruited as part of a prospective naturalistic observational study examining the links between trait procrastination and making intended healthy changes, the results of which are reported elsewhere (Sirois, Giguère, & Eren, 2012). The current study focused solely on the associations among procrastination, self-compassion, and stress in this sample. Participants who intended to but had not started to make healthy lifestyle changes were recruited through ads and notices placed in the community and through a recruitment booth at the local mall and then contacted six months later to assess their progress in making the healthy changes on their own. Participants were given incentive gift cards worth \$15 for completing the Time 1 survey and returning it by mail, and \$30 for their Time 2 participation six months later which involved completing a survey in person in the lab or by mail to report their success or lack thereof in making their intended healthy changes. The Time 1 sample consisted of 207 participants and of these 94 completed the Time 2 survey six months later. Measures of procrastination were completed in the Time 1 survey and a measure of self-compassion was completed at the Time 2 survey. Perceived stress was assessed in both surveys.

Measures

Table 2 provides a summary of the scale means and reliabilities across each of the four samples.

Procrastination. Two different measures of trait-like procrastination were used for this study. Lay's General Procrastination scale (GPS; Lay, 1986), a 20-item scale that assesses tendencies towards procrastination in general across a range of tasks, was completed by all four samples. 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 scale 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 ($\alpha = 0.82$; Lay, 1986). In addition to the GPS, the revised Adult Inventory of Procrastination (AIP-R; McCown & Johnson, 2001) was also completed by Samples 1 and 4. This revised 15-item measure assesses

TABLE 2 Summary of the Characteristics of the Study Variables for the Four Independent Samples

	Sample 1		Sample 2		Sample 3		Sample 4	
	<i>M (SD)</i>	α	<i>M (SD)</i>	α	<i>M (SD)</i>	α	<i>M (SD)</i>	α
Procrastination – GPS	2.75 ^a (0.59)	0.88	2.68 ^a (0.55)	0.86	2.68 ^a (0.58)	0.89	2.38 ^b (0.88)	0.88
Procrastination – AIP-R	3.50 (0.79)	0.82	–	–	–	–	2.82 (0.63)	0.78
Self-compassion	3.00 (0.69)	0.94	2.99 (0.57)	0.91	3.10 (0.66)	0.93	3.14 (0.75)	0.94
Perceived stress	2.81 (0.58)	0.82	2.96 ^a (0.55)	0.84	2.93 ^a (0.61)	0.86	2.54 ^b (0.74)	0.89

Notes: GPS = General Procrastination scale; AIP-R = Adult Inventory of Procrastination. ^{a,b} Different alphabetical superscripts indicate that scale means differed significantly between samples at $p < 0.001$.

trait-like procrastination motivated by avoiding task unpleasantness. There are seven positively and eight negatively keyed items. 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 task avoidant procrastination. The AIP-R also includes five distracter items as recommended by the scale creators. This scale has demonstrated good internal consistency ($\alpha = 0.84$, $N = 984$; McCown & Johnson, 2001).

Self-compassion. The 26-item Self-Compassion Scale (SCS; Neff, 2003a) was completed by all samples. This scale assesses the three main components of self-compassion, Self-kindness (Self-judgment), Common Humanity (Isolation), and Mindfulness (Over-identification), using both positive and negative scored items for each component subscale. Self-kindness items include, "I try to be loving towards myself when I'm feeling emotional pain," whereas Self-judgment items include, "I'm disapproving and judgmental about my own flaws and inadequacies," Common Humanity items include, "I try to see my failings as part of the human condition," whereas Isolation items include, "When I fail at something that's important to me, I tend to feel alone in my failure," Mindfulness items include "When something painful happens I try to take a balanced view of the situation," whereas Over-identification items include, "When I'm feeling down I tend to obsess and fixate on everything that's wrong." Previous research indicates that the subscales are highly intercorrelated and are therefore best explained by a single higher order factor of self-compassion (Neff, 2003a). All items are prefaced with the statement "How I typically act towards myself during difficult times" and respondents indicate how often they behave in the described way using response options ranging from 1 (*Almost never*) to 5 (*Almost always*). A total self-compassion score is obtained by averaging the mean subscale scores after reverse coding the negative items. This scale has demonstrated good reliability (Neff, 2003a). The community adult sample completed the SCS at the six-month follow-up after they reported whether or not they were successful in making their intended healthy changes.

Stress. The Perceived Stress Scale (PSS; Cohen & Williamson, 1988) was completed by all four samples. This 10-item version of the widely used empirically established index of general stress appraisal 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). For the community adult sample, the PSS completed at the six-month follow-up was analyzed.

Results

Descriptive Results

The means and standard deviations of the study scales for each of the four samples are presented in Table 2. One-way analyses of variance (ANOVAs) were conducted to examine if the means for procrastination (GPS), self-compassion, and perceived stress differed between groups. Significant group differences were found for procrastination, $F(3, 764) = 8.29$, $p < 0.001$, and perceived stress, $F(3, 764) = 13.24$, $p < 0.001$, but not self-compassion, $F(3, 763) = 2.07$, $p = 0.10$. Because Levene tests indicated unequal variances among the samples for perceived stress. Dunnett T3 tests were used for the post

TABLE 3 Correlations of Procrastination, Self-compassion, and Perceived Stress for Each of the Four Independent Samples

	Sample 1 (N = 145)	Sample 2 (N = 339)	Sample 3 (N = 190)	Sample 4 (N = 94)
<i>Self-compassion</i>				
Procrastination – GPS	– 0.36**	– 0.27**	– 0.29**	– 0.20*
Procrastination – AIPR	– 0.38**	–	–	– 0.16
Perceived stress	– 0.63**	– 0.63**	– 0.58**	– 0.60**
<i>Procrastination – GPS</i>				
Perceived stress	0.43**	0.32**	0.35**	0.23*
Perceived stress T1	–	–	–	0.31**
<i>Procrastination – AIPR</i>				
Perceived stress	0.46**	–	–	0.27*
Perceived stress T1	–	–	–	0.34**

Notes: GPS = General Procrastination scale; AIP-R = Adult Inventory of Procrastination. T1 N = 205. *p < 0.05; **p < 0.01.

hoc analysis of this variable, whereas Scheffe's test was used for post hoc pairwise comparisons among the samples for procrastination. Given the large overall sample size of the four samples combined, the significance level for the post hoc tests was set at $p < .01$. Results of the post hoc analyses indicated that the community adult sample (Sample 4) scored significantly lower on perceived stress than two of the student samples, Sample 2 and Sample 3, $ps < 0.001$. Similarly, the community adult sample scored significantly lower on procrastination than each of the three student samples, all $ps < 0.001$.

Analyses to determine if those who participated at Time 2 in the adult community sample differed from those who did not participate found no significant differences on any of the demographic characteristics. However, there was a non-significant trend towards higher procrastination scores among those who did not participate at Time 2 ($M = 2.55$, $SD = 0.61$) compared to those who did ($M = 2.38$, $SD = 0.63$); $t(205) = 1.93$, $p = 0.055$.

Associations Between Procrastination, Self-compassion, and Stress

The correlations of self-compassion with procrastination and perceived stress are presented in Table 3. When measured with the General Procrastination Scale (GPS), self-compassion was significantly and negatively associated with procrastination in each of the four samples. However, when procrastination was measured with the Adult Inventory of Procrastination, revised (AIP-R), self-compassion was only significantly and negatively associated with Sample 1, the student sample, but not Sample 4, the adult community sample. The GPS and the AIP-R were positively correlated in both the adult sample ($N = 207$), $r = 0.70$, and the student sample ($N = 145$), $r = 0.79$. Procrastination (GPS) was positively and self-compassion was negatively correlated with perceived stress in all four samples indicating that tests of the indirect effects of procrastination on stress through self-compassion were appropriate.

To test whether the strength of the correlations among self-compassion and procrastination differed across the four samples Fisher r -to- z transformations were conducted. The results revealed that the strength of the correlations between self-compassion and procrastination did not differ among any of the three student samples or between the adult community sample and any of the student samples (see Table 3). There were no significant differences in the strength of associations between procrastination and stress among any of the samples.

Finally, to obtain a more comprehensive understanding of the associations between procrastination (measured by the GPS) and self-compassion across the samples, a meta-analysis was conducted on the correlations from the four samples. A weighted mean correlation (ρ) was calculated as the average of the individual effects (r) weighted by the reciprocal of their variance following the method suggested by Hedges and Olkin (1985). The effects size calculations and analyses were conducted with the meta-analytic software program Comprehensive Meta-analysis, Version 2 (Borenstein, Hedges, Higgins, & Rothstein, 2006). The calculation of ρ included a test of the homogeneity of the set of effect sizes with the Q statistic, a test of the significance of the effect, and a 95% confidence interval. The results of the meta-analysis revealed a significant negative average correlation between procrastination and self-compassion, $\rho = -0.31$ ($CI = -0.38/-0.23$), $p < 0.001$, and that the set of effects was homogeneous, $Q(3) = 2.145$. According to Cohen's (1988) guidelines, this means that procrastination had a moderate sized negative association with self-compassion across the four samples. Supplemental meta-analyses were conducted on the associations between procrastination and stress, and self-compassion and stress. The average correlation between

TABLE 4 Indirect Effects of Procrastination on Perceived Stress Through Self-Compassion Across the Four Samples

Sample	N	Path	B (SE)	t	Indirect effects			Overall Model R ²	F (df)
					Data (SE)	Boot-strapping (SE)	Bias-corrected and accelerated CIs		
1	145	GP – SC (a)	-2.54 (0.55)	-4.66**				0.45	57.74** (2, 142)
		SC – PS (b)	-0.08 (0.04)	-8.23**					
		GP – PS (c)	0.42 (0.07)	5.72**					
2	339	GP – SC – PS (ab)	0.23 (0.07)	3.46**	0.20 (0.05)	20 (0.06)	0.09; 0.32	0.42	123.13** (2, 336)
		GP – SC (a)	-0.27 (0.05)	-5.04**					
		SC – PS (b)	-0.57 (0.04)	-13.71**					
3	190	GP – PS (c)	0.31 (0.05)	6.12**				0.37	55.51** (2, 187)
		GP – SC – PS (ab)	0.16 (0.04)	3.72**	0.16 (0.03)	0.16 (0.03)	0.09; 0.22		
		GP – SC (a)	-0.33 (0.08)	-4.19**					
4	94	SC – PS (b)	-0.48 (0.06)	-8.70**				0.36	25.36** (2, 91)
		GP – PS (c)	0.36 (0.07)	5.02**					
		GP – SC – PS (ab)	0.20 (0.06)	3.13*	0.16 (0.04)	0.16 (0.04)	0.08; 0.27		
		GP – SC (a)	-0.24 (0.05)	-1.97*					
		SC – PS (b)	-0.58 (0.08)	-6.87**					
		GP – PS (c)	0.23 (0.12)	1.94*					
		GP – SC – PS (ab)	0.09 (0.10)	0.95†	0.14 (0.07)	0.14 (0.07)	0.02; 0.28		

Notes: The potential effects of sex and age were also tested by including sex and age as covariates in the model. Because the covariates were not significant in any of the analyses and did not impact the significance of the effects tested, the analyses and results reported did not include these covariates. CI = confidence interval; GP = General Procrastination; SC = Self-compassion; PS = perceived stress. Boot strapping analyses was conducted with 5,000 resamples; † $p = 0.06$; * $p < 0.05$; ** $p < 0.001$.

procrastination and stress was significant, $\rho = 0.34$ (CI = 0.27/0.40) $p < 0.001$, as was the average correlation between self-compassion and stress, $\rho = -0.61$ (CI = $-0.66/-0.57$), $p < 0.001$.

Indirect Effects of Procrastination on Stress Through Self-compassion

Mediation of the effects of procrastination on stress through self-compassion in each sample was tested following the basic criteria of Baron and Kenny (1986). However, the use of the Sobel (1982) test has been criticized as a means for testing the significance of the indirect effects because of the assumptions it makes regarding the sampling distribution of the indirect effect (Preacher & Hayes, 2008). Accordingly, the significance of the indirect effects were evaluated using a bootstrapping resampling procedure which involved drawing 5,000 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).

Table 4 presents a summary of the mediation analyses and indirect effects analyses for each of the four samples which used 5,000 bootstrapping resamples and bias corrected 95% confidence intervals.

The results of the indirect effects analyses for the three student samples, Sample 1 (S1), Sample 2 (S2), and Sample 3 (S3), were essentially the same (see Table 4). The paths from procrastination to self-compassion, and stress, and the paths from self-compassion to stress, were all significant (all $ps < 0.001$). The indirect effect of procrastination on perceived stress through self-compassion was also significant for each of the three samples. However, the direct effect of procrastination on stress in each of the three samples remained significant after accounting for the effects of self-compassion, indicating that self-compassion partially mediated the effects of procrastination on stress among the student samples.

For the adult community sample, Sample 4, the paths of procrastination to self-compassion and stress, and of self-compassion to stress, were significant. After accounting for the significant indirect effect of procrastination on stress through self-compassion (Table 4), the direct effect of procrastination on stress was no longer significant, suggesting that self-compassion mediated the link between procrastination and stress. A test of the homogeneity of regression slopes or the “*no interaction assumption*” was also conducted for each of the samples using the Preacher and Hayes macro *MEDIATE* (Preacher & Hayes, 2012). This test screens for a possible interaction between the independent variable, procrastination, and the mediator, self-compassion in the context of testing for mediation. The tests were non-significant indicating that self-compassion did not moderate the association between procrastination and stress.

Given the cross-sectional nature of these analyses a further mediation analysis was conducted on the Sample 4 longitudinal data, this time controlling for Time 1 perceived stress. After controlling for Time 1 stress the path from procrastination to Time 2 stress was no longer significant ($B = 0.12$; $p = 0.26$). However, the path from self-compassion to Time 2 stress remained significant even after controlling for both Time 1 stress ($B = -0.45$, $p < 0.001$) and procrastination ($B = -0.45$, $p < 0.001$). The indirect effect of procrastination on Time 2 stress through self-compassion after controlling for Time 1 stress was not significant, ($B = 0.08$; 95% CI: -0.02 ; 0.19). An inspection of the mean perceived stress scores for Time 1 ($M = 2.80$, $SD = 0.64$) and Time 2 ($M = 2.54$, $SD = 0.74$) revealed that Time 2 stress was lower than Time 1 stress. A paired samples *t*-test verifying whether there had been significant change in perceived stress from Time 1 to Time 2 was significant, $t(93) = 3.73$, Cohen’s $d = 0.39$, $p < 0.001$.

Discussion

The findings from this study provide support for the proposed relationship between procrastination and self-compassion. Across four different samples, procrastination was significantly associated with lower levels of self-compassion, and lower levels of self-compassion partially explained the indirect effects of procrastination on stress. The post hoc analyses further indicated that, although the strength of the association between procrastination and self-compassion appeared larger in the student samples compared to the adult sample, none of the tests comparing these associations was significantly different. However, the rather stringent test controlling for Time 1 stress in the supplemental analyses with the adult sample found that self-compassion but not procrastination explained the decreased levels of stress over time. The differences in the analyses between the student and adults samples are intriguing and suggest that the relationships among procrastination, self-compassion and stress may vary across different populations. These differences may be due in part to the lower average procrastination and stress scores in the adult sample compared to the student samples, or perhaps the smaller sample size at Time 2 in the adult sample. Nonetheless, the meta-analyses revealed an overall moderate negative effect size linking procrastination and self-compassion across the four samples.

As this is the first study to examine the role of self-compassion in explaining the stress associated with trait procrastination, the current findings add to an emerging body of research that probes the reasons for the higher levels of stress associated with procrastination noted in previous investigations (Flett et al., 1995, 2012; Sirois, 2007; Sirois et al., 2003). Previous work found a role for mindfulness, a component of self-compassion, in explaining the link between procrastination and stress (Sirois & Tosti, 2012). In the current study self-compassion partially mediated the procrastination–stress relationship indicating that, in addition to becoming over identified with the negative states associated with procrastination, negative self-judgments and feeling isolated by one’s procrastinating can be a stressful experience that compromises the well-being of those who chronically procrastinate.

The current findings expand on the growing body of research demonstrating the problems associated with lower levels of self-compassion (e.g., MacBeth & Gumley, 2012) by highlighting the self-regulation difficulties associated with not being self-compassionate. Whereas self-compassion is noted as a quality that can enhance self-regulation through reducing negative states and negative self-evaluations such as self-blame that can interfere with adaptive regulation and well-being (Allen & Leary, 2010; Neff & McGehee, 2009; Neff et al., 2007), procrastination is a form of self-regulation failure associated with negative self-evaluations (Flett et al., 1995, 2012; Stainton et al., 2000), self-blame (Sirois & Stout, 2011), and poor well-being (Martin et al., 1996; Rice et al., 2012; Sirois, 2007). The lower levels of self-compassion among chronic procrastinators noted across the four samples in the current study indicate that treating oneself harshly, with self-blame, criticism, and a general lack of kindness and acceptance after failure to act on intended actions may contribute to the stress associated with procrastinating and further compromise well-being, and potentially physical health. It is also conceivable that other negative ways of conceptualizing the self, such as self-criticism, may demonstrate the same pattern of findings found with lower levels of self-compassion in the current study. However, one could speculate that because having less self-compassion refers to a spectrum of negative ways of relating to the self that includes, but is not identical to, related constructs such as self-criticism (Neff, 2003a), the mediating role of self-compassion in the procrastination–stress relationship suggested by the current

findings may be unique to having less self-compassion. Future research on this issue is clearly needed to provide further insight into this important question.

Although the current findings are cross-sectional and focused on trait procrastination, it is possible that a lack of self-compassion may set the stage for initial instances of procrastination to become more chronic in nature. Indeed, research on procrastinatory cognitions, another form of negative self-evaluation associated with trait procrastination, suggests that this is quite possible (Stainton et al., 2000). Viewed from the lens of the theory of meta-cognitive awareness (Teasdale, Segal, & Williams, 1995) and other cognitive theories of incompleteness (Gold & Wegner, 1995), not being compassionate to oneself after procrastinating could contribute to the self-blame and over identification with negative states that arise from this act that could in turn promote becoming ruminatively focused on the unattained goal (i.e., end-state thinking) rather than on the ways to attain the goal. These negative self-evaluations could therefore promote a cycle of procrastination. Research demonstrating the link between having less self-compassion and fear of failure (Neff et al., 2005) provides further evidence for the possible multi-directional relationship between procrastination and self-compassion, as fear of failure is often cited as a reason for procrastination (Steel, 2007). Together with recent empirical work on the role of negative self-evaluations for interfering with task persistence (Evans, Baer, & Segerstrom, 2009), a role for low self-compassion in the development of a tendency to procrastination seems plausible.

From this perspective, the current findings also provide some insights into how to alleviate some of the stress associated with procrastination, and in doing so perhaps provide insight into how to reduce instances of situational procrastination. Interventions that focus on increasing self-compassion may be particularly beneficial for reducing the stress associated with procrastination. As noted previously there is mounting evidence that interventions such as mindfulness-based stress reduction (MBSR) and Mindful Self-compassion programs (MSC) are effective ways to increase self-compassion (Birnie, Speca, & Carlson, 2010; Lee & Bang, 2010; Neff & Germer, 2012; Rimes & Wingrove, 2011) and therefore may be useful for reducing the stress associated with trait procrastination. Rather than encouraging procrastination by minimizing the consequences of this problematic behavior, research indicates that interventions that increase self-compassion can help people recognize their part in negative events (such as failure to act in a timely manner) without becoming entangled with the associated negative emotions and the ruminative procrastinatory cognitions that can promote future procrastination (Stainton et al., 2000). For example, one study found that experimentally inducing a self-compassionate perspective helped people become less overwhelmed by their negative emotions in response to a negative event (Leary et al., 2007).

Accordingly, interventions that increase self-compassion may be beneficial to procrastinators because they reduce the negative states that promote short-term mood misregulation by disengaging from a difficult or aversive task (Sirois & Pychyl, in press). Evidence from a study examining the effects of a related construct, self-forgiveness, on procrastination supports this proposition. Students who had high levels of self-forgiveness for procrastinating on studying for their first midterm examination reported less studying procrastination on their subsequent midterm examination (Wohl, Pychyl, & Bennett, 2010). Moreover, decreased negative mood explained the link between increased self-forgiveness and reduced procrastination. Although self-forgiveness may only occur after a single act or event, self-compassion can be viewed as a quality that can be cultivated to help reduce overall self-judgment and over identification with the negative states. Interventions aimed at increasing self-compassion may therefore have more sustained effects for procrastinators.

Strengths and Limitations

This study has several limitations and strengths worth noting. Three of the four samples in which the links between procrastination, self-compassion and stress were examined were student samples. Although this may initially be seen as a shortcoming of the study, especially given the post hoc analyses, which suggested slightly weaker ties between self-compassion and procrastination in the adult sample, there is also reason to view this as a strength of the study. Procrastination rates, and especially chronic procrastination rates, are notably higher among student samples (50%) in comparison to community adult samples (15–20%; Steel, 2007). Students are therefore an appropriate population for examining the procrastination–stress relationship and qualities such as self-compassion, which may mediate this relationship. Indeed, in the current study the procrastination scores in the student samples were higher than the scores of the community adult sample when measured with the General Procrastination Scale (GPS; Lay, 1986). However, the test of the indirect effects found that self-compassion partially mediated the effects of procrastination on stress in the student samples whereas it more fully explained the effects in the adult sample. These results were only found for the GPS though and not the Adult Inventory of Procrastination (McCown & Johnson, 2001), which was not significantly associated with self-compassion in the smaller sample of adults. Future investigations should nonetheless examine these indirect effects in other adult samples to verify the current findings given the relatively small size of the adult community sample in the present study.

Given that three of the four samples used cross-sectional data from a single data collection, the directionality of the relationships among the study variables cannot be concluded from these findings. As discussed, it is possible that low self-compassion contributes to procrastination tendencies. Further longitudinal research is therefore needed to verify the direction of the effects.

One strength of the study worth mentioning is the use of several smaller samples to examine the associations of self-compassion with procrastination and stress using a meta-analysis. According to Hong and Paunonen (2009) replicating a relation between predictor and criterion variables in several small samples is preferable to finding that relation in a larger, pooled sample for several reasons. Among the advantages, using several smaller samples helps to control for Type I errors by decreasing the likelihood that the effects found are spurious. As well, the effects sizes found with smaller samples will have to be more substantial in order to reach significance. In the current study this replication strategy also provided several analyses from which to assess the overall association between procrastination and self-compassion using meta-analysis. Finally, the multiple sample approach allowed for a cross-validation of the finding that self-compassion accounts for some of the stress associated with procrastination with four independent samples thus providing stronger support for the proposition that trait procrastination is associated with low self-compassion.

Conclusion

The findings from the current study demonstrate that chronic procrastination is associated with lower levels of self-compassion in both students and adults from the community. The finding that having less self-compassion accounts in part for the stress associated with procrastination expands the existing literature on the links between procrastination and stress. By merging the research literature on procrastination and self-compassion, this study provides new insights into how the stress associated with procrastination may be reduced as well as highlighting the correlates and consequences of not being self-compassionate.

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