J Rat-Emo Cognitive-Behav Ther (2016) 34:169–186
DOI 10.1007/s10942-016-0235-1

Procrastination and Depression from a Cognitive Perspective: An Exploration of the Associations Among Procrastinatory Automatic Thoughts, Rumination, and Mindfulness

Alison L. Flett[1] · Mohsen Haghbin[1] · Timothy A. Pychyl[1]

Published online: 10 March 2016

Abstract Extensive research indicates that procrastination is associated with many maladaptive outcomes including diminished performance and greater psychological distress, but the specific factors and mechanisms associated with the vulnerability of procrastinators still need to be identified. The current study examined the associations among procrastination, ruminative brooding, mindfulness, and self-compassion. Procrastination was measured in terms of academic procrastination as well as a cognitive measure of procrastination examining the frequency of procrastination-related automatic thoughts. In addition to the main focus on the vulnerability of procrastinators, the question of whether students with multiple vulnerabilities would be particularly at risk for depression was also assessed. A sample of 214 undergraduate students completed measures of academic procrastination, procrastination-related automatic thoughts, rumination, mindfulness, self-compassion, and depression. Correlational analyses showed that both procrastination measures were associated with ruminative brooding as well as reduced mindfulness and self-compassion. Moderator-effect tests yielded no significant interactions. Overall, our findings highlight the relevance of cognitive factors in explaining procrastination and depression. Elevated levels on measures tapping cognitive risk factors (ruminative brooding and procrastination-related automatic thoughts) or a low level of protective, self-relevant cognitive factors associated with resilience (mindfulness and self-compassion) were related to a high level of procrastination and depression. These results imply that procrastinators might be vulnerable to depression due to the joint presence of these cognitive risk and resilience factors.

✉ Alison L. Flett
AlisonFlett@cmail.carleton.ca

[1] Department of Psychology, Carleton University, B550 Loeb, 1125 Colonel By Drive, Ottawa, ON K1S 5B6, Canada

Keywords Depression · Procrastination · Ruminative brooding · Automatic thoughts · Mindfulness · Self-compassion

Introduction

Deleterious Effects Aassociated with Procrastination

Psychologists generally agree that procrastination is the voluntary delay of an intended act despite the awareness that this needless delay will be detrimental in the longer term (e.g., Sirois and Pychyl 2013; Steel 2007). The damaging effects of procrastination are described in case accounts and in past research. For instance, Ferrari et al. (1995) provided compelling case descriptions of individuals who typically engage in self-defeating and self-damaging behaviour related to procrastination. These accounts illustrate that procrastination can have very serious consequences, and they complement empirical research that documents the costs and consequences of procrastination, including workplace problems such as unemployment or underemployment (e.g., Nguyen et al. 2013), negative health outcomes (e.g., Sirois et al. 2003; Sirois 2007, 2015), and adjustment problems including suicidal tendencies (Klibert et al. 2011).

Previously, Pychyl and Flett (2012) introduced a special issue of *the Journal of Rational-Emotive and Cognitive-Behavior Therapy* by discussing chronic procrastination as a type of self-regulatory failure that is complex and highly dysfunctional, especially when it is found among people who are characterized by other psychological vulnerabilities and behavioral problems. They noted further that procrastination can also undermine the therapeutic process, but fortunately, there are also indications that REBT and CBT can be effective in addressing the complexities inherent in the self-regulation failure experienced by maladjusted procrastinators (e.g., Dryden et al. 1999; Dryden and Sabelus 2012). Subsequent evidence has supported this interpretation (see Uzun Özer et al. 2013).

A Review of the Literature on Predictive Factors Linked with Procrastination

One topic that has been relatively neglected thus far is how risk and resilience factors are related to the cognitive functioning of procrastinators. In addition, there is a need to explore how these same factors influence susceptibility to the development and maladaptive responses associated with distress. To date, cognitively based studies have been focused on the effects of self-critical cognitions on indecisiveness (e.g., Harriott et al. 1996), frustration intolerance (e.g., Harrington 2005) or clinical studies involving a Rational-Emotive-Behavioral approach (e.g., Dryden 2000; Dryden and Sabelus 2012). However, much remains to be known about the thought processes and cognitive operations associated with procrastination. Accordingly, the current study was designed to address this gap in the research literature. Cognitively-based factors examined in the current study included one

factor typically associated with vulnerability to distress (i.e., ruminative brooding) and two factors that are typically protective (i.e., mindfulness and self-compassion).

A cognitive perspective was incorporated in three ways. First, the association between procrastination and rumination was investigated. The association between procrastination and ruminative brooding has not been investigated empirically despite the presence of conceptual models (e.g., Flett et al. 1995; Sirois and Pychyl 2013) that focus on maladaptive coping responses as key factors that underlie the link between procrastination and psychological distress. Second, as indicated above, cognitively-based protective factors were examined. Mindfulness and self-compassion are resilience resources that can mitigate the impact of negative factors that undermine well-being even in the face of stress or negative cognitions (Birnie et al. 2010; Frewen et al. 2008), and were expected to be associated negatively with procrastination and depression. Finally, while most procrastination research focuses on trait procrastination, the current study reflects an extended cognitive conceptualization of procrastination that went beyond a focus on academic procrastination to also study procrastination-related automatic thoughts (i.e., a procrastination-specific form of rumination). Stainton et al. (2000) created the Procrastinatory Cognitions Inventory in order to assess individual differences in the frequency of automatic thoughts related to dilatory behavior. They identified a procrastination-specific form of rumination in the form of automatic thoughts about tendencies to delay. The development of this scale was based on the foundational principle that the study of personality must strive to take into account both stable dispositional characteristics and how traits are cognitively expressed (Stainton et al. 2000; Cantor 1990). More recent research has established that frequent thoughts involving procrastination are associated with elevated levels of stress and distress (see Flett et al. 2012), but fundamental issues involving procrastination-related automatic thoughts have not been investigated. For instance, the extent to which procrastination thoughts are related to depressive rumination has not been examined.

A Call for Further Examination of the Link Between Procrastination and Rumination

Why should procrastinators be prone to experience rumination? Rumination is particularly likely among people who engage in chronic avoidance fuelled by self-doubts and low feelings of efficacy. General evidence has linked rumination with behavioral avoidance, cognitive-behavioral avoidance, and experiential avoidance (Cribbs et al. 2006; Krieger et al. 2013; Morina 2011; Moulds et al. 2007). This is relevant because extreme procrastinators are often characterized as habitually avoidant, self-focused and defensive, yet lacking a sense of personal efficacy or confidence (e.g., Ferrari et al. 1995). Also, procrastination is a tendency to have a reduced task orientation and involves a tendency to delay acting, and people who are focused on rumination rather than being engaged in a distracting task are more likely to be cognitively preoccupied in ways that sustain negative affect (Morrow and Nolen-Hoeksema 1990).

Rumination is typically measured using the Ruminative Responses Scale (RRS), which is composed of two separate factors, reflection and brooding. Whereas the

reflection factor of the scale is intended to measure the extent to which an individual engages in problem solving to alleviate depression, the brooding component measures the extent to which an individual passively compares the discrepancy between his or her current situation and an unachieved desired state. Brooding is the relevant component of the present study, as previous research by Treynor et al. (2003) suggests that the reflection factor is related to *less* depression over time but more depression concurrently, whereas the brooding factor is correlated positively with both (Treynor et al. 2003). This suggests that while reflection may be adaptive in reducing negative affect in the long-term, the brooding factor is not adaptive for psychological well-being in either the short-term or the long-term. Furthermore, the brooding component of rumination has been shown to be a more salient indicator of psychological distress among clinical populations (Wilkinson and Goodyer 2008). Collectively, these results suggest it is essential to separate the factors of rumination into brooding and reflection when predicting depression.

To the authors' knowledge, the association between procrastination and rumination has been assessed in only one previous study. Cohen and Ferrari (2010) showed that reflective rumination and indecision, a cognitive form of procrastination, may help aid the creative process. Unfortunately, while their study linked procrastination with the more adaptive reflection component of rumination, it did not report on the theoretically interesting and plausible link between procrastination and ruminative brooding. Furthermore, because the focus of the Cohen and Ferrari (2010) study was on decisional procrastination, it did not address how other ways of conceptualizing procrastination (i.e., academic procrastination and automatic thoughts) relate to rumination.

It follows that individuals who experience these ruminatory and procrastinatory automatic thoughts may be less prone to depression to the extent that they are characterized by either higher levels of mindfulness or self-compassion. Mindfulness is a cognitive state in which the person is focused on the present and there is a strong self-awareness that is nonjudgmental and non-reactive. For example, rather than ruminating on feelings or thoughts of despair and hopelessness, an individual learns to become aware of these emotions without automatically reacting to them. In treatment models, the practice of mindfulness can be conceptualized as a cognitive process in which distressing thoughts and feelings are observed and acknowledged without personal judgment (Segal et al. 2002). These therapies have been shown to enhance overall psychological well-being, even in response to chronic stressors (Brown and Ryan 2003), as well as reduce the likelihood of depression (Segal et al. 2002).

Initial research on procrastination and mindfulness was conducted by Pychyl and Rotblatt (2007) and by Sirois and Tosti (2012). Sirois and Tosti (2012) reasoned that procrastinators are low in mindfulness because although they are typically focused on the present rather than the past or the future, procrastinators tend to display a need to avoid unpleasant thoughts and feelings. As well, they typically display a propensity to engage in impulsive behaviours in response to self-esteem threats, which is in keeping with current research which found that both procrastination and impulsivity share considerable genetic variation primarily due to differences in goal management ability (Gustavson et al. 2014). Sirois and Tosti (2012) reported that

scores on the Lay (1986) General Procrastination Scale were associated negatively with scores on two mindfulness measures, including the instrument used in the current study. They also reported a small negative association between procrastination and mindfulness practices. Consequently, these individuals may find that mindfulness-based practices or interventions are beneficial in helping to restore psychological wellness (Sirois and Tosti 2012).

An important element of being high in mindfulness is developing a sense of self-compassion, which is an emotionally positive view whereby individuals feel warmth and understanding towards themselves when faced with life difficulties. Self-compassion provides several emotional benefits, as it is associated with well-being and resiliency (Neff and Pittman 2010). For instance, highly self-compassionate individuals show more intrinsic motivation in academic settings, experience less fear of failure, and are more able to accept negative feedback directed towards them (Neff et al. 2005). Most notably, the brooding component of the rumination scale conceptualized by Nolen–Hoeksema, unlike the reflection component, has emerged as a significant mediator in the link between self-compassion and depression (Raes 2010). With respect to procrastination, a meta-analysis conducted by Sirois (2014b) revealed that there is a moderate negative correlation between trait procrastination and self-compassion. Moreover, self-compassion was found to mediate the link between trait procrastination and stress, suggesting that some procrastinators may experience more stress due to reduced self-compassion (Sirois 2014b). The relation between self-compassion and lower procrastination (and lower stress) may seem counterintuitive at first, as it might be assumed that a more self-compassionate stance might result in more self-indulgent reconstruals of delay in a positive way, consequently resulting in more procrastination. Wohl et al. (2010), who found similar results with higher self-forgiveness resulting in less procrastination, explain that self-forgiveness (and self-compassion) change the motivation from an avoidance to approach orientation. Rather than continued brooding about the procrastination along with feelings of guilt or shame, acts of self-compassion like self-forgiveness allow the individual to try again accepting the previous failure of self-regulation, thereby alleviating past negative feelings. These results suggest that self-compassion, in addition to mindfulness, is an important resiliency resource for offsetting the effects of stress due to procrastination.

Goals of the Research

The primary goal of this research was to investigate whether both academic procrastination and procrastinatory cognitions would be associated significantly with ruminative brooding. While the link with rumination has largely been unexplored, there is some evidence linking procrastination with other measures of cognitive preoccupation such as worry (see Flett et al. 1995). The hypothesis was that both academic procrastination and procrastination-related automatic thoughts would be associated with ruminative brooding. If these relationships were supported, this would point to the possibility that certain procrastinators are prone to persistent depression and thus, require more individualized treatment interventions.

The second goal of this research was to evaluate the extent to which mindfulness and self-compassion relate to individual differences in cognitions related to procrastination. The current study evaluated the links that trait mindfulness has in relation to academic procrastination, procrastination-related automatic thoughts, and ruminative brooding in accordance with the claim that low mindfulness results in being cognitively preoccupied with thoughts that are difficult to control. In addition, this study sought to replicate and extend the work of Sirois (2014b) by evaluating the extent to which low self-compassion is linked with a tendency to experience procrastination-related automatic thoughts. While Sirois' research has demonstrated that procrastination is negatively correlated to mindfulness and self-compassion, there have been no attempts thus far to examine how these constructs relate to automatic thoughts related to procrastination. Therefore, in this study, the hypothesis was that higher levels of procrastination-related thoughts would be related to lower levels of mindfulness and self-compassion.

Through the use of multiple regressions, exploratory research was conducted in order to also test whether there are differences in how risk and resilience factors predict academic procrastination as opposed to procrastinatory cognitions. Furthermore, moderation models explored whether these same variables combined with procrastination scores to predict scores of depression. Interactions are possible to the extent that people are more at risk if they have multiple maladaptive tendencies; in this regard, poorer adjustment is possible when procrastination is combined with a less than optimal approach to cognitive and emotional self-regulation as reflected by tendencies to experience negative automatic thoughts and a relative lack of mindfulness or self-compassion. This research was exploratory in nature due to the paucity of existing research. However, from a conceptual perspective, it follows that participants who are characterized jointly by rumination and lower levels of mindfulness and self-compassion should be particularly at risk for depression. This is in keeping with the notion that ruminators who are procrastinators are self-focused and seem to lack a capacity to engage in positive tasks or forms of thinking that could serve as an effective distraction.

The issues outlined above were examined in a sample of university students. University students were selected as participants for two reasons. First, there is growing evidence of escalating adjustment problems among university students (Klibert et al. 2011). Second, procrastination is related to adjustment problems in university and college students (Eisenberg et al. 2013).

Methods

Participants and Procedure

A sample of 214 participants (152 women, 59 men, 3 undisclosed) with an average age of 20.2 years old were recruited from first and second year introductory psychology courses at a large, research-intensive Canadian university. In this regard, an Ethics Review Board formally approved this study. Ages of the participants ranged from 17 to 51 years, with about one-third of the population

reporting the most common age of 18 years old. The sample was 65.4 % Caucasian, 4.7 % African American, 1.9 % Aboriginal, 9.8 % Asian, 3.7 % Hispanic, and 9.4 % of South Asian and Middle Eastern descent. Mixed race individuals or those specifying another race comprised 5.1 % of the population. With respect to student status, full time students comprised 93 % of the total sample, whereas part-time students comprised 7 % of the total sample.

Volunteers could elect to participate in the online study hosted on the Qualtrics website in exchange for receiving bonus credit towards their final grade. Alternatively, participants could earn the equivalent bonus credit by choosing to select, read, and report on an assortment of psychological research articles. In the present study, participants completed a consent form, a demographics questionnaire, and a package of questionnaires that have been used extensively in previous research and have demonstrated validity for their use. Each measure is summarized briefly below.

Measures

Academic Procrastination

The Procrastination Academic Scale for Students (PASS) is a 44-item scale assessing the degree to which one exhibits procrastination tendencies related to academic tasks (Solomon and Rothblum 1984). Participants rate the degree to which they procrastinate on given tasks using a five-point Likert-type scale with options ranging from "never procrastinate" to "always procrastinate." This scale is used widely in assessing academic procrastination within student populations (Alexander and Onwuegbuzie 2007). With regards to reliability, one study indicated that the PASS measure had a Cronbach alpha of 0.85 (Alexander and Onwuegbuzie 2007). The present study produced a similar alpha of 0.83.

Procrastinatory Cognitions

The Procrastination Cognitions Inventory (PCI) is an 18-item scale requiring individuals to rate how often they have experienced particular thoughts over the past two weeks (Stainton et al. 2000). Sample items include "I need to be more responsible" and "why can't I just get started?" Participants are asked to indicate the frequency of their thoughts by rating their responses on a five-point Likert scale ranging from 0 (*meaning not at all*) to 4 (*meaning all of the time*). This measure has shown a high internal consistency with a Cronbach alpha of 0.94 (Flett et al. 2012). The PCI had an alpha of 0.94 in this study.

Ruminative Brooding

The Ruminative Response Scale (RRS) is a 22-item scale that measures the extent to which an individual experiences certain thoughts when they feel down, sad, or depressed (Nolen-Hoeksema and Morrow 1991). It is designed to evaluate whether a person is unable to let go of stressors or troubling thoughts after they occur.

Participants rate their responses on a scale from 1 (*almost never*) to 4 (*almost always*). Previous studies have shown this scale has good test–retest reliability (Nolen-Hoeksema et al. 1994). Furthermore, this scale has shown acceptable convergent and predictive validity (Nolen-Hoeksema and Morrow 1991). The current study examined the brooding factor, and its deleterious role in prolonging distress (see Treynor et al. 2003). Brooding is tapped by such items as "Why do I have problems other people don't have?" (Treynor et al. 2003). In the present study, the brooding subscale had an alpha of 0.84.

Mindfulness

The Mindful Awareness Attention Scale (MAAS) consists of 15 items intended to examine an individual's dispositional mindfulness (Brown and Ryan 2003). The scale includes items such as "I find it difficult to stay focused on what's happening in the present" and "I rush through activities without being really attentive to them." Respondents rate their response using a Likert scale ranging from 1 (*almost always*) to 6 (*almost never*). The MAAS is predictive of self-regulation and wellbeing constructs with a Cronbach alpha coefficient ranging from .82 to .87 (Brown and Ryan 2003). This is comparable to the alpha of 0.88 that was achieved.

Self-Compassion

The Self-Compassion Scale (SCS; Neff 2003) is a 26-item scale measuring the degree to which individuals are kind to themselves rather than self-critical when confronted with pain, failure, or stress. Participants are asked to rate their responses to statements using a five-point Likert scale ranging from 1 (*almost never*) to 5 (*almost always*). Sample items include, "I try to be loving towards myself when I'm feeling emotional pain," as well as, "when I fail at something important to me I become consumed by feelings of inadequacy." This measure has shown good test–retest reliability when compared across two time points (Neff 2003). In the present study, the SCS was found to have high internal consistency ($\alpha = .90$), which is consistent with previously reported alphas for this scale (Neff et al. 2007).

Depression

The Depression Anxiety Stress Scale (DASS) contains 42-items and includes 3 subscales that are designed to measure the degree to which someone has experienced depression, anxiety, and stress in the last week (Crawford and Henry 2003). The depression subscale was used in the present study. Participants rate their responses on a four-point Likert scale ranging from 0 (*did not apply to me at all)* to 3 (*applied to me very much, or most of the time*). The depression, anxiety, and stress subscales have shown acceptable reliability with Cronbach alphas of 0.91, 0.84, and 0.90 (Crawford and Henry 2003). The DASS has also shown acceptable convergent and discriminant validity (Crawford and Henry 2003). The present study produced a similar alpha of 0.95.

Results

Preliminary Statistics to Test General Assumptions

The data were inspected for missing values and there were very few. Little's MCAR test was conducted to test whether missing values were random. The test was not significant, suggesting that missing values were random, so the regression method was used to substitute missing values. Due to the nature of some of the variables seeming very closely related to one another, tests of partial correlations were completed to establish that the key measures in the current study were not redundant with each other. A partial correlation that controlled for brooding showed that the PCI was still related to depression ($r = .23$, $p < .01$), and the PASS was still related to depression ($r = .23$, $p < 0.01$). In addition, the PASS was still related to depression when controlling for the PCI ($r = .13$, $p = .05$), and more notably, the PCI was still related to depression when controlling for the PASS ($r = .33$, $p < .01$). Mindfulness was still related to depression ($r = -.13$, $p = .05$) when controlling for self-compassion; however self-compassion was no longer associated significantly with depression ($r = -.11$, $p = .10$) upon controlling for mindfulness.

Results of Correlational Analyses for Primary and Secondary Hypotheses

The primary research question for this study investigated whether both academic procrastination and procrastinatory cognitions were correlated significantly with ruminative brooding. As shown in Table 1, the hypothesis was supported, as ruminative brooding was positively associated with both academic procrastination and the PCI. In addition, the secondary research question for this study assessed the degree to which mindfulness and self-compassion relate to individual differences in cognitions related to procrastination. As was predicted, a significant negative correlation was found between the PCI and both mindfulness and self-compassion. It is important to note that the PCI was most robustly correlated with depression and ruminative brooding, suggesting that this measure serves the intended purpose of assessing a form of negative automatic thoughts.

Testing Exploratory Hypotheses Using Regression and Moderation Models

To study the extent to which ruminative brooding as a vulnerability factor and mindfulness and compassion as resilience factors were uniquely related to procrastination, two multiple regression analyses were conducted. Academic procrastination and PCI were defined as dependent variables in the first and second analyses respectively, with the above factors as the independent variables. Both regression models were significant and explained 21 and 37 % of variance in academic procrastination and cognitions related to procrastination (See Table 2). Both brooding and mindfulness had a significant and unique association with academic procrastination as well as procrastinatory cognitions. Self-compassion did not have a significant relation with academic procrastination after removing its

Table 1 Descriptive statistics including Pearson correlation coefficients

	1	2	3	4	5	6
1 PASS	–					
2 PCI	.66**	–				
3 MAAS	−.37**	−.44**	–			
4 SCS	−.33**	−.48**	.43**	–		
5 Brooding	.39**	.54**	−.43**	−.57**	–	
6 Depression	.42**	.50**	−.37**	−.44**	.65**	–
Alpha	.83	.94	.88	.90	.84	.95

** Correlation significant at .01 level (2-tailed); $n = 214$. *PASS* Procrastination Assessment Scale-Students, *PCI* Procrastinatory Cognitions Inventory, *MAAS* Mindful Attention Awareness Scale, *SCS* Self-Compassion Scale, *Brooding* ruminative brooding

Table 2 Regression results with brooding, mindfulness, and self-compassion predicting procrastination

	R^2	F	beta	T	p value
Regression 1	.21	18.55*			
Brooding			0.24	3.16	0.002
MAAS			−0.22	−3.16	0.002
SCS			−0.10	−1.25	0.212
Regression 2	.37	41.21*			
Brooding			0.34	4.91	0.000
MAAS			−0.21	−3.35	0.001
SCS			−0.20	−2.88	0.004

* $p < 0.001$; ΔR^2: R-squared change. Regression 1: Dependent variable = academic procrastination; Regression 2: Dependent variable = procrastinatory automatic thoughts. *Brooding* ruminative brooding, *MAAS* Mindful Awareness Attention Scale, *SCS* Self-Compassion Scale; N = 214

shared variance with mindfulness and brooding. The standard beta of self-compassion and the PCI were similar to mindfulness and the PCI total score, indicating both factors had unique effects with respect to the cognitive elements of procrastination. The regression analysis of the variables in the sample highlighted the importance of ruminative brooding in relation to these procrastinatory cognitions (see Regression 2 results in Table 2).

Next, two moderation models were tested using hierarchical multiple regressions. All independent and moderated variables were standardized to reduce possible collinearity in the second block. The variance inflation factor (VIF) for each predictor in both blocks was far less than 10, indicating no multicollinearity problem (e.g., Gordon 2012). A combination of Mahalanobis and Cook's Distance statistics were used to identify influential outliers. Less than 3 cases were identified in different analyses. Multiple regression analyses were used in samples with and

without identified cases. Since the results were almost identical, the results related to the full sample were only reported (N = 214).

A hierarchical multiple regression analysis was performed with depression as the outcome variable. The first prediction block consisted of the procrastination and brooding measures. This block was significant [$F(3,210) = 58.74$, $p = .000$] and accounted for 45.6 % of the variance in depression scores. The significant individual predictor within the block was brooding $\beta = .53$, $t = 8.66$, $p < 0.001$. In the next block, two-way interaction variables were added and were non-significant, accounting for less than 1.0 % of unique variance (see Table 3).

A similar analysis was conducted with academic procrastination, mindfulness, and self-compassion as the predictors of depression. The main effect predictors accounted for 29.1 % of the variance in depression scores [$F(3,210) = 28.72$, $p = .000$]. Significant individual predictors within the block were procrastination $t = 4.21$, $p < .001$, mindfulness, $t = -2.91$, $p < 0.05$, and self-compassion, $t = -4.32$, $p < .001$. Once again, the two-way interactions accounted for less than 1.0 % of the additional variance (see Table 4).

Discussion

The results of the current study illustrated the usefulness of examining procrastination from a cognitive perspective. The main hypothesis was that both trait procrastination and cognitions related to procrastination would be positively correlated with ruminative brooding. As expected, both procrastination measures were associated with ruminative brooding in keeping with the theory that elements of procrastination, including its association with chronic avoidance, point to a link between procrastination and rumination. Moreover, it was found that both procrastination measures and ruminative brooding were related to depression. In addition, partial correlation analyses showed that students' self-reported procrastination, as measured by the PCI and the PASS, was still related to their reports of

Table 3 Regression results with brooding, procrastination, and procrastinatory cognitions predicting depression

Blocks	ΔR^2	F	beta	T	p value
Main effect block	.456*	58.74*			
Brooding			.53	8.66	.000
PCI			.13	1.81	.072
PASS			.12	1.79	.074
Interaction block	.009	36.03*			
PASS × Brooding			0.08	1.12	.265
PASS × PCI			0.02	0.21	.835

* $p < 0.001$; ΔR^2: R-squared change. *Brooding* ruminative brooding, *PCI* procrastinatory cognitions inventory, *PASS* Procrastination Assessment Scale-Students; F for stage one and two are presented in the main and interaction blocks respectively

Table 4 Regression results with procrastination, self-compassion, and mindfulness predicting depression

Blocks	ΔR^2	F	beta	T	p value
Main effect block	.291[a]	28.72[a]			
PASS			.270	4.21	.000
MAAS			−.150	−2.19	.029
SCS			−.290	−4.32	.000
Interaction block	.009	17.84*			
PASS × MAAS			.004	0.05	.960
PASS × SCS			−0.099	−1.37	.174

* $p < 0.001$; ΔR^2: *R*-squared change. *PASS* Procrastination Assessment Scale-Students, *MAAS* Mindful Awareness Attention Scale, *SCS* Self-Compassion Scale; F for stage one and two are presented in the main and interaction blocks respectively

depression after statistically taking into account the considerable association that brooding had with depression.

The finding that procrastination is associated with ruminative brooding is noteworthy in several respects. This finding suggests that students who tend to procrastinate have a chronic tendency to cognitively dwell on their dysphoric feelings and on negative self-relevant information in a way that may keep self-doubts salient. While this significant association cannot imply causality, it does suggest that negative emotion and cognitive contemplation of one's procrastination contributes to the development of distress. Although future experimental and longitudinal research on this phenomenon is necessary to document causal paths, these initial results suggest that automatic negative cognitions should be a focus of clinical and counselling interventions for distressed procrastinators. It may be useful to incorporate an explicit focus on procrastinatory thoughts and ruminative tendencies in these interventions as well as treatments involving unguided self-help. Results provide further support that effective clinical interventions such as the one described in a recent paper by Rozental et al. (2015) would be improved further by incorporating an explicit focus on the removal of the ruminative response style and automatic thoughts related to procrastination.

As the results suggest, it may be argued that the notion that procrastination is an attempt at short-term mood repair needs to be qualified by noting that procrastinators not only have self-regulation failures described by Sirois and Pychyl (2013), they also have mood regulation failures. As evidenced by the moderation analyses, a higher level of brooding in conjunction with a higher level of procrastinatory cognitions does not appear to be linked with heightened distress compared to those with lower levels. However, future research should explore whether ruminating procrastinators are more resistant to change in the therapeutic context, and thus more impervious to common treatment methods. If ruminating procrastinators are susceptible to both self-regulation and mood regulation failures as the results suggest, a more tailored therapeutic approach for these individuals may be required.

Additional results indicated that both mindfulness and self-compassion were negatively related with automatic thoughts related to procrastination. These findings extend past research linking trait procrastination with mindfulness and self-compassion by showing that frequent rumination about procrastination also characterizes students who are relatively low in trait mindfulness and self-compassion. The negative association obtained between mindfulness and automatic thoughts involving procrastination qualifies past evidence of a negative association between mindfulness and general rumination and brooding (e.g., Alleva et al. 2014; Kiken and Shook 2014) by suggesting that the tendency for people low in mindfulness to ruminate is more general and extends to other forms of cognitive activity.

As mentioned previously, the most comprehensive assessment thus far of self-compassion and procrastination found across four samples that trait procrastination has a moderate negative association with self-compassion (Sirois 2014b). Findings from the current study indicate that this association extends to the experience of automatic thoughts involving procrastination and raise the possibility that certain procrastinators are cognitively preoccupied with the negative self-judgments that are central to their lack of self-compassion. It is possible that in the case of chronic procrastinators, self-compassion training may be useful for treatment as part of broader cognitive-behavioural interventions. For instance, Sirois (2014b) suggests that self-compassion interventions may be beneficial for reducing the stress that is associated with procrastination, because an individual can recognize the costs and consequences of procrastination while inhibiting negative emotions and rumination. However, further research on this particular phenomenon is warranted.

This study is unique in terms of its conceptual and empirical focus on procrastinatory cognitions and ruminative brooding. To date, to the authors' knowledge, there is no study that examines the link between these two constructs. Results showed that procrastination-related automatic thoughts were moderately correlated with ruminative brooding. More specifically, results provide support for the concept that procrastination is related to the inability to regulate emotion or control the occurrence of negative automatic thoughts. Some individuals who procrastinate may be particularly prone to distress if they ruminate about their delay and make speculations about how this reflects an inadequacy or personal flaw in character. Given that procrastination has been linked with poorer health, treatment delay, perceived stress, and fewer wellness behaviours (Sirois et al. 2003), it seems imperative to take into account the role of ruminative brooding with respect to the maintenance of physical and mental well-being. Furthermore, given recent data linking procrastination with the tendency to experience cognitive failures (Sirois 2014a), future research needs to examine whether ruminative brooding underpins this relationship.

This study also showed that those students who self-report more frequent procrastination-related thoughts also tend to be low in self-compassion. Perhaps these thoughts are limiting the ability of distressed students to engage in self-compassion and to experience life in a mindful way. Ultimately, an inability to control these negative automatic thoughts may exacerbate their procrastination and related forms of avoidant behaviour. The ability to be self-compassionate is likely a

key contributing factor in the process of overcoming these procrastinatory thoughts and the subsequent behaviours that accompany them. This is in keeping with a study by Wohl et al. (2010) which showed that individuals who reported high procrastination but who also forgave themselves (an act of self-compassion) were less likely to procrastinate on the same task in the future than those who reported a lack of forgiveness.

Multiple regression models were used to explore whether the risk factors (ruminative brooding) and resilience factors (mindfulness, self-compassion) uniquely predict the occurrence of both academic procrastination and procrastinatory cognitions. Results showed that brooding and mindfulness each had significant and unique associations with academic procrastination. Furthermore, brooding, mindfulness and self-compassion all had a significant and unique association with thoughts related to procrastination. Altogether, this suggests that these risk and resilience factors are a key contributing component of both forms of procrastination. Furthermore, within these models, the variance attributable to these risk and resilience factors was much greater when evaluating the PCI as the outcome variable in comparison to the PASS (with an explained variance of 37 versus 21 %, respectively). Although ruminative brooding, mindfulness, and self-compassion are components of academic procrastination, these results suggest that these risk and resilience factors are more predictive of the occurrence of negative automatic thoughts associated with procrastination.

Furthermore, statistical tests of moderation were used to explore whether risk factors (ruminative brooding, procrastinatory cognitions) and resilience factors (mindfulness, self-compassion) jointly combined to predict scores of depression. However, no evidence was found with respect to interaction effects among these same variables. These results suggest that students who have multiple vulnerabilities (i.e., procrastination, rumination, low self-compassion) are more prone to depression than students with one or none of the vulnerability factors, but it does not seem to be due to these factors combining with each other to produce elevated risk. In retrospect, it may be more plausible to test mediational models involving these factors. However, a meditational approach was not implemented in the current work despite its apparent usefulness due to the need to develop plausible conceptual models that would support this approach and because cross-sectional data are not well suited for the exploration of mediation (Baron and Kenny 1986; Maxwell and Cole 2007).

It is important to also acknowledge that the findings provide further support for the link between procrastination and depression. As expected, procrastination and depression were linked significantly, but the association between depression and procrastination-related thoughts was stronger in magnitude than might be anticipated. A meta-analysis shows that across studies, trait procrastination is associated with depression with an average correlation of 0.28 (Steel 2007). Another recent study found that trait procrastination had a significant correlation of only .17 (see Uzun Özer et al. 2014). The results from the present study suggest that procrastinatory cognitions are more strongly related to depression than academic procrastination is related to depression. In addition, the partial correlation showing that the PCI was significantly related to depression when controlling for the PASS

($r = .33$, $p < .01$) further demonstrates that the PCI was the stronger predictor of depression as compared to the PASS. These results imply that the extent of the link between procrastination and depression depends, in part, on how procrastination is measured and that the link with procrastination-related automatic thought and depression is much more robust than is suggested by past meta-analyses.

While the emphasis in this study was on the substantive findings, additional results suggest that the PCI is a useful tool that provides insight into the degree to which individuals who engage in a high degree of procrastinatory cognitions experience distress. As Flett et al. (2012) note, this measure can be used as an indicator of whether cognitive-behavioural interventions have been successful in alleviating the frequency of these thoughts, as well as decreasing the rate of procrastination in general. While the frequency of the maladaptive thoughts associated with procrastination can reflect past difficulties in overcoming delay, cognitions may also reflect a concern about anticipated failures and shortcomings (Flett et al. 2012). Given the negative link found between mindfulness and procrastination-related automatic thoughts in the current research, it would be intriguing in future research to evaluate whether a mindfulness intervention helps those who procrastinate better manage their negative cognitions.

Limitations and Future Directions

Some key limitations of the study must be noted. First, this study was conducted with university students and there is a possibility that these results may not generalize to other populations. The results from this sample apply to levels of less severe depression and should not necessarily be compared to levels of clinical depression. Given the reliance on self-report data, there is also the possibility that the data were influenced by biased responses. Moreover it must also be acknowledged that the link between procrastination and depression is bidirectional in nature. However, the decision to use procrastination, rather than depression, as the predictor variable in both regression models rested on a key theoretical distinction. When a non-depressed agent procrastinates, they are said to be consciously aware that their action is contrary to their best interests; by this view, procrastination is considered a self-regulatory failure or weakness of will (Mele 2012; Stroud 2010). In contrast, the source of procrastination for depressed agents is difficult to discern because they experience emotional dysregulation and impairments in self-regulation that may impact their practical reasoning and intentions to act (Mele 2012). For this reason, in this study, procrastination was chosen as the more meaningful predictor variable to assess in relation to depression. Lastly, since this study was cross-sectional rather than longitudinal, no conclusions can be drawn about the causal directionality between these variables. Future research may focus on modeling the complex relations among these variables over time. Overall, it is the authors' view that the results are not undermined by these limitations. This study aimed at evaluating academic procrastination among a student sample. As well, the results are empirically similar to past studies and there is a clear theoretical basis for the expected relations between the variables.

Overall Conclusions

In summary, the results of the present study advance what is currently known about procrastination and maladjustment from a cognitive perspective in several ways. The findings showed that ruminative brooding and procrastination-related automatic thoughts are linked with depression and trait procrastination. Furthermore, findings showed self-compassion and mindfulness as both negatively related to procrastinatory automatic thoughts and depression. Procrastination was found to be a modest predictor of depression despite taking into account varying levels of risk and resilience factors.

The results of the study indicate that interventions should take into account the role of ruminative brooding and procrastinatory cognitions as well as protective factors such as mindfulness that might serve to counteract the effects of these self-defeating cognitions. As such, the findings have clear practical implications in terms of highlighting the negative cognitive styles and tendencies of distressed procrastinators and underscoring the need to bolster positive resources and orientations.

References

Alexander, E. S., & Onwuegbuzie, A. J. (2007). Academic procrastination and the role of hope as a coping strategy. *Personality and Individual Differences, 42*, 1301–1310.

Alleva, J., Roelofs, J., Voncken, M., Meevissen, Y., & Alberts, H. (2014). On the relation between mindfulness and depressive symptoms: Rumination as a possible mediator. *Mindfulness, 5*, 72–79.

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*, 1173–1182.

Birnie, K., Speca, M., & Carlson, L. E. (2010). Exploring self-compassion and empathy in the context of mindfulness-based stress reduction. *Stress and Health: Journal of the International Society for the Investigation of Stress, 26*, 359–371.

Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: The role of mindfulness in psychological well-being. *Journal of Personality and Social Psychology, 84*, 822–848.

Cantor, N. (1990). From thought to behavior: "Having" and "doing" in the study of personality and cognition. *American Psychologist, 45*, 735–750.

Cohen, J. R., & Ferrari, J. R. (2010). Take some time to think this over: The relation between rumination, indecision, and creativity. *Creativity Research Journal, 22*, 68–73.

Crawford, J. R., & Henry, J. D. (2003). The Depression Anxiety Stress Scales (DASS): Normative data and latent structure in a large non-clinical sample. *British Journal of Clinical Psychology, 42*, 111–131.

Cribbs, G., Moulds, M., & Carter, S. (2006). Rumination and experiential avoidance in depression. *Behaviour Change, 23*, 168–176.

Dryden, W. (2000). *Overcoming procrastination*. London: Sheldon Press.

Dryden, W., Neenan, M., & Yankura, J. (1999). *Counselling individuals: A rational emotive behavioural handbook* (3rd ed.). Philadelphia, PA: Whurr Publishers.

Dryden, W., & Sabelus, S. (2012). The perceived credibility of two rational emotive behavior therapy rationales for the treatment of academic procrastination. *Journal of Rational-Emotive & Cognitive Behavior Therapy, 30*, 1–24.

Eisenberg, D., Hunt, J., & Speer, N. (2013). Mental health in American colleges and universities: Variation across student subgroups and across campuses. *Journal of Nervous and Mental Disease, 201*, 60–67.

Ferrari, J. R., Johnson, J. L., & McCown, W. G. (1995). *Procrastination and task avoidance*. New York, NY: Plenum Press.

Flett, G. L., Blankstein, K. R., & Martin, T. R. (1995). Procrastination, negative self-evaluation, and stress in depression and anxiety: A review and preliminary model. In J. R. Ferrari & J. L. Johnson (Eds.), *Procrastination and task avoidance: Theory, research, and treatment* (pp. 137–167). New York: Plenum Press.

Flett, G. L., Stainton, M., Hewitt, P. L., Sherry, S. B., & Lay, C. (2012). Procrastination automatic thoughts as a personality construct: An analysis of the Procrastinatory Cognitions Inventory. *Journal of Rational-Emotive & Cognitive-Behavior Therapy, 30*, 223–236.

Frewen, P. A., Evans, E. M., Maraj, N., Dozois, D. J. A., & Partridge, K. (2008). Letting go: Mindfulness and negative automatic thinking. *Cognitive Therapy and Research, 32*, 758–774.

Gordon, R. A. (2012). *Applied statistics for the social and health sciences*. New York, NY: Routledge.

Gustavson, D. E., Mikaye, A., Hewitt, J. K., & Friedman, N. P. (2014). Genetic relations among procrastination, impulsivity, and goal-management ability: Implications for the evolutionary origin of procrastination. *Psychological Science, 25*, 1178–1188.

Harrington, N. (2005). It's too difficult! Frustration intolerance beliefs and procrastination. *Personality and Individual Differences, 39*, 873–883.

Harriott, J. S., Ferrari, J. R., & Dovidio, J. F. (1996). Distractibility, daydreaming, and self -critical cognitions as determinants of indecision. *Journal of Social Behavior and Personality, 11*, 337–344.

Kiken, L. G., & Shook, N. J. (2014). Does mindfulness attenuate thoughts emphasizing negativity, but not positivity? *Journal of Research in Personality, 53*, 22–30.

Klibert, J., Langhinrichsen-Rohling, J., Luna, A., & Robichaux, M. (2011). Suicide proneness in college students: Relationships with gender, procrastination, and achievement motivation. *Death Studies, 35*, 625–645.

Krieger, T., Altenstein, D., Baettig, I., Doerig, N., & Holtforth, M. (2013). Self-compassion in depression: Associations with depressive symptoms, rumination, and avoidance in depressed outpatients. *Behavior Therapy, 44*, 501–513.

Lay, C. H. (1986). At last, my research in procrastination. *Personality and Individual Differences, 20*, 479–495.

Maxwell, S. E., & Cole, D. A. (2007). Bias in cross-sectional analyses of longitudinal mediation. *Psychological Methods, 12*, 23–44.

Mele, A. (2012). *Backsliding: Understanding weakness of will*. New York: Oxford University Press.

Morina, N. (2011). Rumination and avoidance as predictors of prolonged grief, depression, and posttraumatic stress in female widowed survivors of war. *The Journal of Nervous and Mental Disease, 199*, 921–927.

Morrow, J., & Nolen-Hoeksema, S. (1990). Effects of responses to depression on the remediation of depressive affect. *Journal of Personality and Social Psychology, 58*, 519–527.

Moulds, M. L., Kandris, E., Starr, S., & Wong, A. C. M. (2007). The relationship between rumination, avoidance, and depression in a non-clinical sample. *Behaviour Research and Therapy, 45*, 251–267.

Neff, K. D. (2003). Development and validation of a scale to measure self-compassion. *Self and Identity, 2*, 223–250.

Neff, K. D., Hsieh, Y., & Dejitthirat, K. (2005). Self-compassion, achievement goals, and coping with academic failure. *Self and Identity, 4*, 263–287.

Neff, K. D., & Pittman, M. (2010). Self-compassion and psychological resilience among adolescents and young adults. *Self and Identity, 9*, 225–240.

Neff, K. D., Rude, S. S., & Kirkpatrick, K. (2007). An examination of self-compassion in relation to positive psychological functioning and personality traits. *Journal of Research in Personality, 41*, 908–916.

Nguyen, B., Steel, P., & Ferrari, J. R. (2013). Procrastination's impact in the workplace and the workplace's impact on procrastination. *International Journal of Selection and Assessment, 21*, 388–399.

Nolen-Hoeksema, S., & Morrow, J. (1991). A prospective study of depression and posttraumatic stress symptoms after a natural disaster: The 1989 Loma Prieta earthquake. *Journal of Personality and Social Psychology, 61*, 115–121.

Nolen-Hoeksema, S., Parker, L. E., & Larson, J. (1994). Ruminative coping with depressed mood following loss. *Journal of Personality and Social Psychology, 67*, 92–104.

Pychyl, T. A., & Flett, G. L. (2012). Procrastination and self-regulatory failure: An introduction to the special issue. *Journal of Rational-Emotive & Cognitive-Behavior Therapy, 30*, 203–212.

Pychyl, T. A. & Rotblatt, A. (2007, July). *Mindfulness meditation as an intervention for academic procrastination*. Paper presented at the biennial conference Counseling the Procrastinator in Academic Settings, Catholic University of Peru, Lima, Peru.

Raes, F. (2010). Ruminating and worrying as mediators of the relationship between self-compassion and anxiety and depression. *Personality and Individual Differences, 48*, 757–761.

Rozental, A., Forsell, E., Svensson, A., Andersson, G., & Carlbring, P. (2015). Internet-based cognitive behaviour therapy for procrastination: A randomized control trial. *Journal of Consulting and Clinical Psychology, 83*, 808–824.

Segal, Z. V., Williams, J. M. G., & Teasdale, J. D. (2002). *Mindfulness-based cognitive therapy for depression: A new approach to preventing relapse*. New York, NY: Guilford Press.

Sirois, F. M. (2007). "I'll look after my health, later": A replication and extension of the procrastination-health model with community-dwelling adults. *Personality and Individual Differences, 43*, 15–26.

Sirois, F. M. (2014a). Absorbed in the moment? An investigation of procrastination, absorption, and cognitive failures. *Personality and Individual Differences, 71*, 30–34.

Sirois, F. M. (2014b). Procrastination and stress: Exploring the role of self-compassion. *Self and Identity, 13*, 128–145.

Sirois, F. M. (2015). Is procrastination a vulnerability factor for hypertension and cardiovascular disease? Testing an extension of the procrastination-health model. *Journal of Behavioral Medicine, 38*, 578–589.

Sirois, F. M., Melia-Gordon, M. L., & Pychyl, T. A. (2003). "I'll look after my health later": An investigation of procrastination and health. *Personality and Individual Differences, 35*, 1167–1184.

Sirois, F. M., & Pychyl, T. A. (2013). Procrastination and the priority of short-term mood regulation: Consequences for future self. *Social and Personality Compass, 7*, 115–127.

Sirois, F. M., & Tosti, N. (2012). Lost in the moment? An investigation of procrastination, mindfulness, and well-being. *Journal of Rational-Emotive & Cognitive-Behavior Therapy, 30*, 237–248.

Solomon, L. J., & Rothblum, E. D. (1984). Academic procrastination: Frequency and cognitive-behavioral correlates. *Journal of Counseling Psychology, 31*, 503–509.

Stainton, M., Lay, C. H., & Flett, G. L. (2000). Trait procrastinators and behavior/trait-specific cognitions. *Journal of Social Behavior and Personality, 15*, 297–312.

Steel, P. (2007). The nature of procrastination: A meta-analytic and theoretical review of quintessential self-regulatory failure. *Psychological Bulletin, 133*, 65–94.

Stroud, S. (2010). Is procrastination weakness of will? In C. Andreou & M. D. White (Eds.), *The thief of time: philosophical essays on procrastination* (pp. 51–67). New York, NY: Oxford University Press.

Treynor, W., Gonzalez, R., & Nolen-Hoeksema, S. (2003). Rumination reconsidered: A psychometric analysis. *Cognitive Therapy and Research, 27*, 247–259.

Uzun Özer, B., Demir, A., & Ferrari, J. R. (2013). Reducing academic procrastination through a group treatment program: A pilot study. *Journal of Rational-Emotive & Cognitive-Behavior Therapy, 31*, 127–135.

Uzun Özer, B., O'Callaghan, J., Bokszczanin, A., Ederer, E., & Essau, C. (2014). Dynamic interplay of depression, perfectionism, and self-regulation on procrastination. *British Journal of Guidance and Counselling, 42*, 309–319.

Wilkinson, P. O., & Goodyer, I. M. (2008). The effects of cognitive-behavioural therapy on mood-related ruminative response style in depressed adolescents. *Child and Adolescent Psychiatry and Mental Health, 2*, 3.

Wohl, M. J. A., Pychyl, T. A., & Bennett, S. H. (2010). I forgive myself, now I can study: How self-forgiveness for procrastinating can reduce future procrastination. *Personality and Individual Differences, 48*, 803–808.