

Anxiety, Depression, and Procrastination Among Students: Rumination Plays a Larger Mediating Role than Worry

Kaytlin Constantin¹ · Megan M. English² · Dwight Mazmanian³

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Abstract Procrastination is prevalent among students and is associated with negative outcomes, including poor academic performance and psychological distress. Research also suggests that anxiety and depression can exacerbate procrastination; however, the mechanisms associated with the development of procrastination are less understood. The current study aimed to clarify the role of negative repetitive thought (i.e., rumination and worry) in the links between anxiety and procrastination, and depression and procrastination. Ninety-one undergraduate students completed self-report measures of anxiety, depression, worry, brooding rumination, and procrastination, and two multiple mediator models were tested. Procrastination was positively correlated with the study variables, including medium effects for anxiety and depression, a large effect for rumination, and a small effect for worry. Rumination independently mediated the relationships between anxiety and procrastination, and depression and procrastination. Worry did not independently mediate these

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✉ Megan M. English
Megan.English@easternhealth.ca

Kaytlin Constantin
kaytlin@uoguelph.ca

Dwight Mazmanian
dwight.mazmanian@lakeheadu.ca

¹ Department of Psychology, University of Guelph, 87 Trent Lane, Guelph, ON N1G 2W1, Canada

² Eastern Health, Medicine Program, Health Sciences Centre, 300 Prince Phillip Drive, St. John's, NL A1B 3V6, Canada

³ Department of Psychology, Lakehead University, 955 Oliver Road, Thunder Bay, ON P7B 5E1, Canada

relationships. The current findings suggest rumination plays a larger role in the links between anxiety, depression, and procrastination than worry. Thus, students with higher levels of anxiety and depression engage in more negative repetitive thought, which may contribute to procrastinatory behavior as a result of a preoccupation with depressing or painful thoughts about the past.

Keywords Procrastination · Depression · Anxiety · Rumination · Worry · Negative repetitive thought

Introduction

Procrastination is often defined as a delay in beginning or completing an “intended course of action despite expecting to be worse off for the delay” (Steel 2007, p. 66), and is common among university students. Research findings indicate that 30–60% of students report that they frequently delay completing tasks—particularly educational assignments (e.g., studying, writing papers; Onwuegbuzie 2004). Furthermore, anxiety and depression are positively correlated with delays in completing tasks on time and meeting deadlines (Fernie et al. 2016a, b; Spada et al. 2006). Procrastination is also associated with higher levels of overall psychological distress (e.g., more intense symptoms, impairment in social and interpersonal functioning; Fernie et al. 2016a; Rice et al. 2012), stress (Fernie et al. 2016a; Schraw et al. 2007; Sirois and Tosti 2012), daily hassles (Stead et al. 2010), and low self-esteem and self-compassion (Flett et al. 2016; Sirois 2014a) among students. In addition to being a consequence of procrastination, negative moods may also exacerbate this behavior (e.g., Rozental et al. 2015a). That is, students may be more likely to delay tasks when they are experiencing higher levels of psychological distress.

Procrastination and Psychological Distress

Task aversiveness is a common reason cited for procrastination (Ferrari and Scher 2000; Onwuegbuzie 2004; Schraw et al. 2007). When a task is viewed as aversive (e.g., difficult, boring, frustrating), this may lead to negative mood states and be put off in exchange for activities viewed as enjoyable (Blunt and Pychyl 2000; Pychyl et al. 2000; Sirois and Pychyl 2013). Research indicates that tasks may be avoided in order to manage unpleasant feelings, despite negative future consequences (e.g., completing an assignment at a later time; Sirois and Pychyl 2013; Tice and Bratslavsky 2000). A previous study involving a negative mood induction indicated that participants preparing for a math test engaged in higher levels of procrastination if alternative options were viewed as enjoyable (e.g., video games) compared to those viewed as boring (e.g., preschool-level video games; Tice et al. 2001). Thus, procrastination and task avoidance may be viewed as a method to cope with negative moods and to escape or avoid unpleasant feelings (Sirois 2004; Tice and Bratslavsky 2000; Tice et al. 2001). Consistent with this notion, recent evidence

suggests that a subgroup of procrastinators is characterized by poor emotion regulation, and may prioritize the management of aversive mood states over goal pursuit (Rebetez et al. 2015). Individuals experiencing negative emotional states, such as depression and anxiety, may delay long-term goal-directed behavior as a short-term mood regulation strategy (Sirois and Pychyl 2013).

Symptoms of anxiety and depression often co-occur and are experienced in approximately one-third of student populations (American Psychiatric Association 2013; Bitsika and Sharpley 2012). Previous research indicates a positive relationship between anxiety and procrastination, with procrastinators experiencing greater levels of anxiety compared to non-procrastinators (Ferrari 1991; Fernie et al. 2016a, b; Flett et al. 1995; Haycock et al. 1998). Specifically, thinking about previous procrastination behaviors contributes to feelings of anxiety (Lay 1994; Schraw et al. 2007). Further, evidence suggests that students are more likely to procrastinate early in the semester on academic tasks that they perceive to be most effortful and anxiety-provoking (e.g., homework, studying; Ferrari and Scher 2000). Prior research also indicates that depression is positively linked to dispositional avoidance (i.e., tendency to avoid situations and problems) and procrastination, independent of symptoms of anxiety (Cribb et al. 2006; Fernie et al. 2016a, b; 2017; Flett et al. 2016; Spada et al. 2006; Steel 2007). This link may be partially explained by the symptomatology of depressive disorders (Rozenal et al. 2015a). For example, reduced pleasure in daily life events, low levels of energy, and difficulties concentrating are associated with depression (American Psychiatric Association 2013) and may hinder one's ability to initiate and complete tasks (Rozenal et al. 2015a). In fact, students report fatigue and lack of concentration as a common reason for delaying tasks (Schraw et al. 2007; Strongman and Burt 2000). Based on these findings, it appears that there is an established link between experiencing negative moods, such as anxiety and depression, and engaging in procrastination. However, the mediating processes that underlie these links are less understood.

Potential Roles of Worry and Rumination

Anxiety and depression are both characterized by cognitive processes linked to negative repetitive thought (Beckwé et al. 2014). Worry is negatively-affect laden and involves thoughts about future events in which the outcome is uncertain (Borkovec et al. 1983). Rumination, particularly the brooding subtype, is also related to negative affect and is characterized by self-focused attention on previous events (Treyner et al. 2003). Worry and rumination share similar cognitive processes and are both correlated with anxiety and depression (Segerstrom et al. 2000). However, despite conceptual overlap, worry and rumination differ in regards to their temporal focus (i.e., future vs. past), and are considered distinct constructs (Goring and Papageorgious 2008; Watkins et al. 2005).

Worry is positively linked to procrastination (Spada et al. 2006), beyond the effects of anxiety and depression (Stöber and Joormann 2001). Individuals with higher levels of worry are slower to make decisions and tend to have elevated fear of failure, which may contribute to procrastination (Metzger et al. 1990). In fact,

research indicates that fear of failure is also linked to procrastination (Haghbin et al. 2012) and is another common reason for task delay among students (Onwuegbuzie 2004). Prior research demonstrates that anxiety and depression are no longer linked to procrastination when controlling for worry, suggesting that worry might be a mediating link underlying psychological distress and procrastination (Stöber and Joormann 2001).

The past-oriented thought pattern of rumination is also positively associated with procrastination, as well as other forms of avoidance (e.g., distraction from thoughts, emotion suppression; Cribb et al. 2006; Flett et al. 2016). Furthermore, thinking about past avoidant behavior and the failure to complete intended tasks is linked to higher levels of stress and psychological distress (i.e., anxiety and depression; Flett et al. 2012) and lower levels of self-compassion and mindfulness (Flett et al. 2016). Thus, students who procrastinate may have a tendency to dwell on negative feelings and self-relevant information, which contributes to further distress (Flett et al. 2016). Moreover, this self-focused attention reduces the availability of cognitive resources required for the completion of various academic tasks (Ferne et al. 2016a, 2017). A concept introduced by Stainton et al. (2000), namely procrastinatory cognitions, provides additional evidence of the link between rumination and procrastination. This construct is characterized by automatic thoughts related to dilatory behavior, such as failing to meet personal or social expectations, and ruminative brooding about procrastination. The frequency of procrastinatory cognitions has been found to mediate the relationship between trait procrastination and negative affect (Stainton et al. 2000). Self-focused ruminative brooding may have similar effects in the relation between anxiety, depression, and procrastination.

Examining both worry and rumination in the relation between anxiety, depression, and procrastination may help clarify whether either of these cognitive processes play a larger role in contributing to procrastination among students, and might therefore be more relevant to target in a treatment context. Currently, cognitive-behavioral treatments for procrastination include behavioral interventions that address time-management and goal-setting techniques, and cognitive interventions that focus on dysfunctional or irrational beliefs (e.g., self-doubt, fear of failure; Dryden and Sabelus 2012; Rozental et al. 2015b; Uzun Ozer et al. 2013). By examining the potential role of worry and rumination, findings from the current study may provide insight into past- and future-oriented cognitive models that examine how procrastination develops and is maintained among students, and suggest targets for prevention and intervention.

Current Investigation

The aim of the current study was to explore the role of negative repetitive thought as the underlying process linking anxiety and procrastination, as well as linking depression and procrastination. First, the relations between anxiety, depression, negative repetitive thoughts (i.e., rumination and worry) and procrastination were investigated. Additionally, rumination and worry were examined as mediators between anxiety and procrastination, and depression and procrastination. In

accordance with the prior literature, it was hypothesized that worry and rumination both individually and in combination mediate these relations.

Method

Participants

Ninety-one students recruited from undergraduate courses at a Canadian university completed measures of anxiety, depression, procrastination, rumination, and worry. The mean age of the sample was 21.20 years ($SD = 5.69$; range = 18–47 years), and the sample was predominantly White (86.5%), female (72.5%), and either single (58.4%) or in a committed relationship (41.6%). The majority of the sample were full-time students (93.5%) in their first year of study (63.7%).

Self-Report Questionnaires

Depression Anxiety and Stress Scales-21 (DASS-21; Antony et al. 1998)

The DASS-21 is a 21-item self-report instrument that independently measures depression, anxiety, and stress. The depression (e.g., “I felt downhearted and blue”) and anxiety (e.g., “I felt I was close to panic”) scales were examined in the current study. Items are rated on a four-point Likert-type scale ranging from zero (*did not apply to me at all*) to three (*applied to me very much, or most of the time*), with higher scores indicative of greater levels of symptoms. Cronbach’s alphas for the depression and anxiety scales were .91 and .85, respectively, in the current study.

Irrational Procrastination Scale (IPS; Steel 2002)

The IPS is a 9-item self-report measure of the severity of procrastination behaviors (e.g., “I delay tasks beyond what is reasonable”). Participants responded on a five-point Likert-type scale (1 = *not or very seldom true*; 5 = *very often or always true*), with higher scores indicative of higher levels of procrastination. This measure demonstrates construct validity with other measures of procrastination (e.g., Pure Procrastination Scale; Steel 2010) and test–retest reliability after four months ($r = .67$; Steel 2002, 2010). Additionally, the IPS is negatively related to measures of conscientiousness and self-discipline, and positively correlated with measures of impulsiveness and academic delay (Steel 2002, 2010). Cronbach’s alpha for this scale was .90 in the present study, which is similar to previous research (e.g., Steel 2010; Steel and Ferrari 2013).

Ruminative Responses Scale (RRS; Treynor et al. 2003)

The 5-item brooding subscale of the RRS was used in the present study to assess preoccupation with depressing or painful thoughts (e.g., “Think ‘Why can’t I handle things better?’”). Participants rated their response on a four-point Likert-type scale

ranging from zero (*almost never*) to three (*almost always*), and higher levels are indicative of greater brooding rumination. Cronbach's alpha for the brooding subscale was .82 for the present study.

Penn State Worry Questionnaire (PSWQ; Meyer et al. 1990)

The PSWQ is a 16-item measure of chronic worrying (e.g., "My worries overwhelm me"). Items are rated on a 5-point Likert-type scale (1 = *not at all typical of me* to 5 = *very typical of me*). Higher scores are indicative of higher levels of worry symptoms. Cronbach's alpha for this scale was .95 in the current study.

Personality Research Form—Infrequency Scale (PRF-IN; Jackson 1984)

The PRF-IN consists of 16 true–false items and was included in this study to detect non-purposeful responding by including highly unlikely items at the beginning, middle, and end of the questionnaire battery (e.g., "I have never had any hair on my head"). Higher scores are indicative of unlikely or random responding.

Procedure

Approval from the appropriate Institutional Ethics Board was obtained prior to commencing the study, and students were offered an incentive of two bonus course marks for their participation. Participants attended a laboratory session to complete a questionnaire battery that took approximately 45–60 min to complete.

Results

Pre-analysis

Less than 1% of the data were missing and a non-significant Little's (1988) MCAR tests indicated missing data were missing completely at random. Therefore, single imputation using expectation maximization was used to impute missing data. The full sample was included in the analyses ($N = 91$) given that no participant obtained an infrequency score greater than the suggested cutoff score of four (Jackson 1984). All test statistics were evaluated at the .01 and .05 alpha level, with the exception of the mediator models. Mediation was examined using a bootstrapped procedure (Hayes and Preacher 2014), which controls Type I error rates. Effect sizes are also presented and described based on Cohen's (1992) conventions. Bivariate correlations indicated that the demographic variables were not related to the study variables, with the exception of age (correlated with anxiety; $r = -.27$, $p < .01$) and sex (correlated with worry and rumination; $r = .33$ and $.35$, respectively, $p < .01$), and therefore were included as covariates in the mediation models.

Relationships Among Anxiety, Depression, Procrastination, Rumination, and Worry

The descriptive statistics for the study measures are presented in Table 1, and are similar to other university samples (Short and Mazmanian 2013). Bivariate correlations among anxiety, depression, procrastination, rumination, and worry were conducted and are presented in Table 2. All measures correlated in the expected direction. Procrastination positively correlated with all of the study measures ($r =$ small to medium effects). All other study measures were strongly correlated ($r =$ large effects), with the exception of a moderate correlation between depression and worry ($r =$ medium effects).

Mediation Analyses

To examine the indirect effects of worry and rumination between anxiety, depression and procrastination, two multiple mediator models were tested using a bootstrapped multivariate procedure (Hayes and Preacher 2014). Indirect effects were estimated in five thousand random samples that were taken from the data. This procedure enables multiple mediators to be examined, and determines the independent effect of each mediator, while controlling for the other. Findings may be considered consistent with a mediation hypothesis if the 95% confidence intervals do not contain zero, suggesting the indirect effect is significant.

Regression coefficient estimates and bias-corrected 95% confidence intervals were calculated for the first model and are presented in Fig. 1. The results indicated that rumination independently mediated the relationship between anxiety and procrastination; however, worry did not independently mediate this relationship.

Regression coefficient estimates and bias-corrected 95% confidence intervals for the second model are presented in Fig. 2. The findings indicated that rumination independently mediated the relationship between depression and procrastination. Similar to the first model, worry did not independently mediate this relationship.

Table 1 Descriptive statistics of the study variables

	Mean	SD	Potential range	Actual range	Coefficient alpha
DASS-21 anxiety	5.41	4.30	0–21	0–17	.85
DASS-21 depression	4.61	4.83	0–21	0–20	.91
IPS procrastination	26.60	7.12	9–45	12–44	.90
RRS rumination	6.68	3.61	0–15	0–15	.82
PSWQ worry	78.32	9.93	16–80	22–79	.95

DASS-21, Depression Anxiety Stress Scales; IPS, Irrational Procrastination Scale; RRS, Ruminative Responses Scale; PSWQ, Penn State Worry Questionnaire

Table 2 Bivariate correlations between anxiety, depression, procrastination, rumination, and worry

	1	2	3	4
1. DASS-21 anxiety				
2. DASS-21 depression	.72**			
3. IPS procrastination	.34**	.45**		
4. RRS rumination	.58**	.61**	.50**	
5. PSWQ worry	.59**	.47**	.23*	.59**

* $p < .05$; ** $p < .01$

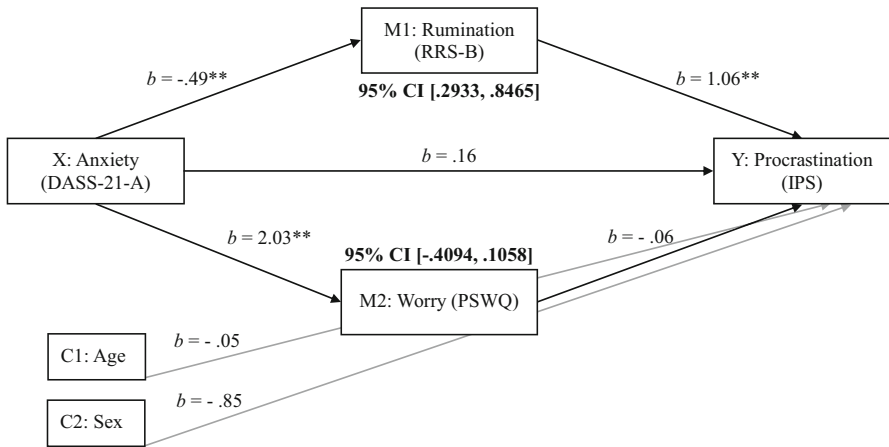


Fig. 1 Indirect effects of negative repetitive thought on the relationship between anxiety and procrastination. Note: CI confidence interval. * $p < .05$; ** $p < .001$

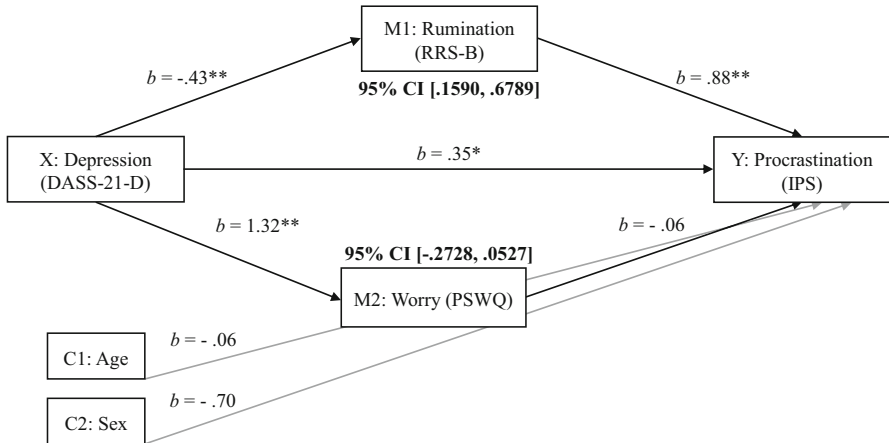


Fig. 2 Indirect effects of negative repetitive thought on the relationship between depression and procrastination. Note: CI confidence interval. * $p < .05$; ** $p < .001$

Discussion

The aim of the current study was to examine the link between psychological distress and procrastination, and the potential underlying role of negative repetitive thought. Similar to past research, procrastination was positively correlated with anxiety, depression, rumination, and worry. These results highlight the negative psychological correlates of intentionally delaying tasks. Additionally, small correlations were found between procrastination and worry, while all other study measures were moderately to strongly correlated. These findings suggest that both worry and rumination are relevant in the context of anxiety and depression, which is consistent with past research (Stöber and Joormann 2001). These findings were expected, given that worry and rumination are both characterized by negative repetitive thinking.

The multiple mediation analyses provided further clarification regarding the nature of these relationships. Specifically, rumination independently mediated the links between anxiety and procrastination, as well as depression and procrastination; however, worry did not independently mediate either of these relations. These results indicate that students experiencing high levels of anxiety and depression may be more vulnerable to procrastination as a result of negative repetitive thought, particularly regarding past events. These findings partially support our hypotheses. Although worry was not a significant independent mediator, these results align well with models of procrastination that examine procrastination behavior from a temporal perspective (Sirois 2014b; Sirois and Pychyl 2013). This view contends that procrastination is a failure in self-regulation that results from a disconnection between the “present” and “future self”; specifically, procrastinators focus less on the future (Sirois and Pychyl 2013). Delaying an intended task shifts the burden of completing that task to the “future self”, and this is particularly likely to occur when attempting to regulate negative mood states (e.g., anxiety, depression; Sirois and Pychyl 2013; Tice et al. 2001). Thus, students may avoid planned behaviors in order to manage their current distress, and this may help to explain why rumination appears to play a larger role in contributing to procrastination than worry (Sirois and Pychyl 2013). Worry is linked with negative repetitive thoughts about future events, which may clarify why worry did not play as large of a role as rumination in the links between psychological distress and procrastination. Findings from the current study align well with those by Stainton et al. (2000), and support the importance of examining negative repetitive thoughts about the past when explaining the link between psychological distress and procrastination. Procrastinators may be more concerned with past and present feelings, thoughts, and behaviors, which is consistent with past-oriented thoughts of rumination.

Addressing anxiety and depression among students by targeting repetitive thoughts about the past may serve to reduce procrastination, which is a possible avenue for future research. Presently, treatment interventions for procrastination and related difficulties focus on cognitive and behavioral factors, including: psychoeducation, goal-setting techniques, motivation and reward systems, prioritizing, dysfunctional beliefs, and personal values (Rozenal et al. 2015b). Recent

investigations suggest counselling services for procrastinators focus on automatic negative thoughts, given the positive associations between worry, rumination, and procrastination (Flett et al. 2016). Moreover, increasing students' resilience by targeting self-compassion in students may reduce ruminative brooding and procrastination by fostering acceptance of past self-regulation failure, and subsequently alleviating the associated distress (Flett et al. 2016). In turn, this may also increase the availability of cognitive resources necessary for the initiation and completion of assignments. Thus, the results from the present study suggest that intervention strategies may benefit from emphasizing both the behavioral and cognitive components of treatment, specifically targeting distressing thoughts about the past.

Limitations and Future Research

This study utilized a cross-sectional design, and it is possible that a reciprocal relationship exists between anxiety, depression, negative repetitive thought, and procrastination. A longitudinal study is needed to understand how these variables interact over time. The majority of our sample consisted of female undergraduate students, which limits the generalizability of results to other populations. Future research in this area should also include a more diverse sample (e.g., a wider range of age and education levels). Self-report instruments were used to assess each construct, which rely on accuracy and insight into one's cognition. Including various sources (e.g., informant reports) and modes (e.g., experimental tasks) of measurement would help more fully assess these constructs. Our findings suggest targeting negative repetitive thoughts, particularly rumination among students who are experiencing anxiety and depression, may decrease procrastination of tasks.

Conclusions

The current investigation generates further knowledge regarding procrastination and psychological distress. The findings provide insight into the relation between anxiety, depression, and procrastination by revealing mediating effects of negative repetitive thought patterns, particularly regarding the past. Our findings suggest that students with higher levels of anxiety and depression are more likely to engage in procrastination as a result of negative repetitive thought, particularly associated with depressing or painful thoughts about the past.

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Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

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