



Academic procrastination of undergraduates: Low self-efficacy to self-regulate predicts higher levels of procrastination

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Abstract

This article reports two studies exploring the academic procrastination of 456 undergraduates. Study 1 explores the relationships among academic procrastination, self-regulation, academic self-efficacy, self-esteem, and self-efficacy for self-regulation. Results reveal that although other self-variables are related to procrastination, self-efficacy for self-regulation is most predictive of procrastination tendencies. Study 2 examines academic and motivation characteristics of “negative procrastinators,” the undergraduates who are most adversely influenced by procrastination. The 25% of 195 participants in Study 2 who were classified as negative procrastinators had significantly lower GPAs, higher levels of daily and task procrastination, lower predicted and actual class grades, and lower self-efficacy for self-regulation. After controlling for GPA, daily procrastination and self-efficacy for self-regulation significantly predicted the negative impact of procrastination. The article concludes with a discussion of the importance that self-efficacy for self-regulation holds for procrastination research, and with suggestions for practitioners who work with students who are adversely affected by procrastination.

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1. Introduction

Nothing (is) so fatiguing as the eternal hanging on of an uncompleted task. William James in an 1886 letter to fellow psychologist Carl Stumpf (H. James, 1926, p. 247).

Procrastination is not a new phenomenon—William James recognized the psychological cost of procrastination 120 years ago, and Steel (2007) traces procrastination references back to 800 B.C. Contemporary psychologists are increasingly interested in conducting research that explains procrastination, but in spite of growing research attention, “much has yet to be learned about the causes of procrastination” (Steel, 2007, p. 65), and procrastination remains “one of the least understood human miseries” (Ferrari, 1994, p. 673). The empirical and theoretical foundations of procrastination research are less well established than those of other psychological constructs, even though procrastination is common and can lead to stress and illness (e.g., Dewitte & Schouwenburg, 2002; Fritzsche, Young, & Hickson, 2003; Tice & Baumeister, 1997). Hammer and Ferrari (2002) found as many as 20% of adults experience chronic procrastination for everyday tasks, while the rate for problematic academic procrastination among undergraduates is estimated to be at least 70–95% (Ellis & Knaus, 1977; Steel, 2007), with estimates of chronic or severe procrastination among undergraduates between 20% and 30% (e.g., Ferrari, Johnson, & McCown, 1995; McCown & Johnson, 1991; Solomon & Rothblum, 1984). But procrastination is a relatively un-explored psychological construct. A database search conducted by procrastination researcher Ferrari and colleagues in the mid-1990s found articles on depression out-numbered articles on procrastination by a factor of 1000 (Ferrari et al., 1995). Interest in procrastination research appears to be growing—our own recent search of the PsycINFO database found that in the last seven years (2000–2007), the depression-to-procrastination research ratio was reduced to a factor of 274, with 117 articles published since 2000, in comparison to 38 articles published in the previous 7 year span. In spite of the increasing pace of procrastination research, numerous questions remain about procrastination and the people for whom procrastination is a problem. In this article we explore some of the motivation correlates and academic costs of those for whom “the uncompleted task” has great impact—undergraduate procrastinators.

Procrastination consists of the intentional delay of an intended course of action, in spite of an awareness of negative outcomes (Steel, 2007), and it often results in unsatisfactory performance (Ferrari, O’Callaghan, & Newbegin, 2005; Solomon & Rothblum, 1984). Considerable attention has been given to procrastination in university settings, with findings that academic procrastination is related to lower levels of self-regulation, academic self-efficacy, and self-esteem, and is associated with higher levels of anxiety, stress, and illness (e.g., Ferrari et al., 2005; Howell, Watson, Powell, & Buro, 2006; Schraw, Wadkins, & Olafson, 2007; Tice & Baumeister, 1997; Wolters, 2003). In some cases, procrastination is beneficial—Chu and Choi (2005) report that some students benefit from working under time pressures, and actively choose to procrastinate, and Tice and Baumeister (1997) report that undergraduate procrastinators experience less stress and illness than non-procrastinators early (but not later) in an academic semester. More frequently, however, procrastination is connected with negative behaviors and outcomes, such as submitting late assignments, cramming, test and social anxiety, use of self-handicapping strategies, fear of failure, under-achievement and can result in damaging mental health outcomes such as depression and anxiety (Dewitte & Schouwenburg, 2002; Ferrari & Scher, 2000; Fritz-

sche et al., 2003; Lay & Schouwenburg, 1993; Lee, 2005; Midgley & Urdan, 2001). Among all of the variables that have been investigated in relationship to academic procrastination, self-regulation, self-efficacy, and self-esteem have received the most attention (e.g., Cassidy & Johnson, 2002; Chu & Choi, 2005; DeRoma et al., 2003; Ferrari, 2001; Haycock, McCarthy, & Skay, 1998; Howell et al., 2006; Senécal, Koestner, & Vallerand, 1995; Steel, 2007; Tuckman, 1991; Wolters, 2003), with most studies showing significant inverse relationships with procrastination.

1.1. Procrastination and self-regulation

In contrast to functional motivation variables like self-regulation, procrastination suggests lower levels of a motivated, planful approach to learning. Much of the most recent procrastination research views procrastination as a function of low levels of self-regulation (e.g., Ferrari, 2001; Senécal et al., 1995; Steel, 2007; Wolters, 2003). Ferrari (2001) proposed that procrastination might be considered a “self-regulation failure of performance” (p. 391), in which procrastinators fail to regulate their functioning in situations of stress and high cognitive load. Senécal et al. (1995) found that the problems students have in self-regulating their academic behaviors are strongly connected with procrastination practices. Steel (2007) reviewed 216 procrastination studies and noted that procrastination—like other forms of self-regulatory problems (e.g., obesity, excessive debt)—may be on the increase. Steel concludes that procrastination research is “especially important, because it can provide insight into the relationship of traits to performance and motivation” (2007, p. 81). Wolters (2003) explored procrastination’s relationship to self-regulated learning and found that metacognitive self-regulation was the second strongest predictor of procrastination after academic self-efficacy beliefs. In sum, there is a strong body of evidence that lower levels of self-regulating behaviours are related to higher levels of procrastination, and that self-regulation is one of the keys to understanding procrastination.

1.2. Procrastination, academic self-efficacy, and self-esteem

Another key to understanding procrastination may be self-efficacy. Self-efficacy theory (Bandura, 1997) holds that what we believe about ourselves strongly influences our task choice, level of effort, persistence, and resilience, and how we subsequently perform. Self-efficacy—beliefs in one’s capabilities to carry out the actions needed to succeed in a task—has been found to be one of the strongest factors predicting performance in domains as diverse as sports, business, and education. In academic settings, self-efficacy is a strong predictor of performance, with the strength of association dependent on correspondence with the task in question, as well as level of specificity (Pajares, 1996). Self-efficacy has been studied in several previous procrastination studies, with results showing an inverse relationship with procrastination (Ferrari, Parker, & Ware, 1992; Haycock et al., 1998; Steel, 2007; Tuckman, 1991; Wolters, 2003).

Self-efficacy can be assessed at a variety of levels of specificity, from very specific (“I am confident I will be able to solve this math problem”) to more general (“I am confident I have the capabilities to succeed in university”). Self-efficacy theorists caution that self-efficacy measures need to be carefully tailored to the criterial task and the domain being analyzed (Pajares, 1996), because disparity between self-efficacy and the criterial task results in weakened relationships and findings that are not robust (Bandura, 1997). Most studies

exploring the relationship between procrastination and academic self-efficacy use self-efficacy measures that are at a middle level of specificity; that is, they assess students' confidence to complete generalized academic tasks. Although self-efficacy is a powerful predictor of performance when the self-efficacy measure and performance domain closely correspond, it loses predictive power when correspondence is weak. One explanation for the significant yet modest relationship between academic self-efficacy and procrastination is that the correspondence between the two variables is low—self-efficacy is not a personality trait that characterizes a person's functioning across domains, but rather a reflection of self-beliefs that are domain specific.

Whereas self-efficacy refers to judgments of a person's capabilities, another construct that is often connected with procrastination—self-esteem—refers to judgments of global self-worth (Bandura, 1997). The relationship between procrastination and self-esteem has received considerable attention in the procrastination literature. Procrastination has been described as a self-protective strategy that masks a fragile self-esteem, and numerous studies have found a significant inverse relationship between self-report procrastination and self-esteem (e.g., Beck, Koons, & Milgrim, 2000; Ferrari, 1994; Ferrari, 2000; Solomon & Rothblum, 1984). Flett, Blankstein, and Martin (1995) propose that procrastinators suffer from low self-esteem that results in a general tendency to engage in behaviors—like task delay and avoidance—that protect self-presentation by providing an excuse for poor performance and negative outcomes. Although the most recent procrastination research explain procrastination through self-efficacy or self-regulation models (e.g., Howell & Watson, 2007; Steel, 2007; Wolters, 2003), considerable research has explored, and continues to explore the link between procrastination and self-esteem.

1.3. *Self-efficacy for self-regulation*

Self-regulation of learning involves selecting appropriate learning strategies, assessing one's knowledge, self-correcting when necessary, and understanding the importance of strategy use. But knowledge of cognitive and metacognitive tools is not sufficient to ensure academic success. Individuals need to possess the confidence to implement self-regulation strategies: "Firm belief in one's self-regulatory skills provides the staying power" (Bandura, 1993, p. 136). The staying power derived from belief in one's capabilities to self-regulate may also be a key factor that determines procrastination patterns. Self-efficacy for self-regulation reflects an individual's beliefs in his or her capabilities to use a variety of learning strategies, resist distractions, complete schoolwork, and participate in class learning, and has been found to influence academic achievement (Klassen, 2007; Zimmerman, Bandura, & Martinez-Pons, 1992).

No studies have linked self-efficacy for self-regulation with procrastination, but the conceptual links between the two constructs are clear. Whereas theorists have heretofore proposed that procrastination is primarily a deficit in self-regulation, we propose that procrastination may be equally strongly connected with the confidence that one has to select and implement self-regulation strategies; that is, self-efficacy for self-regulation. Measures of self-regulation assess *what is*, or what has happened in the past, whereas self-efficacy for self-regulation is a reflection of people's forward-looking beliefs about their capabilities over future events. Just as self-efficacy for academic achievement has been shown to predict academic performance over and above past performance, we sug-

gest that self-beliefs in the capability to self-regulate are at least as important as current self-regulation practices.

In this article we contribute to the theoretical base on which to build a theory of procrastination. First, we extend the procrastination research by arguing that understanding procrastination as a failure of self-regulation is insufficient, and that procrastination may be closely linked to lower self-efficacy for self-regulation. Second, we explore procrastination, motivation, and task characteristics of individuals who are most negatively influenced by procrastination, with attention paid to the role of self-efficacy for self-regulation. We hope that readers of this article will gain a deeper understanding of an exceedingly common but poorly understood motivation variable.

Our research questions were:

- Does self-efficacy for self-regulation predict procrastination, after accounting for GPA, general academic self-efficacy, self-regulation practices, and self-esteem?
- What are the academic and motivation differences between two groups of students—those who report being adversely affected by procrastination and those who do not?

2. Study 1

2.1. Method

Participants for Study 1 included 261 undergraduate students from a large public university in Western Canada. Data were collected in 6 third and fourth year educational psychology classes, with an estimated response rate of 90%. The sample was primarily female (81%), with an age range of 18 to 53 years, and a mean of 23.33 years ($SD = 5.19$), and all participants were volunteers (who did not receive class credit for participation). Most students (239 or 92%) were born in Canada, and the remaining students were largely East or South Asian (16 or 6%).

In each of the classes, a team of researchers briefly introduced the project, and distributed the survey to be completed at the end of the scheduled class. GPA was assessed by self-report on a four-point scale. For each of the following measures, the items were summed (after re-scoring reversed items) and the total score was used to represent the construct. We used Tuckman's 16-item procrastination measure, which provides a measure of "the tendency to waste time, delay, and intentionally put off something that should be done" (Tuckman, 1991, p. 479). In Tuckman's validation study, the measure showed adequate reliability and validity, with a significant correlation ($r = -.54$) with a behavioral measure of homework completion. Recent studies have used Tuckman's measure, with results showing high reliability, and validity evidence shown in the form of high positive correlations with other procrastination measures, and significant inverse relationships with behavioral measures of timely task completion (e.g., Howell & Watson, 2007; Howell et al., 2006). Procrastination was measured using a 4-point scale, anchored at "1" by "That's not really me" and at "4" by "That's me for sure," with a possible total score of 64. Examples of items on the procrastination measure included "I needlessly delay finishing jobs, even when they're important," and "I postpone starting on things I don't like to do."

We used two components of the Motivated Strategies for Learning Questionnaire (MSLQ) to assess participants' academic self-regulation and academic self-efficacy. The MSLQ is a widely used tool measuring motivational orientations and strategy use (Pintrich, Smith, Garcia, & McKeachie, 1993). The academic self-regulation measure included 12 items designed to assess students' awareness, knowledge, and control of cognition. Examples of the academic self-regulation measure include, "If course materials are difficult to understand, I change the way I read the material," and "I try to change the way I study in order to fit the course requirements and instructor's teaching style." The academic self-efficacy measure included five items that were adapted from the MSLQ Self-Efficacy for Learning and Performance scale. We strengthened the theoretical fidelity of the measure by omitting the 3 expectancy-value items, and re-phrasing each item with the preface "I am confident," and further re-phrasing each item to reflect academic self-efficacy in all of the participants' classes, rather than in one particular class (e.g., "I am confident I can understand the most difficult material presented in the readings in my classes"). For the MSLQ measures, we used a 7-point scale with descriptors at "1" ("Not at all true of me") and "7" ("Very true of me"), with possible total scores of 84 and 35 for the self-regulation and self-efficacy scales, respectively.

Self-esteem was measured using Rosenberg's 10-item, 4-point *Self-Esteem Scale* (Rosenberg, 1979), which has been widely used in procrastination and other research (e.g., Beck et al., 2000; Ferrari, 1994, 2000; Flett et al., 1995). Self-efficacy for self-regulation was measured with the scale used in the academic motivation study conducted by Zimmerman et al., (1992). This self-efficacy measure assesses students' beliefs in their capability to implement self-regulation strategies. The 11 items in this scale include items such as "How well can you finish homework assignments by deadlines?" and "How well can you concentrate on school subjects?" Participants completed a 7-point scale anchored by descriptors at "1" ("Not well at all") and "7" ("Very well"), with a possible total score of 77. Previous studies have found the measure to display strong reliability and validity properties (e.g., Klassen, 2007; Zimmerman et al., 1992).

2.2. Results

The reliability indices of the measures used in Study 1 were acceptable, and ranged from .80 (self-efficacy for self-regulation) to .90 (academic self-efficacy). Table 1 reports means, standard deviations, and reliability coefficients for procrastination, self-regulation,

Table 1
Means, standard deviations, and reliabilities for variables in Study 1 ($N = 261$)

	<i>M</i>	<i>SD</i>	α
Procrastination	38.44	8.20	.88
Self-regulation	50.00	11.15	.81
Academic self-efficacy	26.00	5.03	.90
Self-esteem	31.82	3.64	.86
Self-efficacy for self-regulation	57.08	9.24	.80
GPA	3.09	.41	—

Note. GPA is self-reported on a 4 point scale.

academic self-efficacy, self-esteem, and self-efficacy for self-regulation, and means and standard deviations for GPA.

Correlations among major variables are presented in Table 2 (bivariate relationships between procrastination and the major variables were all significant, $p < .001$). Results showed that students with higher GPA were less likely to report procrastination ($r = -.22$), and that students with stronger academic self-efficacy and global self-esteem were less likely to procrastinate ($r = -.18$ and $r = -.19$, respectively). Stronger relationships were seen with the self-regulation variables. Students who reported higher levels of self-regulation reported lower levels of procrastination ($r = -.40$). The strongest bivariate relationship was found between procrastination and self-efficacy for self-regulation ($r = -.59$), suggesting that students who expressed beliefs in their capability to regulate their learning reported the lowest levels of procrastination. The direction and strength of the relationships between procrastination and GPA, self-regulation, self-efficacy, and self-esteem were consistent with those found in previous studies (e.g., Ferrari 1994, 2000; Steel, 2007).

Hierarchical multiple regression was used to further explore the relationship between procrastination and the other variables. We chose this analysis strategy to first examine how academic self-regulation, academic self-efficacy, and self-esteem predicted procrastination after controlling for GPA. Next we were interested in finding out if self-efficacy for self-regulation accounted for additional procrastination variance beyond the variables most often shown to be associated with procrastination (i.e., GPA, academic self-regulation, academic self-efficacy, and self-esteem).

As presented in Table 3, results from the first step showed that GPA ($\beta = -.22$, $p < .001$) accounted for a modest but significant amount of procrastination variance, $R^2 = .05$, $F(1, 259) = 12.56$, $p < .001$. In the second step, entering self-regulation, self-efficacy, and self-esteem resulted in a significant increase in the amount of explained variance, $\Delta R^2 = .15$, $\Delta F(3, 256) = 15.32$, $p < .001$. Self-regulation ($\beta = -.36$, $p < .001$) and self-esteem ($\beta = -.16$, $p < .01$) were the only significant predictors of procrastination. In the third step, entering self-efficacy for self-regulation resulted in a significant increase in explained variance, $\Delta R^2 = .19$, $\Delta F(1, 255) = 79.90$, $p < .001$. Self-regulation ($\beta = -.12$, $p < .05$) and self-esteem ($\beta = -.16$, $p < .01$) remained significant individual predictors of procrastination, whereas GPA and academic self-efficacy were not significant individual predictors of procrastination. After accounting for all variables, self-efficacy for self-regulation was the strongest individual predictor of procrastination ($\beta = -.52$, $p < .001$).

Table 2
Correlations for procrastination, GPA, and motivation variables in Study 1 ($N = 261$)

Variable	1	2	3	4	5	6
(1) Procrastination						
(2) GPA	-.22**					
(3) Self-regulation	-.40**	.35**				
(4) Academic self-efficacy	-.18**	.36**	.28**			
(5) Self-esteem	-.19**	.07	.08	.28**		
(6) SE for self-regulation	-.59*	.29**	.52**	.27**	.07	

Note. GPA is self-reported on a 4-point scale.

* $p < .05$.

** $p < .01$.

Table 3
Summary of hierarchical regression analysis for variables predicting procrastination in Study 1 ($N = 261$)

Variable	<i>B</i>	<i>SE B</i>	β
<i>Step 1</i>			
GPA	-4.34	1.23	-.22***
<i>Step 2</i>			
GPA	-1.54	1.23	-.08
Self-regulation	-.26	.05	-.36***
Academic self-efficacy	-.01	.10	-.01
Self-esteem	-.35	.13	-.16**
<i>Step 3</i>			
GPA	-.53	1.11	-.03
Self-regulation	-.09	.04	-.12*
Academic self-efficacy	.08	.09	.05
Self-esteem	-.35	.11	-.16**
Self-efficacy for self-regulation	-.46	.05	-.52***

Note. $R^2 = .05$ ($p < .001$) for Step 1; $\Delta R^2 = .15$ ($p < .001$) for Step 2; $\Delta R^2 = .19$ ($p < .001$) for Step 3.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

2.3. Discussion

In Study 1 we explored predictors of procrastination in a sample of university students. Previous procrastination research has suggested that high levels of procrastination are related to students' lack of academic self-efficacy, poor self-regulation skills, and low self-esteem. The simple correlations among the variables showed that academic self-efficacy was related to academic achievement (self-reported GPA), with which it shared a close correspondence, but less strongly related to procrastination, although the relationship was statistically significant. Self-efficacy for self-regulation shared a strong inverse relationship with procrastination, and was also closely associated with ratings of self-regulation skills. In the hierarchical regression, GPA and academic self-efficacy lost explanatory power when self-efficacy for self-regulation was entered, whereas self-regulation and self-esteem maintained their significant contributions to the prediction of procrastination.

Procrastination has been described as the "quintessential self-regulatory failure" (Steel, 2007, p. 65), but we suggest that academic procrastination is influenced not only by self-regulation skills, but also by beliefs in the forward-looking *self-efficacy* to self-regulate. Skills in self-regulation are not sufficient to ensure that academic tasks get started or completed; self-efficacy to structure the learning environment—to plan and organize tasks, to use cognitive strategies, to obtain required information, to persevere in the face of distractions—leads to timely task completion and successful academic achievement. In this study, academic self-efficacy, i.e., confidence to carry out academic tasks was a weak predictor of academic procrastination, likely due to the lack of correspondence with the procrastination measure. Students may be confident they can understand class content and complete class assignments, but this confidence lacks close correspondence with timely task completion. Academic self-efficacy strongly predicts academic outcomes, but only when there is a close connection between self-efficacy measure and the criterial task (Bandura, 1997;

Pajares, 1996). Similarly, students' self-regulation skills, which current research posits as a motivational explanation for academic procrastination (Ferrari, 2001; Steel, 2007; Wolters, 2003), was a weak predictor of procrastination when self-efficacy for self-regulation was entered into the regression equation. Bandura (1993) suggests "Self-regulatory skills will not contribute much if students cannot get themselves to apply them persistently in the face of difficulties, stressors, and competing attractions" (p. 136). In our study, the higher the students' self-efficacy for self-regulation, the less likely they were to be distracted in the face of competing attractions. Perceived self-efficacy to self-regulate appears to be a key in understanding academic procrastination. In Study 2, we further explore this powerful motivation construct by exploring the relationship between self-efficacy for self-regulation and two additional procrastination measures, and the ways in which students who are most adversely affected by procrastination rate their confidence to regulate their learning.

3. Study 2

The results from Study 1 confirmed our belief that procrastination is strongly influenced by a person's confidence to self-regulate their learning. Although our understanding of the motivational correlates of procrastination was strengthened through Study 1, we were further interested in the academic and motivational characteristics of undergraduates for whom procrastination was viewed as a problem. Several studies have explored how procrastination negatively influences academic performance, and is more strongly associated with certain academic domains (e.g., Ackerman & Gross, 2005), but few studies have explored how students who are most adversely affected by procrastination differ from other students on daily procrastination, procrastination on specific tasks, self-efficacy for self-regulation, and academic performance. In Study 2, we examine academic and motivation characteristics of undergraduates who report being most negatively influenced by procrastination.

3.1. Method

Before conducting Study 2, we conducted a pilot study with 16 undergraduates to investigate the clarity of the measures. Student feedback resulted in minor changes to the survey in order to enhance students' understanding.

Participants for Study 2 included 195 undergraduate volunteers from a large public university in Western Canada. Data were collected in 3 third and fourth year educational psychology classes, with an estimated response rate of 90%. Participants in Study 2 were drawn from different classes than in Study 1, and the data were collected at the beginning of class by the second author and an associate. The sample was primarily female (72%), with an age range of 19–40 years, and a mean age of 23.20 years ($SD = 3.89$). Although ethnicity data were not collected, 94% of participants listed Canada as country of birth.

Surveys were distributed and completed during class time in the first few weeks of the semester. As in Study 1, GPA was assessed by self-report on a four-point scale. We measured behavioral procrastination in two ways. First, we asked students about their daily procrastination: "How much time do you procrastinate on schoolwork during a typical day?" with five response options ranging from "Less than 1 hour" to "More than 6 hours." Next, we adapted the behavioral procrastination measure created by Ackerman

and Gross (2005) to measure task procrastination. Students were asked to think about an important assignment from the previous semester, and to list the number of days or weeks given by the instructor for completion, and the number of days or weeks before the due date that the assignment was started. We calculated a procrastination ratio defined as total time allowed/time remaining before the assignment was started. A larger ratio indicated greater task procrastination.

To gauge the negative impact of procrastination, we asked participants, “In general, how much does procrastination negatively influence your academic functioning?” with response options of “Not at all,” “Not too much,” “Quite a lot,” and “Very much.” Students who responded “Quite a lot” or “Very much” were classified as “negative procrastinators” whereas students who responded “Not at all,” or “Not too much” were classified as “neutral procrastinators.” We chose to classify students by self-report of the negative impact of procrastination rather than by using a median split procedure with scores from a procrastination measure (e.g., Ferrari, 2001; Lay, 1986), because higher levels of procrastination do not always have a negative influence on performance (e.g., Knaus, 2000; Tice & Baumeister, 1997), and can even be positive and functional (Chu & Choi, 2005).

Based on a measure used by Solomon and Rothblum (1984) in their study of academic procrastination, we investigated domain procrastination, by asking students “On what kinds of tasks do you most often procrastinate?” with choices of reading tasks, writing tasks, studying tasks, research tasks, and talking with instructor (we adapted the wording of the measure slightly to improve clarity based on feedback from the pilot study). Participants were asked to predict their grade (on a 4-point scale) in the course in which the surveys were administered, and we collected the actual course grades from the instructors at the end of the semester. We included the self-efficacy for self-regulation scale as described in Study 1 for two reasons. First, we wanted a validity check against the two behavioral procrastination measures, and second, we wondered how students most affected by procrastination would rate their self-efficacy for self-regulation.

3.2. Results

Table 4 reports correlations among GPA, daily procrastination, task procrastination, impact of procrastination, self-efficacy for self-regulation, predicted class grade, and actual class grade. The negative impact of procrastination was most closely associated with hours

Table 4
Correlations for Study 2 variables ($N = 195$)

Variable	1	2	3	4	5	6
(1) GPA						
(2) Daily procrastination	-.06					
(3) Task procrastination	-.05	.36**				
(4) Impact of procrastination	-.29**	.38**	.25**			
(5) SE for self-regulation	.25**	-.34**	-.24**	-.36**		
(6) Predicted class grade	.49**	-.05	.04	-.21**	.25**	
(7) Actual class grade	.48**	-.07	.01	-.16*	.25**	.56**

Note. GPA is self-reported on a 4-point scale.

* $p < .05$.

** $p < .01$.

of daily procrastination ($r = .38, p < .01$) and self-efficacy for self-regulation ($r = -.36, p < .01$), but was also significantly associated with GPA ($r = -.29, p < .01$), task procrastination ($r = .25, r < .01$), predicted class grade ($r = -.21, p < .01$), and actual class grade ($r = -.16, p < .05$). Almost 90% of undergraduates reported spending more than 1 h per day procrastinating, with a mean halfway between “1–2 hours” and “3–4 hours” per day.

Twenty-five percent (49 out of 195) of the Study 2 participants responded, “Quite a lot” or “Very much” to the item “In general, how much does procrastination negatively influence your academic functioning?” and were labeled negative procrastinators. By way of contrast, other studies (e.g., Ferrari et al., 1995; McCown & Johnson, 1994; Solomon & Rothblum, 1984) found that between 20% and 30% of undergraduates characterized themselves as chronic or severe procrastinators. In Table 5 we present means, standard deviations, and effect sizes from an ANOVA conducted to compare the levels of GPA, daily procrastination, task procrastination, predicted and actual course grades, and self-efficacy for self-regulation across the two groups of negative and neutral procrastinators. Using a Bonferroni-adjusted significance level, negative procrastinators reported a significantly lower GPA $F(1, 189) = 14.94, p < .001$; higher daily procrastination $F(1, 190) = 19.66, p < .001$; higher task procrastination $F(1, 189) = 6.59, p < .01$; lower predicted grades, $F(1, 189) = 12.39, p = .001$; lower actual course grades $F(1, 184) = 8.15, p < .01$; and lower self-efficacy for self-regulation $F(1, 194) = 19.33, p < .001$.

Our next question pertained to how negative and neutral procrastinators rated procrastination tendencies according to domain. Table 6 reports means and standard deviations of the tendency to procrastinate on five academic domains. The order of tendency to procrastinate was the same for both groups—writing tasks were most prone to procrastination, followed by studying tasks, research tasks, reading tasks, and talking with the instructor. Negative procrastinators reported higher procrastination levels for all domains, but after adjusting for family-wise error using a Bonferroni adjustment, only writing procrastination was significantly higher for negative procrastinators $F(1, 193) = 14.57, p < .001$.

Table 7 reports a hierarchical regression analysis predicting negative impact of procrastination, with GPA entered on the first step, daily procrastination and task procrastination entered on the second step, and self-efficacy for self-regulation entered on the third step. After controlling for GPA on the first step ($\beta = -.26, p < .001$), the entry of daily procrastination ($\beta = .34, p < .001$), and task procrastination ($\beta = .12, p = ns$), significantly improved the prediction of the impact of procrastination, $\Delta R^2 = .16, \Delta F(2, 176) = 17.76$,

Table 5
Means and standard deviations for variables for negative and neutral procrastinators

	Negative procrastinators ($n = 49$)		Neutral procrastinators ($n = 146$)		Cohen's d
	M	SD	M	SD	
GPA*	3.04	.27	3.26	.33	.70
Daily procrastination*	2.98	1.13	2.30	.83	.75
Task procrastination*	16.04	20.18	9.54	12.90	.43
Predicted class grade*	2.12	.75	2.48	.66	.54
Actual class grade*	2.08	.89	2.53	.88	.51
SE for SRL*	49.63	9.20	55.94	8.52	.73

* $p < .008$.

Table 6
On what kinds of tasks do you most often procrastinate? ($N = 195$)

	Negative procrastinators ($n = 49$)		Neutral procrastinators ($n = 146$)		Cohen's d
	M	SD	M	SD	
Reading tasks	5.06	1.92	4.59	1.71	.64
Writing tasks*	6.04	1.19	5.03	1.71	
Studying tasks	5.22	1.82	4.58	1.61	
Research tasks	5.18	1.79	4.57	1.70	
Talking with instructor	3.49	2.00	2.78	1.87	

Note. Scale is 1 ("Not at all") to 7 ("Very much").

* $p < .01$.

Table 7
Summary of hierarchical regression analysis for variables predicting the impact of procrastination ($N = 195$)

Variable	B	$SE B$	β
<i>Step 1</i>			
GPA	-.47	.13	-.26**
<i>Step 2</i>			
GPA	-.44	.12	-.24**
Daily procrastination	.21	.04	.34**
Task procrastination	.01	.01	.12
<i>Step 3</i>			
GPA	-.33	.12	-.19*
Daily procrastination	.16	.04	.27**
Task procrastination	.01	.01	.09
Self-efficacy for self-regulation	-.02	.01	-.23*

Note. $R^2 = .07$ ($p < .001$) for Step 1; $\Delta R^2 = .16$ ($p < .001$) for Step 2; $\Delta R^2 = .04$ ($p < .01$) for Step 3. "Impact of procrastination" was measured with one item asking participants, "In general, how much does procrastination negatively influence your academic functioning?"

* $p < .01$.

** $p < .001$.

$p < .001$. Prediction of the negative impact of procrastination was significantly improved on the third step with the entry of self-efficacy for self-regulation, $\Delta R^2 = .04$, $\Delta F(1, 175) = 10.10$, $p < .001$. After accounting for all the variables, GPA ($\beta = -.19$, $p < .001$), daily procrastination ($\beta = .27$, $p < .001$), and self-efficacy for self-regulation ($\beta = -.23$, $p < .001$) significantly predicted the degree of negative impact of procrastination.

3.3. Discussion

The results from Study 2 extend the findings from Study 1 by showing that self-efficacy for self-regulation plays an important role in understanding procrastination, and by showing how undergraduates who are most negatively affected by procrastination differ from those who are less affected by procrastination. Self-efficacy to self-regulate was significantly lower for undergraduates who perceived themselves to be most negatively affected

by procrastination. Negative procrastinators also reported lower GPA, higher levels of daily and task-specific procrastination, and lower predicted and actual class grades. In addition negative procrastinators reported significantly higher procrastination on writing tasks. The hierarchical multiple regression showed that even after controlling for GPA, negative procrastination can be reliably predicted by hours of procrastination per day and by level of self-efficacy for self-regulation.

Almost all of the students defined themselves as procrastinators, with 89% of students reporting more than 1 hour of procrastination per day. But the negative procrastinators—the 25% of undergraduates who were most negatively affected by procrastination—had poorer academic outcomes, with lower self-reported GPAs, but also lower expectations for class grades, and weaker class grades as determined by the instructor. The negative procrastinators had less expectation of success—they expected (and received) lower class grades, and expressed less confidence in their capabilities to self-regulate in the future. Moreover, the negative procrastinators reported significantly higher procrastination levels than neutral procrastinators on writing tasks, arguably the most important academic task in a university setting, and a task that places a heavy cognitive load on students (Torrance & Galbraith, 2006). Students who delay writing do less well in university, and have less chance of vocational success upon completion of their undergraduate studies (Fritzsche et al., 2003). It should be noted, however, that although the negative procrastinators reported significantly lower GPAs and received lower grades, they were not failing (they reported a GPA of 3.04 in comparison to a GPA of 3.26 reported by neutral procrastinators), and the actual class grade received by negative procrastinators was 2.08 (on a 4-point scale) in comparison to 2.53 for the neutral procrastinators.

4. General discussion

The findings from the two studies reported in this article add to our understanding about the motivational correlates of procrastination, and provide an insight into the negative impact of procrastination on some students. Self-efficacy for self-regulation is a stronger predictor of the tendency to procrastinate than other motivation variables like self-regulation, academic self-efficacy, and self-esteem. The costs of academic procrastination are evident: compared to neutral procrastinators, negative procrastinators reported lower GPAs, expected and received a lower class grade, spent more hours procrastinating each day, took longer to begin important assignments, and expressed less confidence that they were capable of regulating their own learning. On the other hand, although negative procrastinators fared more poorly than neutral procrastinators, they were experiencing a degree of success in a university setting, and reported GPAs above 3.0.

Our findings suggest that negative procrastinators don't simply spend more time on alternate tasks each day (i.e., spending time on more attractive but less productive tasks); they also delay the start of long-term tasks, with a significantly greater procrastination ratio than neutral procrastinators. Thus, negative procrastinators reflect two definitional aspects of procrastination—they devote too much time to the “wrong” tasks as evidenced by higher rates of daily procrastination, and they delay starting the “right” tasks, as evidenced by a higher procrastination ratio on specific tasks. In chess or military language, negative procrastinators have difficulties with *tactics* (organizing and maneuvering resources for a short-term goal) as evidenced by high levels of daily procrastination, but also with *strategy* (carefully devised plan of action to achieve long-term success), as evi-

denced by higher levels of procrastination on important long-term tasks. Our results show that undergraduates who experience the most negative outcomes for procrastination commit tactical errors (daily procrastination) and strategic errors (task procrastination), and moreover, possess lower confidence that they will be able to act differently in the future.

Although most current research has construed procrastination as a failure of self-regulation, we suggest that this interpretation is simplistic, and neglects the important role that self-efficacy plays in cognitive and metacognitive functioning. Most undergraduates, by virtue of possessing enough academic savvy to get into university, enjoy a sound knowledge of planning and learning strategies. Referencing self-regulation as the key to procrastination is limiting, because it neglects the role that motivation plays in the adoption of important metacognitive strategies. Bandura argues “knowing what to do is only part of the story” (1997, p. 223), and that performance failures are frequently the result of a lack of confidence in implementing skills and strategies, not a lack of knowledge about the existence of these skills and strategies. We believe that self-efficacy is a key in understanding procrastination in emerging adults and adults in academic settings, who have knowledge of cognitive and metacognitive skills and strategies, but may possess lower confidence to use them to organize their learning.

We suggest that those working with negative procrastinators can address this problem through attending to the sources of self-efficacy. Possessing the confidence to implement knowledge and skills is acquired through exposure to the sources of self-efficacy; that is, through directing attention to successful past performance, verbal persuasion from influential others, observation of successful others, and interpretation of somatic states (e.g., Usher & Pajares, 2006). Metacognitive strategy training may assist students in knowing what to do and how to do it, but in order to increase self-efficacy for self-regulation, students need repeated successful experiences, encouragement, and demonstrations of the benefits of successful strategy use. For those providing service to undergraduates who are experiencing academic problems, it is not enough to provide academic assistance to help with assignment completion. Instead, assistance should be provided with a goal of developing ways of building the confidence that implementing cognitive and metacognitive strategies will lead to academic success.

4.1. Limitations and future directions

The data collected in these two studies are correlational, and it is misleading to make claims of causality based on the observed relationships. It is possible, for example, that procrastinating behaviors cause a lowering of self-efficacy to self-regulate, and not the reverse as is implied in our study. The two studies are limited by the inclusion of a largely female, undergraduate sample from one large research university in western Canada. However, numerous procrastination studies have shown that sex differences in procrastination are weak or non-existent (e.g., Ackerman & Gross, 2005; Ferrari et al., 1995; Flett et al., 1995; Haycock et al., 1998; Steel, 2007), and at least one study has found consistent rates of chronic procrastination across three western, English-speaking countries (Ferrari, O’Callaghan, & Newbegin, 2005). Based on this limited cross-cultural comparison, we believe that undergraduates at the large public research university included in our study very likely share procrastination tendencies with students at large, public research universities in other western settings. In addition, we used self-report scales of procrastination, although this weakness was mitigated by inclusion of two data collection phases and three

separate measures of procrastination, each of which correlated significantly with self-efficacy for self-regulation. Nevertheless, using self-reports as the central data collection approach may result in common method variance that obscures the true relationships among constructs (e.g., Doty & Glick, 1998). Finally, the study did not include a measure of task value, and it is likely that daily or task procrastination is influenced not solely by a lack of self-regulatory confidence, but by students' valuing of tasks and task outcomes (e.g., Ackerman & Gross, 2005; Milgram, Marshevsky, & Sadeh, 1995).

Academic procrastination may sometimes be discussed in a lighthearted and trivializing fashion, and receive only a fraction of the research attention devoted to other common psychological problems like depression, but the consequences are not trivial for the minority of people for whom procrastination is a serious problem. We believe that procrastination research has the potential to help explain the mystery of why people choose to delay a course of action even when there are serious negative consequences. As a start, we suggest students' lower self-efficacy to self-regulate is a key to understanding academic procrastination. For practitioners who are providing service to negative procrastinators, an understanding that self-efficacy for self-regulation plays an important role in determining the negative influence of procrastination may prove to be a valuable insight, and remediation may be enhanced through a better understanding of this relationship. Our review of the literature suggests at least three areas that would benefit from extended study. First, most research explores the procrastination of undergraduates, and although post-secondary students are especially vulnerable to procrastinating and to its consequences, further research should focus on procrastination in younger populations, with particular attention paid to the developmental path of procrastinating behaviors and to self-efficacy for self-regulation. Second, few studies have explored procrastination from a cross-cultural perspective, and little is known about the incidence and correlates of procrastination in non-Western settings. If procrastination is to mature into a field with a solid theoretical base, attention to the development of procrastination in children and adults and to the presentation of procrastination outside of Western settings is crucial.

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