

Procrastination in College Students: The Role of Self-Efficacy and Anxiety

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In this study, the authors examined the relationships among procrastination, efficacy expectations, anxiety, gender, and age for 141 university students. Participants were asked to think about a major project and to rate their efficacy regarding the skills needed to accomplish the project. Bivariate correlations showed that efficacy expectations and anxiety had significant, individual relationships with procrastination. When these variables were entered into a regression model, only cumulative efficacy strength was a significant predictor of procrastination. Implications for practice and research suggestions are discussed.

Within United States society, productivity, doing, and accomplishing are highly valued norms (Althen, 1988). Procrastination, or the failure to get things done in a timely manner, directly violates these norms. Procrastination involves delaying responsibilities, decisions, or tasks that need to be done. In addition to the delay inherent in this phenomenon, problematic procrastination is accompanied by an internal, subjective discomfort usually thought to be anxiety (Rothblum, Solomon, & Murakami, 1986; Solomon & Rothblum, 1984). This distress differentiates procrastination from simply deciding to do an activity later.

Procrastination is a common and, at times, serious problem (Burka & Yuen, 1983). Internal consequences may include irritation, regret, despair, and self-blame (Burka & Yuen, 1983). External consequences may be costly and can include impaired academic and work progress, lost opportunities, and strained relationships (Burka & Yuen, 1983). For example, researchers who have studied academic procrastination have found that as many as 50% of undergraduates at one university report a tendency to procrastinate on assignments (Hill, Hill, Chabot, & Barrall, 1978; Solomon & Rothblum, 1984). Furthermore, procrastination may be a significant negative predictor of college grade point average (Wesley, 1994). Doctoral student procrastination may result in failure to finish dissertations (Muszynski & Akamatsu, 1991). Procrastination with respect to scholarly writing may put new faculty members at risk of job loss (Boice, 1989).

Despite these negative effects, procrastination remains a relatively poorly understood phenomenon. According to McCown (1986), behaviorists believe that procrastination

is a learned habit developing from a human preference for pleasurable activities and short-term rewards. In contrast, psychodynamic theorists view procrastination as rebellion against overly demanding or overindulgent parents, or as a means of avoiding unconscious death anxiety (Blatt & Quinlan, 1967; McCown, Petzel, & Rupert, 1987). Several cognitive variables have been proposed as predictors of procrastination, including irrational beliefs (Beswick, Rothblum, & Mann, 1988; Solomon & Rothblum, 1984), attribution style (Rothblum et al., 1986), beliefs about time (Lay, 1988; Lay & Schouwenberg, 1993), self-esteem (Beswick et al., 1988), optimism (Lay, 1988; Lay & Burns, 1991), and self-handicapping strategies (Ferrari, 1992). Cognitive variables have been the most frequent subjects of empirical investigations, but the results are equivocal. For example, Beswick et al. (1988) found that irrational beliefs accounted for only 1% of the variance in procrastination for a sample of Australian university students. In contrast, Solomon and Rothblum (1984) found a significant correlation ($r = .30$) between academic procrastination and irrational beliefs for their sample of university students.

A popular theory about the etiology of procrastination is that it is a strategy for protecting a fragile sense of self-esteem (Berry, 1975; Burka & Yuen, 1983). For individuals who base their esteem on high performance, procrastination allows them to avoid complete testing of their abilities, thus maintaining a belief that their abilities are higher than their actual performance might be. Empirical support for a self-esteem-procrastination relationship is modest. For example, in a study of Australian university students, self-esteem accounted for only 5% of the variance in procrastination (Beswick et al., 1988).

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Because the empirical support for current explanations of procrastination is so limited, further research is needed, including studies of other variables that may be related to the construct. One promising theory is Bandura's (1986) self-efficacy theory. Although self-efficacy may seem to be similar to self-esteem (e.g., both are components of self-referent thought), Bandura has argued that they are very different constructs. Self-efficacy pertains to an individual's judgment of how well she or he can perform certain behaviors in specific situations. Bandura (1986) defines two related but distinct components of self-efficacy: *efficacy expectations* and *outcome expectations*. Efficacy expectations are beliefs about one's capabilities to accomplish specific tasks. Outcome expectations refer to beliefs about the likelihood that certain behaviors will result in desired outcomes. Bandura argued that if adequate levels of ability and motivation exist, self-efficacy will affect a person's task initiation and persistence. Weak efficacy beliefs can contribute to behavior avoidance, whereas strong efficacy beliefs can promote behavior initiation and persistence.

Given the hypothesized role that self-efficacy plays in initiating and completing behaviors, it is surprising that only a few published studies have attempted to examine the link between self-efficacy and procrastination. Using a global measure of efficacy expectations, Tuckman (1991) found a significant inverse relationship between efficacy beliefs and procrastination for his sample of college students. In a second article, Tuckman and Sexton (1992) reviewed their work and concluded that self-beliefs mediate between external conditions and self-regulated performance, such that a lack of efficacy leads to procrastination. Also using a global measure of efficacy expectations, Ferrari, Parker, and Ware (1992) found a significant negative relationship between efficacy beliefs and academic procrastination, with weak efficacy being related to more frequent procrastination. These studies suggest an efficacy-procrastination relationship, although the use of global efficacy measures is inconsistent with Bandura's (1977) argument that self-efficacy should be measured by items indicative of the behaviors necessary to accomplish a more specific task.

Anxiety is another frequently studied variable, both in research on procrastination (e.g., Rothblum et al., 1986; Solomon & Rothblum, 1984) and in studies of self-efficacy (e.g., Bandura, 1986; Bandura, Adams, & Beyer, 1977). Typically, procrastination researchers have found a significant positive relationship such that individuals with higher anxiety are also more likely to procrastinate. Self-efficacy theory proposes a reciprocal relationship; levels of anxiety arousal can affect the extent to which individuals believe that they are able to handle threatening situations and vice versa (Bandura, 1986). When people experience weak efficacy in potentially threatening situations, they also tend to experience increased anxiety. Procrastination may be an avoidance response related to either anxiety or weak efficacy expectations, or perhaps to both variables.

To date, the only demographic variable consistently examined in procrastination studies is gender, and the findings are mixed in this area. Some research indicates no sig-

nificant gender differences in the incidence of procrastination (e.g., Effert & Ferrari, 1989; Rothblum et al., 1986; Solomon & Rothblum, 1984), whereas other research suggests that women are at greater risk than men (e.g., Paludi & Frankell-Hauser, 1986). Furthermore, women may experience greater levels of anxiety associated with procrastination (Rothblum et al., 1986). More research is needed to clarify the relationship between gender and procrastination. Age might be another significant predictor of procrastination, although no published research has investigated this possibility. For example, it could be argued that younger individuals would report a higher incidence of procrastination given their more limited opportunities to develop efficient work patterns.

As previously stated, little research has been done to examine the role of self-efficacy in procrastination. Furthermore, none of the existing studies assessed domain-specific efficacy expectations and their relationship to anxiety and procrastination. Theoretical considerations suggest that these constructs would be significantly related. Accordingly, this study was designed to assess the amount of variance in procrastination accounted for by a more domain-specific measure of efficacy expectations (defined as beliefs about one's skills for completing a difficult and important task) and state and trait anxiety. Efficacy expectations were chosen as the focus for two reasons. First, Bandura (1986) reported that efficacy expectations tend to be more accurate than outcome expectations in predicting performance. Second, he argued that, because outcome expectations pertain in part to aspects of the external environment, they are not as modifiable as the more internally regulated efficacy expectations. If efficacy expectations are found to be significantly associated with procrastination, then self-efficacy theory may provide a basis for intervention.

The focus of this study concerned the extent to which procrastination can be predicted by variables that are theoretically or empirically tied to the construct. We hypothesized that efficacy expectations would be the strongest predictors of procrastination and that they would be inversely related to procrastination. It was further hypothesized that anxiety would be the next strongest predictor and that it would be positively related to procrastination. No hypotheses were generated concerning either gender or age, given the equivocal nature of the gender findings and the lack of research on age and procrastination.

METHOD

Participants and Procedure

One hundred and forty-one college student volunteers (87 women, 54 men), enrolled at a major midwestern university, participated in this study. Seventy-nine percent ($n = 111$) were enrolled in a learning and study skills course, and 21% ($n = 30$) were in a counseling procedures course for students who were not counseling majors. They ranged in age from 18 to 54 years ($M = 24.50$, $SD = 7.40$). The

majority, 86%, identified themselves as White, and 14% identified as persons of color, primarily Black (4%) and Hispanic (4%). The sample included both undergraduates (82%) and adult extension and graduate students (18%). A variety of academic majors were represented.

Participation was solicited by one of the researchers during class time. The study was described as an investigation of factors that might be related to procrastination. The participants completed the questionnaires anonymously during the class. Of the 143 possible participants, 141 completed usable questionnaires.

Variables

Self-efficacy. The Self-Efficacy Inventory (SEI) was created as part of this study to assess behaviors related to the task of "doing an important and difficult project by a specific deadline." Participants were asked to imagine themselves doing a project such as finding a job, writing a paper, or making a big decision, and to respond to the SEI within the context of their imagined project. This approach was used to increase the likelihood that each participant would select a task that was personally meaningful, salient, and challenging. Participants also were asked to list their project.

The SEI items were developed to assess efficacy *level* and *strength* for distinct behaviors generally related to accomplishing tasks. Level is measured by asking respondents to indicate by answering "yes" or "no" whether they think they can do a series of behaviors that vary in difficulty. Strength is measured by asking respondents to indicate their degree of confidence that they can do each behavior (0 = *great uncertainty* to 100 = *complete certainty*). Although Bandura (1986) recommended arranging items in a hierarchy of difficulty, we used a random format as suggested for complex behavior domains such as career self-efficacy (Lent & Hackett, 1987).

A panel of four psychologists with knowledge and expertise in the areas of procrastination and self-efficacy independently rated 45 items, first for their importance to the behavioral domain and next for their difficulty level for a "typical" person. Forty-three items were rated by all four judges as important to the domain; 31 of these had unanimous agreement for difficulty level. These 31 items constituted the final form of the SEI, with 10 items of high difficulty (e.g., "Can you identify target dates for the realistic completion of your work?"), 17 of medium difficulty (e.g., "Can you establish specific goals for your work?"), and four of low difficulty (e.g., "Can you take time-outs as a break from your work?"). The final form was piloted on 12 mental health professionals, and no substantive changes were made as a result of this pilot testing.

Responses to the SEI were scored in three ways. In accordance with Bandura's (1977) guidelines, efficacy level was determined by summing the number of "yes" responses across the 31 items for each participant. Scores can range from 0 to 31, with higher scores indicating higher efficacy expectations. Efficacy strength was scored in two ways. First,

based on Bandura et al.'s (1977) procedures, an average score was obtained for each participant by dividing the total strength score by the number of "yes" responses, with a possible range of 0 to 100. In addition, a cumulative strength score was obtained for each participant by summing the confidence ratings for all items with a "yes" response. Cumulative strength scores can range from 0 to 3100, with higher scores indicating stronger efficacy. This latter method was used because we questioned how average strength scores are affected by different efficacy levels. For example, an individual responding "yes" to a small number of items with high confidence would have an artificially high indicator of efficacy if average strength was calculated. A cumulative strength score takes into consideration both the number of "yes" responses and the confidence ratings and may contain more information regarding efficacy beliefs. Cronbach's alpha coefficients, calculated for efficacy level, average efficacy strength, and cumulative efficacy strength, were .81, .60, and .91, respectively, indicating adequate-to-high internal consistency reliability.

Procrastination. A modified version of Form G of the Procrastination Inventory (PI; Lay, 1986) was used to measure procrastination. The original form of this self-report inventory contains 20 forced-choice items concerning general, everyday behaviors (e.g., paying bills, returning phone calls promptly, putting things off "until tomorrow"). It was modified to include three items from Form A of the PI pertaining to academic tasks, for a total of 23 items. Items were added to increase the breadth of behaviors measured. Responses reflecting procrastination were scored as 2, and those not reflecting procrastination were scored as 1. Scores are summed across items and can range from 23 to 46, with higher scores indicating greater procrastination. In contrast to Lay's (1988) use of a median split procedure to categorize participants into groups of high and low procrastinators, participant scores were treated as continuous variables.

Internal consistency reliability coefficients ranging from .81 to .89 have been reported in three studies (Lay, 1988; Lay & Burns, 1991; Lay, Edwards, Parker, & Endler, 1989). Test-retest reliability for a 9-month interval was .80 (Ferrari, 1989). There is adequate evidence of construct validity for the PI; for example, it has been positively correlated with the Procrastination Assessment Scale, a measure of academic procrastination (Solomon & Rothblum, 1984), and has low correlations with a social desirability scale (Lay, 1986). Cronbach's alpha coefficient for the modified form of the Procrastination Inventory was .84 for the current sample, indicating good internal consistency reliability.

Anxiety. The Spielberger State-Trait Anxiety Inventory (STAI) (Spielberger, Gorsuch, & Lushene, 1968) was used to measure participant anxiety. The STAI is an anxiety inventory commonly used in procrastination research. It consists of two 20-item scales, the Trait scale and the State scale. The Trait scale is a measure of relatively stable individual differences in anxiety-proneness or a tendency to perceive situations as threatening or dangerous. The State scale measures more transitory anxiety in response to spe-

cific stimuli. For this study, participants were instructed to complete the State scale by imagining themselves doing the same important project identified for completion of the SEI. For each STAI item, respondents rate themselves on a 4-point Likert scale (1 = *not at all*, 4 = *very much*). Scores for each scale can range from 20 to 80, with higher scores suggesting greater anxiety. The STAI is a widely researched inventory with substantial evidence of its reliability and validity (Spielberger et al., 1968). For example, test-retest reliability for the Trait scale ranges from .73 to .86 (Rothblum et al., 1986), but it is low, as expected, for the State scale, which measures transient anxiety (range = .16 to .54) (Spielberger et al., 1968).

Demographics A demographic questionnaire was developed to obtain descriptive information about participants. It consisted of nine questions concerning age, sex, ethnicity, relationship status, student status, educational level, income, and employment status.

RESULTS

Because most of those in the sample were obtained from one university course, and participants from this course were slightly younger and included more men, analyses were performed on all four instruments to investigate any biases related to participant age or sex. None were found. Those in the sample reported experiencing moderate amounts of procrastination ($M = 33.94$, $SD = 5.13$) and high efficacy expectations ($M = 25.84$, $SD = 4.25$ for efficacy level; $M = 1925.81$, $SD = 480.20$, for cumulative strength; and $M = 73.99$, $SD = 10.81$ for average efficacy strength). They reported high state anxiety ($M = 45.96$, $SD = 12.24$) and moderate trait anxiety ($M = 41.61$, $SD = 10.57$).

A series of analyses of variance were conducted to assess differences in procrastination, efficacy, and anxiety as a function of participant demographics. No significant demographic differences were obtained. Zero-order correlations were calculated for scores on the procrastination, self-efficacy, and anxiety measures, and for age and sex. As shown in Table 1,

procrastination scores were significantly related to self-efficacy and anxiety. Procrastination was inversely and significantly related to efficacy level ($r = -.40$), cumulative efficacy strength ($r = -.50$), and average efficacy strength ($r = -.39$). Procrastination was also significantly and positively related to both state and trait anxiety ($r = .31$ and $.23$, respectively) but was not related to either age or sex. Furthermore, there were moderate-to-high levels of multicollinearity between the efficacy, anxiety, and procrastination variables. Each of the efficacy measures was significantly and inversely related to state and trait anxiety. As expected, the three measures of efficacy level and strength were significantly and positively related, as were the state and trait anxiety variables. To examine the relationships between procrastination and all of the predictor variables of interest, a simultaneous multiple linear regression was conducted.

There were two purposes for performing this multiple regression analysis. First, we were interested in determining whether efficacy strength and level continued to be significantly related to procrastination even when the effects of other predictor variables were taken into account. Second, we wanted to identify the efficacy variable that was the strongest predictor of procrastination. The three efficacy measures, both anxiety measures, and the two demographic variables were entered into the regression equation. Although the demographics showed no significant relationship to procrastination in bivariate analyses, they were entered to partial out their influence on the relationships of the other variables. The regression model, summarized in Table 2, accounted for 29% of the variance in procrastination. In reviewing the standardized betas, the coefficient for cumulative efficacy strength is largest, suggesting it is the strongest and only significant predictor of procrastination ($p = .04$). The demographic variables have the smallest standardized betas.

Although efficacy level, average efficacy strength, and anxiety were significant in bivariate analyses, their predictive power was essentially negated by the effect of the cumulative efficacy strength variable due to the high degree of intercorrelations of all of these predictors. Indeed, when

TABLE 1
Correlations Between Major Study Variables

	SE Cumulative	SE Average	State Anxiety	Trait Anxiety	Procrastination	Age	Sex
SE Level	.81**	.29**	-.38**	-.43**	-.40**	-.03	-.15
SE Cumulative		.80**	-.48**	-.50**	-.50**	-.09	-.07
SE Average			-.40**	-.37**	-.39**	.16	.04
State anxiety				.66**	.31**	.13	-.11
Trait anxiety					.23*	.08	.07
Procrastination						.04	.06
Age							.27*
Sex							—

Note. $N = 141$. SE = self-efficacy; SE cumulative = efficacy strength cumulative score; SE average = efficacy strength average score.

* $p < .05$. ** $p < .001$.

TABLE 2
Summary of Simultaneous Multiple Linear Regression Model for Variables Predicting Procrastination

Variable	<i>B</i>	<i>SE B</i>	β	<i>SE</i> β	<i>t</i>	<i>p</i>
Efficacy level	.91	.62	0.75	.52	1.45	.15
Efficacy strength cumulative	-.02	.01	-1.66	.81	-2.05	.04
Efficacy strength average	.34	.24	0.72	.51	1.42	.16
Trait anxiety	-.07	.05	-0.14	.10	-1.35	.18
State anxiety	.08	.04	0.18	.10	1.77	.08
Sex	.85	.84	0.08	.08	1.01	.31
Age	.06	.05	0.09	.08	1.15	.25

Note. $N = 141$. $R^2 = .288$, $F(7, 133) = .771$, $p < .0001$.

cumulative efficacy strength was entered into a regression model by itself, it alone accounted for 25% of the variance.

DISCUSSION

A major theme in the procrastination literature is the search for theoretical explanations of procrastination. Although cognitive constructs such as self-esteem (Beswick et al., 1988), self-handicapping (Ferrari, 1992), optimism (Lay & Burns, 1991), time perception (Lay, 1988), and global efficacy expectations (Tuckman, 1990) have been investigated, to date researchers have not examined the possible role of more domain-specific efficacy expectations. The current study was an investigation of the relationship between efficacy expectations about an important project and procrastination. In addition, anxiety, sex, and age were assessed for their possible connections to procrastination. Anxiety was of particular interest because it is a construct that has been found to be associated with both procrastination and self-efficacy.

The results of a regression analysis indicated that cumulative efficacy strength was a significant and inverse predictor of procrastination. Individuals with strong efficacy expectations tended to report less procrastination. Cumulative efficacy strength was defined as the sum of participant confidence ratings that they could accomplish 31 behaviors necessary to complete a major project.

These findings are consistent with the few studies that have examined global efficacy expectations and procrastination (Ferrari et al., 1992; Tuckman, 1991) and can be explained by Bandura's (1977) self-efficacy theory. Bandura argued that strong efficacy expectations lead to greater task initiation and persistence, whereas weak expectations produce task avoidance and less persistence. Procrastination is one type of behavior avoidance.

Current procrastination interventions emphasize the development of behavioral skills such as self-monitoring and self-reward (Green, 1982), self-control techniques (Ziesat, Rosenthal, & White, 1978), and stress and time management (Brown, 1992). As Solomon and Rothblum (1984) indicated, procrastination encompasses more than poor

study habits and a lack of time management. It involves a complex interaction of behaviors, cognitions, and affect. The current results suggest the need for expanding interventions to include the cognitive component of efficacy expectations. An efficacy intervention could be accomplished by first explaining self-efficacy theory to clients. Next, a graduated set of tasks that will produce client success should be identified and executed to increase clients' success experiences and, thus, strengthen efficacy expectations (Bandura, 1986). A common problem for procrastinators is the skill of getting started on a specified task (Burka & Yuen, 1983). The skills necessary to initiate the task often need to be isolated and broken into small, attainable steps.

To illustrate a self-efficacy intervention, we created the following individual counseling example, based on theory and research reported by Bandura (1977, 1986). The hypothetical client is a male undergraduate student who is procrastinating about writing a term paper. Because Bandura (1977) argued that individuals must have adequate motivation and ability, as well as strong efficacy, to engage in behaviors successfully, the counselor should first clarify whether the project is an important one to the client and one that the client is capable of accomplishing. In simple terms, the explanation should involve what completing the paper means to the client. Has he successfully written papers in the past? Next, the counselor should assess outcome expectations by verifying that the project can reasonably be accomplished (e.g., Is there enough time to complete the paper? Does the client have sufficient resources, such as access to a library and word processing equipment?). The third step involves efficacy expectations and consists of helping the client identify the individual behaviors necessary to complete the project. These might include the following behaviors: conduct a literature search, highlight important points in each source, develop an outline, request instructor feedback on the outline, write a rough draft, and revise the paper. If the client's efficacy expectations are quite weak, these behaviors could be further broken down (e.g., "write a rough draft" could be divided into "write an opening paragraph, write 500 more words, write a concluding paragraph").

After the behaviors are specified, the counselor might ask the client whether he can do each behavior (yes/no) and to rate his confidence (0 = complete uncertainty, 100 = great certainty) for each behavior. This exercise would provide an indication of cumulative efficacy strength. The counselor and client could then identify obstacles to completing each behavior, with particular emphasis on those behaviors for which the client has weak efficacy expectations, and determine ways to minimize these obstacles. It is important for clients to successfully complete behaviors between counseling sessions. As Bandura (1986) stated, an individual must experience success to maintain or strengthen efficacy, so the client's "out of session" assignments should not be too ambitious. In subsequent sessions, the counselor would monitor the client's efficacy expectations by asking him to again rate the behavioral steps.

Several of the items from the SEI used in this study suggest the types of obstacles that are common in procrastinating to do a major task. They include failure to do the following: establish specific goals for the project and revise those goals as necessary, set dates for realistic completion of work, reward one's self for progress, establish specific goals for each work session, schedule sufficient blocks of time for working on the project, plan an efficient way to use one's time during each work session, postpone socializing or doing other things during scheduled work sessions, ask others for assistance when one is "stuck," recall past accomplishments to help in doing the current project, and let go of perfectionistic standards. Discussion of how to remove these obstacles may assist the client in writing the paper, while increasing his self-efficacy.

Another important issue concerns identifying individuals at risk for procrastination. We recommend the use of the Procrastination Assessment Scale–Students (PASS; Solomon & Rothblum, 1984) with college students. The PASS can be used by counselors to identify individuals at risk for academic difficulty due to procrastination. These findings suggest that students should also be screened with self-efficacy measures. Self-efficacy theory seems to be a relevant model for higher education settings, given the emphasis on cognitive processes. Furthermore, a significant amount of student procrastination can involve academic tasks (Burka & Yuen, 1983), and these lend themselves well to behavioral hierarchies that are the essence of efficacy expectations. Screening should be done early in a student's academic career so that failures, which weaken efficacy expectations, can be prevented. Identifying students at risk for procrastination on tasks such as term papers and research projects would allow counselors to intervene and thus increase the students' chances of completing their assignments in a timely manner.

Prior research (e.g., Beswick et al., 1988; Solomon & Rothblum, 1984) has demonstrated significant relationships between anxiety and procrastination. In the current study, when the effects due to efficacy were considered, anxiety did not contribute significantly to the variance in procrastination.

Anxiety may need to be examined and interpreted in the context of its relationship to other variables. For example, it may be that anxiety has an impact on self-efficacy and that its effects on procrastination are mediated by efficacy expectations. However, given Bandura's (1986) theory of *reciprocal determinism*, it is difficult to distinguish between anxiety as an antecedent or as a consequence of behavior initiation and persistence. Furthermore, correlational analyses do not lend themselves to causal interpretations.

Neither of the demographic variables measured in this study were significant predictors of procrastination. More research is needed to clarify whether any relationships exists, because this is the first study of efficacy and procrastination to examine sex and age. These findings suggest that counselors should not expect procrastination to occur more frequently for either male or female clients. However, they should be sensitive to the possibility that the consequences of procrastination differ due to sex. For instance, there is some evidence that women may experience more anxiety than men because of their procrastination (Rothblum et al., 1986).

Several limits of this study suggest that researchers should be cautious in drawing definitive conclusions from the results. The sample was selected in a nonrandom way and participants were predominantly White and thus may not be representative of university students in general. The data lack behavioral confirmation of participant self-perceptions. Finally, many of the participants identified some type of academic procrastination. It is not known whether the current relationships would be found for other types of procrastination. Nevertheless, the findings suggest several research directions.

Typically, efficacy researchers have defined efficacy level as the number of "yes" responses to items, and efficacy strength as the total confidence ratings divided by the sum of the behaviors receiving positive endorsements (Bandura, 1977, 1986; Bandura et al., 1977). The current results indicate that efficacy strength may be a better predictor than efficacy level for complex processes such as procrastination. From a statistical perspective, a 0 to 100 confidence interval provides a greater range of variability than does the categorical, yes/no format used to measure efficacy level. Indeed, as others have argued (Lent & Hackett, 1987), and as demonstrated by the current results, efficacy level is subsumed by efficacy strength. Furthermore, because an average efficacy strength score is calculated by dividing total confidence by a different number of items for each respondent, there is no way to include information about how many items are positively endorsed. Therefore, a cumulative efficacy score contains information concerning both level and strength. Our results suggest that both efficacy level and average efficacy strength are subsumed by a cumulative strength score. Therefore, researchers and practitioners should use cumulative strength scores.

In this study, although there were no ceiling effects for the SEI (indicating adequate variance), scores tended to cluster near the higher end of the scale. These results are not

surprising given that most participants had been in college for a while, suggesting a certain degree of successful behaviors and concomitantly stronger efficacy expectations. Studies that would include samples of at-risk students, larger numbers of new students, or both, would very likely increase response variability. Future research in this area needs to be done with diverse populations.

This study was focused on only one aspect of self-efficacy theory, efficacy expectations. Future procrastination research should also include outcome expectations, which pertain to an individual's judgments about the likelihood that a given behavior will lead to a desired outcome or consequence (Bandura, 1986). For example, does procrastination occur when people have poor outcome expectations because their workloads are impossible to complete? Most of the tasks listed by the participants in this study involved some type of academic procrastination. This study should be replicated with other types of tasks. In addition, although the efficacy measure developed for this study is more task-specific than those measures used in prior research (e.g., Tuckman, 1991), even greater compliance with Bandura's (1977) guideline for specificity could be obtained if research participants were instructed to respond to behavioral items pertaining to the same task.

Although the current results indicate that efficacy expectations are a significant predictor of procrastination, the amount of variance accounted for is modest. One commonly proposed theory about procrastination is that it is a strategy used to protect a fragile sense of self-esteem, especially for individuals who base their esteem on accomplishments (Berry, 1975; Burka & Yuen, 1983). Future studies should assess the unique contributions of self-efficacy and self-esteem to procrastination. Furthermore, Bandura (1986) argued that individuals must have adequate levels of ability for efficacy expectations to be a significant mediator of performance. Future studies of procrastination could include an ability measure such as grade point average.

Finally, there is little research that compares the outcomes of different interventions for procrastination, and there are no studies of efficacy-based treatments. Research is needed to assess the comparative effectiveness of self-efficacy approaches in reducing procrastination. Actual performance should be examined to confirm participant self-reports of procrastination.

This study demonstrated that efficacy expectations were significant predictors of college student procrastination. The findings suggest that interventions designed to reduce procrastination might include a cognitive component such as self-efficacy. We hope that these findings will contribute to theory and practice by highlighting the importance of the social cognitive construct of self-efficacy.

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