

An Investigation of the Efficacy of Acceptance-Based Behavioral Therapy for Academic Procrastination

Debra M. Glick and Susan M. Orsillo
Suffolk University

Procrastination among college students is both prevalent and troublesome, harming both academic performance and physical health. Unfortunately, no “gold standard” intervention exists. Research suggests that psychological inflexibility may drive procrastination. Accordingly, interventions using acceptance and mindfulness methods to increase psychological flexibility may decrease procrastination. This study compared time management and acceptance-based behavioral interventions. College students’ predictions of how much assigned reading they *should* complete were compared to what they *did* complete. Procrastination, anxiety, psychological flexibility, and academic values were also measured. Although a trend suggested that time management intervention participants completed more reading, no group differences in procrastination were revealed. The acceptance-based behavioral intervention was most effective for participants who highly valued academics. Clinical implications and future research are discussed.

Keywords: academic procrastination, psychological inflexibility, acceptance, time management, academic values

On average, college students report that they engage in academic procrastination between 30 and 60% of the time (Rabin, Fogel, & Nutter-Upham, 2011). This high frequency is concerning given its widespread negative consequences. Not surprisingly, procrastination is negatively associated with grades on papers (Tice & Baumeister, 1997), exams (Steel, Brothen, & Wambach, 2001; Tice & Baumeister, 1997), and final course grades (Steel et al., 2001). It is also associated with poorer mental and psychological functioning. For example, students scoring higher on a self-report measure of procrastination report more stress, physical illness, and visits to the health center than do those reporting lower levels of procrastination (Tice & Baumeister, 1997). In addition, procrastination has been linked with poor mental health (Stead, Shanahan, & Neufeld, 2010), a failure to seek mental health services (Stead et al., 2010), and suicide proneness (Klibert, Langhinrichsen-Rohling, & Saito, 2005). Given these adverse effects, it is not surprising that the majority of students report a desire to reduce their procrastination (Solomon & Rothblum, 1984).

Unfortunately, despite its prevalence and negative impact, a “gold standard” intervention for procrastination has not yet been developed. Several studies have demonstrated the benefits of time management (TM) strategies, such as setting deadlines (e.g., Ariely & Wertenbroch, 2002), monitoring and reporting compliance to deadlines (Roberts, Fulton, & Semb, 1988), creating specific plans for completing goals (e.g., Gollwitzer & Brandstätter, 1997;

Häfner, Oberst, & Stock, 2014), and learning study skills (Tuckman & Schouwenberg, 2004) for task completion. However, considerable differences in how procrastination has been operationally defined, methodological differences across studies, and shortcomings to the study designs, limit the interpretability and generalizability of the findings. Studies have varied with respect to how they have defined procrastination. One generally accepted definition is that procrastination is the voluntarily delay of an intended course of action that occurs despite expectations that one will be worse off for the delay (Steel, 2007). Some debate exists as to whether procrastination is best understood as a behavior elicited in response to certain tasks (i.e., dilatory behavior) or as a trait characteristic that manifested across a range of situations (Schouwenberg, 2004). In the present study, procrastination was viewed as a behavioral manifestation of a trait, rather than a trait characteristic itself. In addition, it was viewed as a discrepancy between the intended and the actual time frame for starting or completing work. Specifically, procrastinatory behavior was defined as

... the delay of a task or assignment that is under one’s control. The delay should be under the control of the individual, and the task should be one that needs to be done. Procrastination involves knowing that one needs to perform an activity or attend to a task, and perhaps even wanting to do so, yet failing to motivate oneself to perform within the desired or expected time frame. (Ackerman & Gross, 2005, p. 5)

Perhaps due to the differences in how procrastination has been defined, studies on the behavior have utilized a range of methodologies. For example, Ariely and Wertenbroch (2002) assessed the efficacy of TM strategies incorporated into an academic class, rather than assessing the impact of a standalone TM training. Their study design and findings suggest that professors need to alter their class plan in order to reduce student procrastination, which they may not be willing to do. Further, the outcomes used to determine

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Debra M. Glick and Susan M. Orsillo, Department of Psychology, Suffolk University.

Correspondence concerning this article should be addressed to Debra M. Glick, Suffolk University, 41 Temple Street, Boston, MA 02114. E-mail: Debra.m.glick@gmail.com

the impact of TM range from scores on a trait measure of procrastination (e.g., Tuckman & Schouwenberg, 2004) to the number of days between when students handed in papers and the final day of class (Ariely & Wertenbroch, 2002), the amount of hours students spend on an activity the week before it is due (Häfner et al., 2014), to GPA (Tuckman, 1998), which makes it difficult to integrate cross-study findings.

Moreover, although these studies demonstrate a positive impact of TM strategies on average group performance, this approach was not effective for all participants. For example, the study skills intervention was least effective for students with a high tendency to procrastinate (Tuckman & Schouwenberg, 2004). Furthermore, across studies, TM strategies were not effective for all tasks. For example, setting implementation intentions appears to be more effective in helping participants complete “difficult” than “easy” goals (Gollwitzer & Brandstätter, 1997).

One possible explanation for the limited impact of TM strategies on procrastination is that they may not sufficiently target other factors that play a causal or maintaining role in the behavior. For example, procrastination has been found to be associated with anxiety (e.g., Fritzsche, Young, & Hickson, 2003; Macher, Paechter, Papousek, & Ruggeri, 2012), fear of negative evaluation (e.g., Bui, 2007), fear of failure (e.g., Beck, Koons, & Milgrim, 2000), and problems with emotion regulation (Sirois & Pychyl, 2013), which may not be adequately addressed in TM. Fortunately, a number of cognitive-behavioral programs have been developed to target students’ negative thoughts about their ability to complete quality work (e.g., Kearns, Gardiner, & Marshall, 2008), their difficulty with self-regulating their behavior (e.g., Häfner et al., 2014), and their shame about being “procrastinators,” (e.g., Topman, Kruse, & Beijne, 2004).

Although these studies all report some positive outcomes, methodology limits the conclusions that can be drawn. First, few of the studies utilized a control group, which makes it difficult to attribute any change in procrastination to the cognitive-behavioral theory programs. Moreover, small sample sizes and low participation (e.g., 2% of those who visited a study Web site; Topman et al., 2004) and completion rates (e.g., 57% Topman et al., 2004) limit the generalizability of the findings. Finally, a large variety of outcomes of interest were used, including scores on procrastination scales (e.g., Tuckman & Schouwenberg, 2004) and measures assessing stress and cognitions related to completing work (Kearns et al., 2008), whether students passed their courses (Van Horebeek, Michielsen, Neyskens, & Depreeuw, 2004), and time spent on an important academic assignment (Häfner et al., 2014). This variety prevents direct comparisons across studies.

Another limitation of some of the previous interventions is that they required a great deal of time and/or resources. For example, Tuckman and Schouwenberg’s intervention included 90-min-long groups each week for up to one year, requiring large time commitments from both students and group leaders. Similarly, Topman et al.’s (2004) intervention required daily exercises for a coach to review, which is also quite resource-intensive. Given the prevalence of procrastination among college students, it is important to develop cost and resource effective and easily accessible interventions. Given the prevalence of procrastination among college students, it is important to develop cost and resource effective and easily accessible interventions, which has been a focus of recent research in this area (e.g., Häfner et al., 2014; Scent & Boes,

2014). One recommendation is that online interventions might be particularly beneficial, cost-effective, and easier to implement. However, research is needed to determine whether this mode of delivery would be effective in reducing procrastination.

One hindrance to the development of effective interventions for procrastination may be that there has not been a unified theory developed to explain the behavior. The development and provision of effective interventions for procrastination requires a strong, cohesive theoretical explanation of the behavior. Although there has been a recent increase in scientific research, much has yet to be learned about the causes and maintaining factors of procrastination (Steel, 2007).

One explanation for why TM programs might be limited in their impact is that they may not be sufficiently targeting the constructs underlying procrastination. Recently it has been proposed that chronic procrastination may result from psychological inflexibility (Glick, Millstein, & Orsillo, 2014; Scent & Boes, 2014). Psychological inflexibility is defined by six key psychological processes (i.e., the “hexaflex” model: experiential avoidance, cognitive fusion, dominance of the conceptualized past or future, attachment to the conceptualized self, lack of values clarity, and unworkable action/inaction; Hayes et al., 2004). Psychological inflexibility is proposed to be a process that contributes to the development and maintenance of a broad range of problematic behaviors and psychological distress (Hayes, Strosahl, & Wilson, 2012), and measures of inflexibility have been shown to be associated with measures of depression, anxiety, stress, and overall psychological distress (e.g., Bond et al., 2011; Chawla & Ostafin, 2007).

From this perspective, academic procrastination develops when students feel defined and threatened by the negative thoughts (e.g., “Reading this will be boring,” “I am an incompetent writer,” “I feel stupid when I can’t solve math problems”) and feelings (e.g., anxiety, boredom) that arise when they consider schoolwork (e.g., cognitive fusion). Contributing to these painful thoughts and feelings may be a rigid attachment to one’s identity as a “procrastinator” (e.g., conceptualized self). In an attempt to avoid or suppress those unpleasant internal experiences, students may engage in alternative activities (e.g., watching TV, hanging out with friends) aimed at eliciting more pleasant thoughts and mood states (e.g., experiential avoidance). Although these strategies may produce short-term elevations in mood, if they become a habitual way of coping with academic stress they can produce significant distress. This perspective is consistent with the theory that procrastination is driven by attempts to regulate mood (Sirois & Pychyl, 2013).

Although taking breaks from homework can be an effective way of dealing with academic stress, research demonstrates that students who pursue these activities as a way to enhance mood and avoid discomfort experience a paradoxical increase in distress (e.g., Patry, Blanchard, & Mask, 2007; Pychyl, Lee, Thibodeau, & Blunt, 2000). These findings are consistent with a larger literature demonstrating the paradoxical effects of suppressing thoughts (Wenzlaff & Wegner, 2000), emotions (Dalgleish, Yiend, Schweizer, & Dunn, 2009) and somatic sensations (e.g., Cioffi & Holloway, 1993). Attempts at avoidance and suppression persist, largely because they often produce short-term benefits despite an increase in long-term distress (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996).

From this approach, it is also assumed that students are more likely to procrastinate if they have lost contact with what it is they value about academic pursuits. This lack of clarity about values, coupled with an experientially avoidant way of responding to uncomfortable thoughts and emotions, increases the likelihood that a student will engage in actions that are inconsistent with academic success. Consistent with this theory, Häfner et al. (2014) noted that it might be beneficial for a future intervention for procrastination to include a component in which students are encouraged to think about positive outcomes as a result of completing a task. In a study by Scent and Boes (2014), students were actively encouraged to think about their values. However, they did not focus exclusively on academic values. Nevertheless, clearly there is increasing recognition of the importance of helping students connect with that which they value to help them reduce their procrastination.

Two studies directly examined the hypothesis that psychological inflexibility might partially account for the relationship between anxiety and procrastination (Glick et al., 2014). Their results suggest that attempts to avoid, suppress, or alter anxious thoughts and emotions (i.e., experiential avoidance), decreased acceptance of internal experiences and reduced valuing of academic pursuits contribute to the prediction of academic procrastination over and above that predicted by anxiety alone. Thus, procrastination may result from one's response to anxiety rather than to the anxiety itself.

Acceptance-based behavior therapies (ABBTs)¹ include clinical methods and strategies that directly target many of the processes thought to underlie procrastination. ABBTs aim to enhance psychological flexibility by decreasing experiential avoidance and encouraging engagement in valued activities using strategies such as psychoeducation (e.g., the function of emotions), mindfulness (i.e., curious and compassionate decentering (observation of thoughts and feelings as transient experiences) and values articulation (i.e., identification of the areas of life that are most personally meaningful). Individuals are encouraged to view their painful thoughts and emotions as natural, transient responses that can be observed and allowed instead of self-defining experiences that direct behavior. Previous research demonstrates that ABBT is effective in reducing anxiety (see Roemer & Orsillo, 2009), perhaps through decentering as a mechanism of change (Hayes-Skelton, Usmani, Lee, Roemer, & Orsillo, 2012). Given that ABBTs have been shown to be effective in targeting a wide variety of psychological difficulties including depression and anxiety (e.g., Chiesa & Serretti, 2011; Hofmann, Sawyer & Fang, 2010), addictive behaviors (e.g., Hayes et al., 2004) and chronic pain (e.g., Veehof, Oskam, Schreurs, & Bohlmeijer, 2011), and that they involve strategies that target the processes proposed to underlie procrastination, we propose that it may be useful to examine the potential benefits of an ABBT for this problem area.

There are some studies that have used strategies consistent with this approach to target procrastination. For example, students have been challenged to view their thoughts and feelings about academic performance as separate from their self-definition and identities (Van Essen, Van Heuvel, & Van den Ossebaard, 2004; O'Callaghan, 2004) and informed that change involves tolerating uncomfortable emotions (Van Horebeek et al., 2004; Van Essen et al., 2004). Students have been asked to consider how a miracle would change their lives (O'Callaghan, 2004), which is a strategy similar to those used in ABBTs to help individuals identify their

values and become aware of the ways avoidance and procrastination interferes with quality of life. Although small in number and preliminary, these interventions suggest that there may be benefits to an ABBT-informed procrastination reduction program. To date, there is only one published study examining ABBT and procrastination (Scent & Boes, 2014). In this study, the researchers looked at the impact two 90-min workshops aimed increasing psychological flexibility and personal values. Participants reported an increase in psychological flexibility and they indicated that the workshops were beneficial in helping to reduce their procrastination. However, the sample size used in this study was extremely small and no control group was utilized.

The goal of the present study was to develop and test the efficacy of an ABBT-based intervention aimed at reducing academic procrastination. Given the high prevalence of procrastination among college students, the evidence of brief ABBTs protocols for other concerns (e.g., Gaudiano & Herbert, 2006) and thus the need for cost-effective, accessible resources, we developed a single session program delivered via the Internet.

The present study compared a TM intervention to an ABBT intervention for procrastination. A TM program was selected as the comparison condition because it is one of the most frequently used interventions in the literature (e.g., Levrini & Prevatt, 2012) and is substantially different from the ABBT model. Due to the previous research demonstrating a relationship between procrastination and psychological inflexibility (Glick et al., 2014), we predicted that the ABBT intervention would be more helpful in reducing procrastination than would the TM intervention. The present study attempted to address the primary limitations of previous studies by using a larger sample, employing a randomized controlled experimental design, and assessing the effect of the program on behavioral procrastination on an academic assignment. The following hypotheses were tested:

Hypothesis 1: Students in the ABBT intervention condition engage in less self-reported behavioral procrastination than students in the TM condition.

Hypothesis 2: Because ABBT aims to increase students' willingness to engage in personally meaningful activities, the effects of the ABBT-intervention are moderated by the extent to which students value academics. Specifically, students in the ABBT condition who more strongly endorse academic values procrastinate less after the intervention than do those who more weakly endorse these values.

Hypothesis 3: Because the ABBT intervention directly targets the processes thought to underlie anxiety, experiential avoidance, and diminished clarity of values, students in the ABBT intervention show a greater decrease in trait anxiety and experiential avoidance and a greater increase in academic values than do students in the TM intervention.

¹ ABBTs include acceptance and commitment therapy, dialectical behavior therapy, mindfulness-based cognitive therapy, and others.

Method

Participants

We recruited participants from undergraduate and graduate courses at two large, urban universities in the Northeast region of the United States. Classes were selected if they contained regularly assigned (e.g., weekly) reading. Students were informed that they were being invited to participate in a study for a doctoral dissertation that was aimed at comparing two interventions for academic procrastination. They were told that they would be randomly assigned to the intervention condition and that they could earn either research credit or monetary compensation for their participation. Out of approximately 2,000 students contacted, 274 provided informed consent, of which 258 (94%) completed at least one of the preintervention measures. Of these 258 individuals, 166 (64%) completed the intervention and the manipulation checks of the interventions. Finally, 142 of the 166 (86%) completed at least one of the postintervention measures, representing 52% of the students who provided informed consent. A one-way ANOVA revealed that there was no difference in academic procrastination on the Procrastination Assessment Scale–Students (PASS) among students who discontinued the study after completing only the preintervention measures, students who completed the intervention but not the postintervention measures, and students who completed the study. Participants were excluded if, due to an error in sending the interventions to participants, they completed both interventions ($n = 2$), did not pass the manipulation check (described in more detail below) created to ensure that students watched the intervention video ($n = 22$), did not complete more than one measure on the postintervention survey ($n = 1$), or completed the survey more than once ($n = 2$).

The final sample included 118 (59% female) participants ranging in age from 18 to 34 ($M = 21.12$, $SD = 3.09$). Seventy percent of participants self-identified as White, 4% as multiracial, 4% as Black/African American, 14% as Asian, 4% as other, and 2% declined to state their race. Twelve percent of the participants were freshmen, 22% sophomores, 27% juniors, 27% seniors, and 12% graduate students. Forty-two percent of the participants majored in business, 17% in the natural sciences, 28% in the social sciences, and 1% in the humanities. Eight percent majored in another area and four percent were undecided or did not complete this item. Eight percent reported a diagnosis of a learning disability. Chi-square analyses revealed no demographic differences between intervention groups.

Materials

Demographic questionnaire. A seven-item demographic measure asking about age, gender, race, ethnicity, year in school, and diagnosed learning disabilities was administered.

Procrastination Assessment Scale-Students. (Solomon & Rothblum, 1984). The PASS is a 44-item Likert-type self-report measure that was used to assess a tendency toward academic procrastination. The first part was used in the present study and measures the tendency to procrastinate in six areas: writing papers, studying for exams, weekly reading assignments, administrative tasks, meetings, and general academic tasks). On a 5-point scale, students are asked to report the frequency with which they pro-

crastinate in these areas as well as the extent to which it creates problems for them. A total procrastination score is generated (ranging from 12 to 60), with higher scores indicating a greater amount of procrastination. The Total Problems subscale has been found to be positively correlated with other measures of procrastination (Stead et al., 2010). In addition, test–retest reliability for the Total Problems subscale has been found to be .74 (Fischer & Concoran, 1994). The Cronbach’s alpha for the Total Problems subscale for the present sample was .88.

Action and Acceptance Questionnaire II. (AAQII; Bond et al., 2011). The AAQII is a seven-item Likert-type self-report measure that assesses psychological flexibility. Scores range from 7 to 49, with lower scores corresponding to higher experiential avoidance, or the unwillingness to remain in contact with particular feelings and thoughts, and higher scores reflecting acceptance, action, and greater psychological flexibility. Bond et al. (2011) examined the psychometric properties of this measure. They found that the AAQII had good test–retest reliability in a community sample over 3 months (.81) and 1 year (.79). In addition, Bond and colleagues found the measure to have convergent and discriminant validity, highly correlated with theoretically related constructs (e.g., depression; anxiety). Fledderus, Oude, Voshaar, Ten Klooster, and Bohlmeijer (2012) found the AAQ-II showed incremental validity over a measure of mindfulness in explaining depression, anxiety, and positive mental health. In the present sample, the internal consistency was excellent (Cronbach’s alpha = .90 [pre] and .91 [post]).

Academic Values Questionnaire. (AVQ). The AVQ is a five-item measure designed for the present research. It is scored on a 5-point Likert-type scale from 0 (*strongly agree*) to 4 (*strongly disagree*) designed to assess the extent to which students value academics (Glick & Orsillo, 2009). Each item reflects an academic or educational value. Scores can range from 5 to 25, with higher scores suggesting a greater degree of academic values. Internal consistency for this scale was good, especially for a measure with only five items (Cronbach’s alpha = .84 [pre] and .83 [post]).

State-Trait Anxiety Inventory-Trait. (STAI-T; Spielberger, 1983). The STAI-T is a 20-item self-report measure that assesses the extent to which individuals experience symptoms of anxiety in general. Responses are scored on 4-point Likert-type scale from 1 (*almost never*) to 4 (*almost always*). Scores range from 20 to 80, with high scores indicating higher levels of trait anxiety. There is evidence that the STAI-T has excellent test–retest reliability (average .88) at multiple time intervals (Barnes, Harp, & Jung, 2002). The STAI-T has also shown adequate convergent and discriminant validity with other trait anxiety it has been to differentiate patient from control samples (Spielberger, 1983). Internal consistency for the present sample was excellent (Cronbach’s alpha = .91 [pre] and .93 [post]).

Intervention Manipulation Checks

To assess the extent to which students understood the interventions, they were asked to answer four questions about the content of their assigned intervention. The items were designed to be easily answered by individuals who had viewed the video but not by individuals who had not viewed the video. For example, students in the TM intervention condition were asked, “Which of the following was *not* given as a strategy to improve time manage-

ment?” and were provided with multiple answers from which to select. Similarly, students in the ABBT condition were asked, “Which of the following reflects the way the term *value* was used in the video?” and were also provided with multiple answers from which to choose.

Intervention Questionnaire

At the end of the study, students were asked subjective questions about their assigned intervention including their familiarity with and use of the strategies presented. Both items were measured on a 5-point Likert-type scale. Students were also asked whether or not they found the intervention helpful and/or enjoyable and were encouraged to provide comments.

Interventions²

Both interventions were 20-min programs delivered via an online video with corresponding PowerPoint slides. Both included a definition of procrastination, information about the prevalence of procrastination, a list of negative consequences of procrastination, and some intervention-specific information about the factors thought to cause procrastination and strategies one could use to address this problem behavior. For example, in the TM condition, students were educated about common reasons for poor TM (e.g., unrealistic perceptions of time required for work). Several strategies were introduced that were aimed at structuring one’s time in order to complete assignments (e.g., create a schedule; prepare for last-minute disruptions). They were also provided with a story in which a student was trying to complete his work utilizing the strategies provided in the intervention. The ABBT condition provided information about the function of emotions and the concept of experiential avoidance as well as the benefits of mindfulness practice and academic values articulation. Students were guided through a mindfulness practice that could be useful when struggling with painful thoughts and emotions arising from contemplating the completion of academic assignments (see Roemer & Orsillo, 2009, pp.128–129). Finally, students in the ABBT condition reflected on their academic motivation and values (e.g., the extent to which they value learning) and were encouraged to act in ways that are consistent with these values even in the presence of unpleasant thoughts and feelings.

Procedure

At the beginning of the semester, students who volunteered for the study were randomly assigned to either the TM intervention or the ABBT intervention and completed an online survey consisting of the demographic questionnaire, the PASS, the AAQ, the STAI-T, and the AVQ. They were also provided with a date approximately two thirds of the way into the semester. This date was used to create a behavioral measure of procrastination based on a variation of that used by Ackerman and Gross (2005, 2007). Using a 6-point scale of percentage ranges (0–10, 11–25, 26–50, 51–75, 76–90, 91–100), participants were asked to consider their commitments for the semester and report the percentage of the reading that was assigned by the designated date that they *should* read. A “should” read score (*Ideal*) was derived by taking the midpoint of the percentage ranges. In order to assess behavioral

procrastination, *Ideal* was divided by the percentage of the assigned reading that the students actually read (*Actual*). For example, if students reported that they should complete 94.5% of the reading but that they only completed 5% of it, the *Ideal/Actual* procrastination score would be 18.9. If students reported that they should complete 94.5% and actually did complete that much, the score would be 1. Thus, higher scores reflected more procrastination.

Two weeks later, participants viewed the online video and corresponding PowerPoint presentation of their assigned intervention condition and completed the manipulation check questionnaire. Two weeks after they viewed the intervention, participants were asked to review and reflect on the strategies they learned as they completed their reading for the course.

The day following the designated date (i.e., two thirds of the way into the semester), participants reported the percentage of reading that actually *did* complete (*Actual*). They were also administered the AAQ, STAI-T, AVQ, and the intervention questionnaire.

Results

Baseline Analyses

There were no group differences on baseline measures. See Table 1 for means, standard deviations, and ranges for the pre-intervention study variables. Correlations were also run to determine relationships among the study variables (see Table 2). Both psychological inflexibility and trait anxiety were significantly and positively associated with academic procrastination. Academic values were significantly and negatively correlated with academic procrastination. Whereas *Actual* and *Ideal/Actual* were statistically significantly associated (negatively and positively, respectively) with baseline PASS scores, *Ideal* itself was not.

Manipulation Check Analyses

Of the 166 students who completed the intervention and the manipulation checks of the interventions, 22 did not pass the manipulation check. Results demonstrated that 35% of the participants who completed the study answered the second item incorrectly; thus the item was deemed invalid and was eliminated from the manipulation check total score. Participants who answered at least two of the remaining three items correctly were retained in the data set, whereas those who answered fewer than two items correctly ($n = 10$; 13%) were eliminated from data analysis. Similarly, for the ABBT intervention, item two was deemed invalid, with 36% of the 43 participants answering it incorrectly. Again, participants who answered at least two of the remaining three items correctly were retained in the data set whereas those who answered fewer than two items correctly ($n = 7$; 13%) were eliminated from data analysis.

Intervention Questionnaire Analyses

On a scale from 1 to 5, participants reported an average familiarity score of 3.23 ($SD = 1.04$), indicating that they tended to be

² The intervention materials developed for the present study are available upon request.

Table 1
Means, Standard Deviations, and Ranges for Preintervention Study Variables

| Variable | Total (<i>N</i> = 118) | | TM (<i>n</i> = 69) | ABBT (<i>n</i> = 49) |
|--|----------------------------|--------|------------------------|--------------------------|
| | <i>M</i> (<i>SD</i>) | Range | <i>M</i> (<i>SD</i>) | <i>M</i> (<i>SD</i>) |
| Academic procrastination ^a | 33.14 (7.64) | 12–51 | 32.41 (7.48) | 34.16 (7.81) |
| Trait anxiety ^b | 42.14 (10.08) | 21–70 | 42.42 (10.10) | 41.76 (10.15) |
| Psychological inflexibility ^c | 20.87 (8.82) | 8–48 | 20.84 (9.06) | 20.92 (8.56) |
| Academic values ^d | 22.48 (2.85) | 5–25 | 22.49 (3.16) | 22.47 (2.39) |
| <i>Ideal</i> ^e | 82.25 (22.15) | 5–94.5 | 83.67 (21.44) | 80.24 (23.18) |

Note. TM = time management; ABBT = acceptance-based behavioral therapy.

^a Procrastination Assessment Scale–Students (Total Problems subscale). ^b State-Trait Anxiety Inventory (Trait subscale). ^c Acceptance and Action Questionnaire II. ^d Academic Values Questionnaire. ^e Percentage of reading students report they *should* read.

“somewhat” familiar with the strategies recommended in the interventions. Also on a scale from 1 to 5, they reported an average use score of 2.96 (*SD* = .83), indicating that they “sometimes” used the strategies suggested by the interventions. In addition, the majority of students found the interventions helpful (75%) and enjoyable (81%).

The use and perceived helpfulness questions were also analyzed by intervention group. A chi-square analysis revealed no difference in the percentage of students who reported enjoying the interventions between the TM and ABBT groups, $\chi^2(1, N = 118) = .05, p = .51$. In contrast, a greater percentage of participants in the TM group compared to the ABBT group reported that they found the strategies for coping with procrastination helpful, $\chi^2(1, N = 116) = 6.76, p < .05$. With respect to familiarity with the strategies presented in the interventions, students in the TM group (*M* = 3.72, *SD* = .78) were more familiar with the intervention strategies than were students in the ABBT group (*M* = 2.52, *SD* = .97; *t* = 38.77, *p* < .001). Students in the TM group (*M* = 3.19, *SD* = .75) also reported using the intervention strategies more often than did students in the ABBT group (*M* = 2.65, *SD* = .83; *t* = 6.76, *p* < .01).

Hypothesis 1

To test the hypothesis that students in the ABBT intervention condition would engage in less self-reported behavioral procrastination than would students in the TM condition, independent

samples *t* tests were conducted. Contrary to expectations, there was a trend for students in the TM intervention group (*M* = 69.17, *SD* = 29.20) to complete more reading than students in the ABBT intervention group (*M* = 59.68, *SD* = 31.24; *t* = 1.69, *p* = .09, *d* = .31). However, there were no differences between the TM condition (*M* = 2.77, *SD* = 4.84) and the ABBT condition (*M* = 2.72, *SD* = 4.34; *t* = .06, *p* = .95, *d* = .01) on the *Ideal/Actual* ratio constructed to measure behavioral procrastination. See Table 3 for means, standard deviations, and ranges for all the postintervention study variables.

Hypothesis 2

To test the hypothesis that the effect of the intervention would be moderated by academic values, a stepwise linear regression was conducted. Preintervention AVQ scores (centered), intervention condition (TM or ABBT), and the interaction between centered AVQ and condition served as the independent variables and the *Ideal/Actual* ratio served as the dependent variable. Results suggested that, although there was no main effect for either academic values or condition, there was a statistically significant interaction between the two independent variables (*F* = 5.42, *p* = .02), predicting 5% of the variance ($R^2\Delta = .05, p < .05$). See Table 4 for complete regression results and Figure 1 for a graph of the interaction. Exploration of the bivariate correlations suggested that there was no statistically significant association between academic values and behavioral procrastination within the TM group (*r* =

Table 2
Zero-Order Correlations Among Study Variables

| Variable | Trait anxiety ^a | Academic procrastination ^b | Academic values ^c | <i>Ideal</i> ^d | <i>Actual</i> ^e | <i>Ideal/Actual</i> ^f |
|--|----------------------------|---------------------------------------|------------------------------|---------------------------|----------------------------|----------------------------------|
| Psychological inflexibility ^g | .81** | .42** | -.11 | -.01 | -.13 | .14 |
| Trait anxiety | | .43** | -.00 | -.02 | -.04 | .08 |
| Academic procrastination | | | -.21* | -.04 | -.30** | .23* |
| Academic values | | | | .07 | .15 | -.02 |
| <i>Ideal</i> | | | | | .13 | .18* |
| <i>Actual</i> | | | | | | -.70** |

Note. *N* = 118.

^a State-Trait Anxiety Inventory (Trait subscale). ^b Procrastination Assessment Scale–Students (Total Problems subscale). ^c Academic Values Questionnaire. ^d Percentage of reading students report they *should* read. ^e Percentage of reading students report they *did* read. ^f Ratio of *Ideal* to *Actual*. ^g Acceptance and Action Questionnaire II.

* *p* < .05. ** *p* < .01.

Table 3
Means, Standard Deviations, and Ranges for Postintervention Study Variables

| Variable | Total (<i>N</i> = 118) | | TM (<i>n</i> = 69) | ABBT (<i>n</i> = 49) |
|--|----------------------------|-----------|------------------------|--------------------------|
| | <i>M</i> (<i>SD</i>) | Range | <i>M</i> (<i>SD</i>) | <i>M</i> (<i>SD</i>) |
| Trait anxiety ^a | 40.03 (10.92) | 20–72 | 40.14 (18.83) | 39.86 (11.15) |
| Psychological inflexibility ^b | 20.32 (8.27) | 7–45 | 20.22 (8.14) | 20.47 (8.53) |
| Academic values ^c | 22.42 (3.13) | 5–25 | 22.10 (3.58) | 22.86 (2.31) |
| <i>Actual</i> ^d | 65.23 (30.30) | 5–94.5 | 69.17 (29.20) | 59.68 (31.24) |
| <i>Ideal/Actual</i> ^e | 2.75 (4.62) | .06–18.90 | 2.77 (4.84) | 2.72 (4.34) |

Note. TM = time management; ABBT = acceptance-based behavioral therapy.

^a State-Trait Anxiety Inventory (Trait subscale). ^b Acceptance and Action Questionnaire II. ^c Academic Values Questionnaire. ^d Percentage of reading student report they *did* read. ^e Ratio of *Ideal* to *Actual*.

.13, $p = .30$). In contrast, within the ABBT group, individuals higher in academic values at baseline engaged in less behavioral procrastination ($r = -.31$, $p < .05$).

Hypothesis 3

To examine the impact of the interventions on the secondary (i.e., nonprocrastination) outcome variables, a series of hierarchical linear regressions were conducted on postintervention AAQ, STAI-T, and AVQ, controlling for baseline measures of these variables. To test the hypothesis that participants in the ABBT intervention group would show a greater increase in psychological flexibility than would participants in the TM group, intervention served as the independent variable and the postintervention AAQ served as the dependent variable. Preintervention AAQ was entered in the first step as a covariate. There was no effect of condition on postintervention AAQ ($F = 0.06$, $p = .80$). When an analogous regression was run with the STAI-T, again, there was no effect of intervention ($F = 0.09$, $p = .77$). In contrast, when the impact of the intervention on postintervention AVQ was examined, a trend emerged ($F = 1.99$, $p = .16$), predicting 2% of the variance ($R^2\Delta = .02$). See Table 5 for complete regression results. Descriptive statistics revealed that the postintervention AVQ was higher among the ABBT participants ($M = 22.86$, $SD = 2.31$) than among the TM participants ($M = 22.10$, $SD = 3.58$, $t = 1.30$, $p = .19$, $d = .24$).

Discussion

Academic procrastination is ubiquitous, with estimates that college students procrastinate between 30 and 60% of the time (Rabin

et al., 2011). Given the negative consequences of procrastination on academic performance and emotional and physical health, the frequency of this behavior is of concern. Unfortunately, despite a recent increase in research in this area, there is still much to learn about the causes and maintaining factors of procrastination (Steel, 2007). The aim of the present study, based on the conceptualization of procrastination as a lack of psychological flexibility (Glick et al., 2014), was to test the effectiveness of a brief, Internet-delivered ABBT-based intervention. Further, in designing the study, the goal was to address the methodological limitations of previous studies by using a randomized controlled trial design, employing a relatively large sample, and including a behavioral measure of procrastination.

Contrary to predictions, the interventions did not lead to statistically significant differences between the groups on the proposed measure of behavioral procrastination, the *Ideal/Actual* ratio. However, there was a statistically significant interaction between intervention and academic values. Specifically, within the ABBT group, individuals higher in academic values engaged in less behavioral procrastination as measured by the *Ideal/Actual* ratio, even when controlling for baseline levels of self-reported academic procrastination. Thus, there is some support for the notion that, among students with high academic values, an ABBT intervention that helps them to connect with their values can reduce procrastination.

Table 4
Intervention Condition and Academic Values as Predictors of Behavioral Procrastination

| Step | Predictor | β | <i>t</i> |
|------|------------------------------|---------|----------|
| 1 | Intervention ^a | -.01 | -.06 |
| 1 | Academic values ^b | .12 | 1.11 |
| 2 | Interaction ^c | -.25 | -2.33* |

Note. *N* = 118.

^a Time management or acceptance-based behavioral therapy intervention. ^b Academic Values Questionnaire (Centered). ^c Condition \times Academic Values.

* $p < .05$.

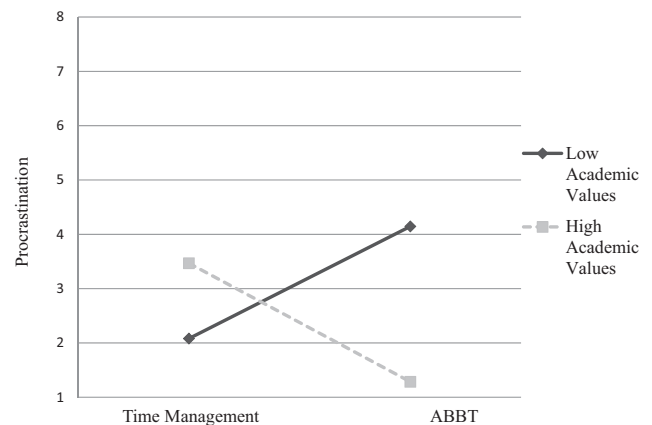


Figure 1. The impact of condition on procrastination by academic values.

Table 5
Intervention Condition as a Predictor of Postintervention Psychological Inflexibility, Academic Values, and Trait Anxiety

| Dependent variables | β | t |
|--|---------|--------|
| Psychological inflexibility ^a | | |
| Step 1: Baseline ^b | .88 | 19.40* |
| Step 2: Intervention ^c | .01 | .25 |
| Academic values ^d | | |
| Step 1: Baseline | .37 | 4.33* |
| Step 2: Intervention | .12 | 1.40† |
| Trait anxiety ^e | | |
| Step 1: Baseline | .85 | 17.00* |
| Step 2: Intervention | .02 | .29 |

Note. $N = 118$.

^a Acceptance and Action Questionnaire II. ^b Baseline measure of the dependent variable. ^c Time management or acceptance-based behavioral therapy intervention. ^d Academic Values Questionnaire. ^e State-Trait Anxiety Inventory (Trait subscale).

† $p = .16$. * $p < .05$.

The present study also tested whether the interventions affected secondary outcome measures. In contrast to predictions, the ABBT intervention did not decrease anxiety or increase psychological flexibility more than did the TM intervention. In contrast, although not statistically significant, a trend emerged, suggesting that the ABBT group experienced a larger increase in academic values than did the TM group. However, given the small magnitude of the finding, these results should be interpreted with caution.

The unexpected findings with respect to the secondary outcome variables could be an indication that a brief one-time ABBT intervention is not powerful enough to alter behavior. Alternatively, the results may be explained by the finding that, compared to ABBT participants, TM participants reported both that the intervention was significantly more helpful and that they used the strategies more frequently. These data present a potential confound to the study. Therefore, despite results by Häfner and colleagues (2014) that a 4-hr TM-training intervention was powerful enough to differentiate the amount of time college students worked on a task the week before the deadline, an ABBT model may require additional time for students. Scent and Boes (2014) reported that when students attended two 90-min-session workshops delivered 1 week apart and were encouraged to practice mindfulness exercises between sessions, they showed an increase in psychological flexibility and a decrease in procrastination. However, this study used a very small sample, and they did not include control group, thus it impossible to determine if the results were specific to an ABBT intervention. In the present study although participants reported using the TM strategies, the intervention was no more effective than ABBT in targeting procrastination. Thus, the lack of an effect of the ABBT intervention does not preclude the potential effectiveness of this approach. Future research will be valuable in understanding the limited effectiveness of both interventions and determining whether modifications would lead to decreased procrastination. It may be that there are elements from each approach that could be combined to create a more powerful intervention. Future studies are also needed to determine whether ABBT would be more effective than an approach that targets emotion and emotion regulation (e.g., cognitive restructuring) and whether or not these approaches share a common mechanism of action. Stud-

ies on potential moderators of response to different programs would also advance the literature.

It is also possible that the behavioral procrastination index used in the current study (i.e., the percentages and ratios of *Ideal*, *Actual*, and *Ideal/Actual* reading), developed as a variation on those created by Ackerman and Gross (2005, 2007) may not accurately capture procrastination or be sensitive enough to detect between-condition differences. Although *Actual* and *Ideal/Actual* were statistically significantly associated (negatively and positively, respectively) with baseline PASS scores, *Ideal* itself was not. Therefore, more research is needed to determine the validity of these variables. It is also possible that this measure of procrastination does not capture planned task delay or the notion that students may complete their reading later than is ideal because of other more pressing deadlines. Differentiating dysfunctional procrastination from planned task delay will be important for future research.

In addition, assessing procrastination as the amount of completed reading one completes may not be as effective as assessing when one starts and completes a writing assignment or studying for an exam, which may be considered “higher stakes” and contribute more to a student’s final grade. Future research on academic procrastination should attempt to elicit the importance that different participants ascribe to different types of academic assignments.

The assessment of academic procrastination using the PASS may also be limited. Participants need to be aware of their behavior and honest in their report to yield accurate responses.

The present study also contained limitations with respect to the sample and the measures used. There was a large selection bias, with only 118 participants out of 2,000 contacted completed all phases of the study. Although this selection bias would presumably randomize out across the two intervention conditions, it may have impacted the external validity of the findings. The study also relied on self-report and included the AVQ, a measure without established psychometric properties. As constructed, the measure taps into espoused values but it may or may not reflect enacted values. Nevertheless, the ABBT intervention appeared to have a positive impact on participants with a higher level of academic values, suggesting potential benefits for identifying students for whom ABBT would be effective.

Finally, the current study was limited by the scope and parameters of the interventions. Although we attempted to match the two conditions on many elements, the ABBT intervention involved an experiential exercise, whereas the TM condition did not. A 20-min online intervention may not have been long or powerful enough, particularly when compared to longer ABBT therapy protocols delivered by therapists (e.g., Roemer, Orsillo, & Salters-Pedneault, 2008) or even to shorter interventions provided by a trainer (Häfner et al., 2014). Without an intervention “leader,” participants may not have fully understood the model of how to effectively use the strategies. Although a brief online intervention for a universal problem like procrastination may be appealing due to its low cost and easy application, a more intensive intervention is likely necessary. Future research should aim to better understand whether a longer, repeatedly delivered intervention would impact participants’ behavior. For example, Drozd, Raeder, Kraft, and Bjørkli (2013) found that repeated 10-min online interventions decreased procrastination and increased mindfulness over the

course of 13 weeks and Scent and Boes (2014) found that two 90-min workshops scheduled 1 week apart helped students increase their psychological flexibility and decrease their procrastination.

Despite these limitations, as the first study to directly attempt to reduce procrastination with an ABBT as compared to a TM intervention among a large sample, the present results suggest that there are benefits to further research based on the conceptualization of procrastination as a consequence of psychological inflexibility.

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