



## Empirical Research

# Committed action: An initial study on its association to procrastination in academic settings



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## ABSTRACT

Despite the relevance of the notion of committed action in the study of procrastination, this construct and theoretical approach has been largely absent in past research. The aim of this study was to investigate whether the variable of committed action from the Psychological Flexibility (PF) model drawn from Acceptance and Commitment Therapy would add incremental variance in the prediction of self-reported procrastination over and above the variables of: psychological distress, acceptance, cognitive fusion, and attention to the present-moment. The sample was comprised of 323 (82.7% female) French-Canadian university students. Results from a three-stage hierarchical multiple regression revealed that committed action added unique and significant variance in the prediction of self-reported procrastination. Moreover, committed action was the strongest predictor in our model contributing more to the prediction of procrastination than psychological distress, acceptance, cognitive fusion, and attention to the present-moment. The unique contribution of committed action brings additional evidence on the applicability of the PF model in the study of procrastination among university students and illustrates the importance of taking into account the behavioral processes from the engaged axis of the PF model in the study of procrastination among university students.

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## 1. Introduction

Procrastination is defined as the voluntary delay of an intended course of action despite expecting negative consequences because of the delay (e.g., Klingsieck (2013), Sirois and Pynchyl (2013) and Steel (2007)). Researchers estimate the prevalence of students engaging in such dilatory behaviors to vary from 70% (Schouwenburg, Lay, Pynchyl, & Ferrari, 2004) to 95% (Ellis & Knaus, 2002). Moreover, other studies have found that 46% of students report procrastinating almost always to always when it comes to writing a term paper, and for 20–30% of students, procrastination has become a serious problem that affects academic success and quality of life (Solomon & Rothblum, 1984).

Past research has found that procrastination is associated with negative emotions such as stress (Blunt & Pynchyl, 2000), lower self-esteem (Beswick, Rothblum, & Mann, 1988), lower self-confidence (Ferrari, 1991), and lower self-efficacy (Ferrari, Parker, & Ware, 1992; Tuckman & Sexton, 1992). Procrastination is also known to lead to course withdrawal (Wesley, 1994), increases the risk of health problems (Sirois, 2007; Sirois, Melia-Gordon, &

Pynchyl, 2003; Tice & Baumeister, 1997), causes interpersonal conflicts (Day, Mensink, & O'Sullivan, 2000), and reduces academic performance (Beswick et al., 1988; Kim & Seo, 2015; Klassen, Krawchuk, & Rajani, 2008; van Eerde, 2003). These results make it clear that procrastination can be an impediment to academic success, a major problem for college and university students, and highlight the need to focus on variables that could be used in clinical (e.g., Pynchyl and Flett (2012)) and academic settings (Schouwenburg et al., 2004) to make more effective interventions based on a refined understanding of procrastination.

There is growing interest in the application of the Psychological Flexibility (PF) model of Acceptance and Commitment Therapy (ACT – Hayes, Strosahl and Wilson (2012)) with college and university students and in counseling centers (see Pistorello (2013), for a complete book on the subject). ACT stems from a philosophy of functional contextualism (Hayes, 1993) and is rooted in a modern behavior analytic theory of human language called Relational Frame Theory (RFT – Hayes, Barnes-Holmes, & Roche, 2001). The PF model integrates six interrelated processes that are conceptualized on a continuum from flexible to inflexible; these are: (1) acceptance vs experiential avoidance, (2) cognitive defusion vs cognitive fusion, (3) self-as-context vs conceptualized-self, (4) flexible present-focused attention vs past or future thoughts, (5) clear values vs unclear values, and (6) committed action vs

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inaction/impulsivity. For research and applied purposes, it is useful to pair these processes in three response styles: “open” (composed of acceptance and defusion), “centered” (self-as-context and flexible present-moment awareness) and “engaged” (values, committed action; Hayes et al. (2012)).

Based on the PF model, Scent and Boes (2014) described procrastination in terms of cognitive fusion and experiential avoidance with difficult thoughts or emotions related to academic tasks. Cognitive fusion happens when private events (e.g., thoughts) exert strong influence on an individual’s subsequent responding, narrowing his or her available repertoire of actions (i.e., psychological inflexibility). For example, when given an assignment, a student may have the thoughts such as: “I don’t think I will be able to do the task I was asked to do,” or “I am not in a mood to study.” The discomfort created by the fusion with these thoughts is avoided by engaging in non-work-related tasks (such as watching television, or surfing on the Internet). While effective in providing short-term mood repair (Tice & Bratslavsky, 2000; Sirois & Pychyl, 2013), this avoidant behavior moves the student away from his or her values and personal goals (e.g., learning, achieving, obtain a diploma). In sum, from a PF model perspective, academic procrastination is understood in terms of the fusion with private events and the use of experiential avoidance as a short-term mood regulation strategy that often results in detrimental and negative outcomes for the student in the long term (e.g., less time is left for writing a paper leaving the student to experience more stress and/or poorer overall performance).

Studies that have investigated the relation between procrastination and the PF model found that procrastination was negatively and moderately related to lower levels of acceptance, adding support to the negative link between PF and procrastination (Glick, Millstein, & Orsillo, 2014). Glick and colleagues found that the combined effects of acceptance, mindfulness (a concept close to “flexible attention to the present-moment” in the PF model), and values added to the prediction of academic procrastination over trait anxiety. Similarly, results from correlational studies, based on three different measures of mindfulness, showed that lower levels of mindfulness were associated with higher levels of self-reported procrastination. In addition, mindfulness was found to mediate the relation between procrastination and perceived stress (Sirois & Tosti, 2012). Together, these results show compelling evidence regarding the support of attentional control variables such as mindfulness in the reduction of the negative effects of dysfunctional procrastination (Pychyl et al., 2012).

More recently, ACT has been tested in a randomized controlled trial with interesting results. In their 8-week intervention study of undergraduates suffering from academic procrastination, Wang et al. (2015) compared an ACT-based intervention ( $n=20$ ) to a CBT intervention ( $n=19$ ) and a control group ( $n=20$ ). The authors found that both interventions had remarkable short-term significant effects in decreasing procrastination, and in regard to the follow-up effect, ACT had a better long-term effect.

Finally, Glick and Orsillo (2015) compared two 20 min web-based interventions for procrastination: Acceptance-Based Behavioral Therapy (ABBT;  $n=49$ ) and a Time Management (TM;  $n=69$ ) intervention. Although the authors found no significant differences between the two interventions with regard to behavioral procrastination there was moderated effect with the results revealing that the ABBT intervention was more effective for students with high academic values, further supporting the centrality of values in overcoming procrastinatory behaviors.

Most of the studies relating PF to procrastination have focused primarily on the open (acceptance, defusion) and centered (attention to the present-moment) axis of the PF model, neglecting other important core processes related to the engaged axis and overt behaviors, notably committed action. Committed action

refers to flexible persistence in actions that are linked to chosen values and goals even in the occurrence of psychological obstacles, such as difficult feelings, thoughts and urges (Hayes et al., 2012). Within the PF model, committed action is seen as the opposite of impulsive behaviors and inaction (Hayes et al., 2012). Given that procrastination is closely associated with impulsive behaviors (e.g., Steel (2007)), avoidant coping strategies (Blunt & Pychyl, 2000; Sirois & Kitner, 2015) and inability to reach personal goals (Gustavson, Miyake, Hewitt, & Friedman, 2014), committed action is expected to be negatively related to procrastination. However, the process of committed action has never been studied in relation to procrastination, and there is no empirical evidence that committed action can add to the explanation of procrastination among university students over and above mindfulness, acceptance or cognitive fusion.

The purpose of the present study was to investigate the applicability of committed action in the prediction of self-reported procrastination. We hypothesized that: (1) committed action, as well as measures of the PF model (acceptance, attention to the present-moment) would have moderate negative correlations with procrastination, whereas measures of psychological inflexibility (cognitive fusion) would have moderate positive correlations with procrastination; and (2) committed action would make a unique contribution over and above variables of psychological distress and variables of the PF model in the prediction of self-reported procrastination.

## 2. Method

### 2.1. Participants and procedure

Participants in the initial sample were 392 university students (82.6% female) between the age of 18 and 63 years ( $M=25.12$ ,  $SD=6.36$ ), from a total of sixteen universities in Quebec, Canada, of whom 67.3% were studying at Université du Québec à Trois-Rivières (UQTR). More than half of the participants (63.6%) were undergraduate students, and 87% were studying full-time. No data concerning ethnicity were collected.

Participants were recruited via universities’ mailing list and social media (e.g., Facebook). Participants completed an online version of the questionnaires on a secure website. Before accessing the questionnaires, they were informed of the voluntary nature of their participation and signed an informed consent. Participants were entered in a draw for a chance to win one of six MASTERCARD® gift certificates worth 25\$. All information was kept confidential and anonymous. There were two eligibility criteria: (a) being at least 18 years of age, and (b) studying in a Canadian university. The Research Ethics and Integrity Committee of UQTR approved this study. Below are the measures that were administered to assess procrastination, general psychological distress, acceptance, cognitive fusion, attention to the present-moment, and committed action.

### 2.2. Measures

#### 2.2.1. Pure Procrastination Scale

Procrastination was assessed using the French version of the Pure Procrastination Scale (PPS; Rebetez, Rochat, Gay and Van der Linden (2014), original version by Steel (2010)). The 11-item questionnaire evaluates procrastination conceptualized as a dysfunctional delay. Sample items are: “I am continually saying I’ll do it tomorrow” and “I delay making decisions until it’s too late.” Participants answered on a 5-point Likert scale (1 = *very seldom or not true of me*, to 5 = *very often true of me*). Responses were summed to create a score of general procrastination. Reliability for

this scale was found to be good with Cronbach's alpha of .89, and test-retest reliability of .87 (Rebetez et al., 2014).

### 2.2.2. Depression Anxiety Stress Scale

The French version of the Depression Anxiety Stress Scale (DASS-21; Henry and Crawford (2005); original 21-item version by Brown, Chorpita, Korotitsch and Barlow (1997)) is a 21-item questionnaire that includes three subscales assessing the dimensions of depression ( $\alpha=.88$ ), anxiety ( $\alpha=.82$ ), and stress ( $\alpha=.90$ ). Each of these subscales can be added together to create a score of general psychological distress. Items are rated on a 4-point Likert scale ranging from 0=*did not apply to me at all* to 3=*applied to me very much, or most of the time*. Higher scores indicate more frequent symptoms. Good reliability has been found in previous studies with a Cronbach's alpha of .93 for the total scale (Henry & Crawford, 2005).

### 2.2.3. Acceptance and Action Questionnaire

The French version of the Acceptance and Action Questionnaire (AAQ-II; Monestès, Villatte, Mouras, Loas and Bond (2009); original version by Bond et al. (2011)) is a 7-item measure of acceptance. Examples of items are: "I'm afraid of my feelings" and "Worries get in the way of my success." Items are rated on a 7-point Likert scale ranging from 1=*never true* to 7=*always true*. The seven items were reversed and added together to produce an acceptance score. Previous research found good reliability with Cronbach's alpha ranging from .76 to .87 and test-retest of .80 and .81 (Bond et al., 2011; Monestès et al., 2009).

### 2.2.4. Cognitive Fusion Questionnaire

The extent to which an individual fuses with his or her thoughts was assessed using the French version of the Cognitive Fusion Questionnaire 7-item (CFQ-7; Dionne et al. (2016); original version by Gillanders, Bolderston, Bond, Dempster, Flaxman, Campbell et al. (2014)). Examples of items are: "My thought cause me distress or emotional pain" and "I tend to get very entangled in my thoughts." This questionnaire is answered on a 7-point Likert scale ranging from 1=*never true* to 7=*always true* with higher scores reflecting higher levels of cognitive fusion. Reliability of the scale was found to be good with Cronbach's alphas of .91 and .93 (Gillanders et al., 2014; Dionne et al., submitted for publication), and test-retest reliability of .81 (Gillanders et al., 2014).

### 2.2.5. Mindful Attention Awareness Scale

The French version of the Mindful Attention Awareness Scale (MAAS; Jermann et al. (2009); original version by Brown and Ryan (2003)) is a 15-item questionnaire assessing attention to the present-moment in daily life. This scale was used as a proxy of attention to the present-moment variable of the PF model (Hayes et al., 2012). Examples of items are: "I find it difficult to stay focused on what's happening in the present" and "I find myself preoccupied with the future or the past." Participants responded on a 6-point Likert scale ranging from 1=*almost always* to 6=*almost never*. Scores range from 15 to 90. Higher scores indicate a higher level of attention to the present-moment. Previous studies found good reliability with Cronbach's alpha of .82 (Brown and Ryan, 2003), and .84, and test-retest reliability of .81 (Jermann et al., 2009).

### 2.2.6. Committed Action Questionnaire

The extent to which an individual engages in persistent action linked with chosen values was assessed using the French version of the Committed Action Questionnaire (CAQ-8; Gagnon, Dionne, Martel, Scott, & McCracken, 2015; original shorten version by McCracken, Chilcot, & Norton, 2015). Examples of items are: "When a goal is difficult to reach, I am able to take small steps to

reach it" and "If I feel distressed or discouraged, I let my commitments slide" (reversed). This 8-item questionnaire is composed of two subscales assessing both the negative and the positive side of committed action. Responses are rated on a 7-point Likert type scale ranging from 0=*never true* to 6=*always true*. The scores of the negatively keyed items are reversed to create a total score of committed action. The CAQ-8 showed good reliability in previous work with Cronbach's alpha of .87 for the total scale (McCracken et al., 2015).

## 3. Results

Descriptive statistics (means and standard deviations), Cronbach's alpha reliability, and skew and kurtosis for each questionnaire are presented in Table 1. Analysis of the distributions revealed that the skew of the AAQ-II and the DASS-21 both deviated from normality. Because of the positively skewed nature of these distributions, a Square Root Transformation (SQRT) was performed for the DASS-21 to achieved normality. For the AAQ-II, the SQRT yielded a *more* skewed distribution. Thus, the SQRT distribution for the DASS-21 was used, whereas the raw distribution of the AAQ-II was used for the analyses.

### 3.1. Missing data

Missing data analyses at the item level revealed that the percentage of missing values in the initial data set was a minor issue (ranging from 0 to 1.2% depending on the scale). Little's MCAR test confirmed that data were missing completely at random for each of the scales. Because of the low rate of missing data, a listwise deletion method was used. Some authors argue that in certain circumstances listwise deletion yields parameter estimates as accurate as more modern approaches (Allison, 2002), and are only minimally biased for multiple regression models (Graham, 2009). Once the listwise deletion was applied, the sample used for further analyses was comprised of 323 university students (82.7% female).

### 3.2. Pearson product-moment correlations

In order to test hypothesis 1, a Pearson product-moment correlation analysis was performed to assess the relations between self-reported procrastination, psychological distress, acceptance, cognitive fusion, attention to the present-moment, and committed action. Results of this analysis are presented in Table 2. As hypothesized, self-reported procrastination was moderately positively correlated to measures of psychological distress  $r(321)=.38$ ,  $p < .05$  and cognitive fusion  $r(321)=.39$ ,  $p < .05$ . Moreover, self-reported procrastination was moderately negatively correlated to

**Table 1**

Descriptive statistics, Cronbach's alpha, skew and kurtosis among the study variables.

	M	SD	Cronbach's alpha	Skew	Kurtosis
1. PPS	29.67	8.82	.91	.059	-.471
2. DASS-21 <sup>a</sup>	3.77	1.29	.92	.073	-.176
3. CFQ-7	25.55	9.38	.94	-.119	-.532
4. AAQ-II	35.37	9.10	.92	-.481	-.382
5. MAAS	57.50	12.88	.90	-.275	-.252
6. CAQ-8	33.16	6.28	.84	-.175	-.039

Note. N=323. M=Means; SD=Standard Deviations; PPS=Pure Procrastination Scale; DASS-21=Depression Anxiety Stress Scale; CFQ-7=Cognitive Fusion Questionnaire; AAQ-II=Acceptance and Action Questionnaire; MAAS=Mindful Attention Awareness Scale; CAQ-8=Committed Action Questionnaire. Standard error skew=.136; kurtosis=.271.

<sup>a</sup> Results for this scale are based on the square root transformation distribution.

**Table 2**  
Pearson product-moment correlations among the study variables.

	1	2	3	4	5	6
1. PPS	–					
2. DASS-21 <sup>a</sup>	.38 <sup>*</sup>	–				
3. CFQ-7	.39 <sup>*</sup>	.67 <sup>*</sup>	–			
4. AAQ-II	-.43 <sup>*</sup>	-.66 <sup>*</sup>	-.79 <sup>*</sup>	–		
5. MAAS	-.35 <sup>*</sup>	-.56 <sup>*</sup>	-.50 <sup>*</sup>	.47 <sup>*</sup>	–	
6. CAQ-8	-.50 <sup>*</sup>	-.45 <sup>*</sup>	-.52 <sup>*</sup>	.50 <sup>*</sup>	.38 <sup>*</sup>	–

Note. N=323. PPS=Pure Procrastination Scale; DASS-21=Depression Anxiety Stress Scale; CFQ-7=Cognitive Fusion Questionnaire; AAQ-II=Acceptance and Action Questionnaire; MAAS=Mindful Attention Awareness Scale; CAQ-8=Committed Action Questionnaire.

<sup>a</sup> Results for this scale are based on the square root transformation distribution.  
\*  $p < .05$ .

measures of acceptance  $r(321) = -.43$ ,  $p < .05$ , attention to the present-moment  $r(321) = -.35$ ,  $p < .05$ , and committed action  $r(321) = -.50$ ,  $p < .05$ .

### 3.3. Hierarchical multiple regression

In order to test hypothesis 2, a hierarchical multiple regression analysis was performed utilizing self-reported procrastination as the criterion and psychological distress, acceptance, cognitive fusion, attention to the present-moment, and committed action as predictors. Prior to the analysis, the data were examined in terms of the assumptions for multiple regression and judged to be satisfied (Tabachnick & Fidell, 2012). In the first step of the model, psychological distress (DASS-21) was entered as the only predictor. The model was statistically significant  $F(1, 321) = 54.62$ ,  $p < .05$ , and accounted for 15% of the total variance ( $R^2 = .15$ ,  $p < .05$ ) of self-reported procrastination. In the second step, acceptance (AAQ-II), cognitive fusion (CFQ-7), and attention to the present-moment (MAAS) were added to the regression model. The model was statistically significant  $F(4, 318) = 22.17$ ,  $p < .05$ , and explained an additional 7% of the total variance of self-reported procrastination ( $R^2 = .07$ ,  $p < .05$ ). In the third step, committed action (CAQ-8) was entered in the model. The model was still statistically significant  $F(5, 317) = 27.70$ ,  $p < .05$ , and committed action alone added an additional 9% to the total variance ( $R^2 = .09$ ,  $p < .05$ ). The whole regression model accounted for 31% ( $R^2 = .31$ ,  $p < .05$ ) of the total variance of self-reported procrastination. Moreover, the full regression model revealed that psychological distress ( $\beta = .06$ ,  $t(317) = .87$ , ns), cognitive fusion ( $\beta = .03$ ,  $t(304) = .30$ , ns), and attention to the present-moment ( $\beta = -.11$ ,  $t(317) = -1.90$ , ns) did not significantly predict scores on self-reported procrastination, however acceptance ( $\beta = -.18$ ,  $t(317) = -2.21$ ,  $p < .05$ ) and committed action ( $\beta = -.35$ ,  $t(317) = -6.26$ ,  $p < .05$ ), did significantly predict value of self-reported procrastination (see Table 3).

## 4. Discussion

It will be recalled that the purpose of this study was to examine the role of committed action in the prediction of self-reported procrastination among university students. Working from the conceptual framework of Psychological Flexibility (PF), the association between self-reported procrastination and measures of general psychological distress, acceptance, cognitive fusion, attention to the present-moment, and committed action was first explored. As expected, self-reported procrastination was moderately positively associated with a measure of cognitive fusion (CFQ-7), and moderately negatively related to measures of both PF variables (AAQ-II and CAQ-8) as well as attention to the present-

**Table 3**

Hierarchical multiple regression predicting self-reported procrastination with acceptance, cognitive fusion, attention to the present-moment, and committed action as predictors controlling for psychological distress.

Variables	$\Delta R^2$	$R^2$ Total	$\beta$	$t$
Step 1	.15 <sup>*</sup>			
DASS-21 <sup>a</sup>			.38	7.39 <sup>*</sup>
Step 2	.07 <sup>*</sup>			
DASS-21			.10	1.29
AAQ-II			-.25	-2.95 <sup>*</sup>
CFQ-7			.06	.66
MAAS			-.15	-2.46 <sup>*</sup>
Step 3	.09 <sup>*</sup>			
DASS-21			.06	.87
AAQ-II			-.18	-2.21 <sup>*</sup>
CFQ-7			.03	.30
MAAS			-.11	-1.90
CAQ-8			-.35	-6.26 <sup>*</sup>
		.31 <sup>*</sup>		

Note. N=323. Method: Enter. PPS=Pure Procrastination Scale; DASS-21=Depression Anxiety Stress Scale; CFQ-7=Cognitive Fusion Questionnaire; AAQ-II=Acceptance and Action Questionnaire; MAAS=Mindful Attention Awareness Scale; CAQ-8=Committed Action Questionnaire.

<sup>a</sup> Results for this scale are based on the square root transformation distribution.  
\*  $p < .05$ .

moment (MAAS). Second, a three-stage hierarchical multiple regression analysis was performed utilizing self-reported procrastination as the criterion and psychological distress, acceptance, cognitive fusion, attention to the present-moment, and committed action as predictors. The final model accounted for 31% of the total variance of self-reported procrastination. Most importantly in terms of the present study, when keeping all the other variables constant in the equation, committed action was the strongest predictor (negatively) of scores of self-reported procrastination.

These results are in line with past studies that investigated variables of the PF model in the study of procrastination (e.g., Glick et al. (2014)), and this replication underscores the important link between acceptance, attention to the present-moment, and procrastination. The unique contribution of committed action brings additional evidence on the applicability of the PF model in the study of procrastination among university students. Our results illustrate the importance of taking into account the behavioral processes from the engaged axis of the PF model, instead of focusing solely on some of its processes as defined from the open and centered axes. In other words, mindfulness or attention to the present-moment (Sirois & Tosti, 2012), and acceptance (Glick et al., 2014), are not sufficient to fully explain procrastination.

Interestingly, the PF view of procrastination is very much in line with the recent conceptualization of procrastination as a form of self-regulatory failure (e.g., Sirois and Pychyl (2013) and Steel (2007)). When a student is facing stressful inner experiences such as negative emotions about a specific task, procrastination acts as a regulation strategy to make the student feel better in the short-term, even if doing so is likely to result in negative consequences for future self (Sirois & Pychyl, 2013; Pychyl & Sirois, in press). As Tice and Bratslavsky (2000) put it, procrastination is an example of “giving in to feel good” where short-term mood repair takes priority over longer-term goal pursuit. While there is general consensus in the research literature on this view of procrastination as an emotion-focused coping strategy that undermines self-regulation, there are few effective intervention strategies that focus on self-regulation, particularly interventions based on a strong empirical framework. The PF model offers an integrative, process-

oriented, and broadly applicable model of human behavior and behavioral changes (McCracken & Morley, 2014) that provides a base for refining our understanding of procrastination, particularly in relation to intervention.

Although our focus was on committed action, the results of the final regression model revealed that acceptance (measured by the AAQ-II) was also a significant predictor of procrastination. These results further support the view that procrastination is associated with experiential avoidance (Dionne & Duckworth, 2011; Glick et al., 2014; Scent & Boes, 2014). As noted above, procrastination can be seen as a way to escape negative emotions, thoughts, and sensations, to feel better in the short-term (Tice & Bratslavsky, 2000). Affective and cognitive variables like state and trait anxiety, social anxiety, guilt, shame, fear of failure, neurosis, learned helplessness and depression (see Ferrari, 2004, for a review) could represent the feelings and thoughts that one is trying to avoid by putting off work. This was captured in the AAQ-II with items such as, “Worries get in the way of my success.” In sum, our results bring additional evidence to the understanding of procrastination as an avoidant coping strategy (Pychyl & Sirois, in press; Sirois & Kitner, 2015; Sirois & Pychyl, 2013).

Interestingly, in the final regression model, attention to the present-moment (measured by the MAAS) was *not* a significant predictor of self-reported procrastination. These results are surprising given the strong link between procrastination and low conscientiousness found in past research (e.g., van Eerde (2003)), as well as previous research that has demonstrated a consistent relation between procrastination and low levels of mindfulness (Glick et al., 2014; Sirois & Tosti, 2012). This result may be explained by the sensitivity to covariance in multiple regression models. Because beta weights must account for all the association among all of the variables, they are heavily affected by the covariance of the variables in the model (Thompson, 2006). In other words, when the variables in the model are correlated with each other, this can result in sample-specific weights, and those weights can change given slight changes in the covariance across samples (Kraha, Turner, Nimon, Zientek, & Henson, 2011). Future research may help distinguish this potential statistical artefact from meaningful relations among the variables. Certainly the zero-order correlations in the current study indicated a significant relation between attention to the present-moment (measured by the MAAS) and procrastination.

The relatively small contribution of cognitive fusion (measured by the CFQ-7) to the prediction of self-reported procrastination scores found in the final regression model was unexpected. Indeed, cognitive fusion is one of the primary processes which leads to psychological inflexibility (Hayes, Luoma, Bond, Masuda, & Lillis, 2006) and is thought to play a central role in procrastination (e.g., Scent and Boes (2014)). Moreover, past research has found that procrastinators tend to have a high level of automatic negative thoughts (Flett, Stainton, Hewitt, Sherry, & Lay, 2012), lower self-esteem (Fee & Tangney, 2000; van Eerde, 2003), and higher levels of self-depreciation and negative thoughts about themselves and others when compared with non-procrastinators (McCown, Blake, & Keiser, 2012). It may be that the strong association found between the CFQ-7 and the AAQ-II ( $-0.79$ ) diminished the unique influence of the CFQ-7 on procrastination, especially given the sensitivity to covariance of multiple regression models noted above. Indeed, when predictors are strongly correlated, variance in the criterion is often not equally divided among the predictors (Kraha, Turner, Nimon, Zientek, & Henson, 2011). Again, future studies may help clarify the relative contributions of each of these variables, as each is certainly important theoretically in the understanding of procrastination.

From a prevention perspective, some researchers have proposed that a treatment aiming at decreasing psychological rigidity

and increasing mindfulness and value-consistent actions would help reduce procrastination in academic settings (Dionne & Duckworth, 2011; Glick et al., 2014). In their Acceptance-based procedure on delay discounting, Morrison, Madden, Odum, Friedel, and Twohig (2014), found that an intervention focusing on acceptance and values helped individuals to decrease their impulsive decision-making. Furthermore, in their ACT-based value training, Chase et al. (2013) showed that the combination of goal setting and value training significantly improved student performance (as measured by GPA scores) over the next semester compared to goal setting alone and to a wait-list control group. While not directly assessing procrastination, their study highlights the importance of clarifying value-based action to help students increase their motivation and ultimately their academic achievement. Moreover, Scent and Boes (2014) stated that helping students connect with their values and to find meaning in their work might be a helpful component in overcoming procrastination. Given the findings of the current study, a psychological intervention targeting the process of committed action should add efficacy to treatment aimed at decreasing procrastinatory behaviors. For example, in counseling centers, either in an individual or group format, counselors might help students determine concrete long- and short-term goals linked with personal values to help them persist in a flexible manner toward them even when they face internal or external obstacles in their goal pursuit.

The present study has some limitations that need to be acknowledged. First, the reliance on self-report questionnaires and the cross-sectional design of this research prevent us from drawing any causal associations between committed action and procrastination. Although theoretically we have speculated that increasing committed action should reduce procrastination, this needs to be demonstrated in longitudinal or experimental research. A potential line of research would be for future research to focus on conducting longitudinal studies with the PF model variables measured prospectively or, even better, an experimental design in order to establish the causality between committed action and procrastination. Secondly, the external validity of the findings is limited as analyses were conducted on a predominantly French-speaking undergraduate student sample comprised mostly of female participants. More research is needed to evaluate if these findings are replicable in different populations (e.g., males, high-school students, adults), or other contexts (e.g., procrastination at work, procrastination related to health behaviors). Thirdly, while the regression model explains a large portion of the variance of self-reported procrastination, other variables within the PF model could have been added to explain the remaining variance such as values and self-as-context. Expanding the model would provide a more comprehensive test of the PF model in its whole instead of some of its processes. Finally, although we have speculated on the intervention implications of the present findings, these are yet to be tested. Future work should focus on doing an ACT-based intervention for university students targeting the process of committed action in addition to other measures (i.e., acceptance, cognitive fusion, flexible attention to the present-moment).

In conclusion, to our knowledge, this study is the first to focus on the process of committed action in the study of procrastination among university students. The present findings provide important preliminary evidence for the significance of committed action in the conceptualization and prediction of procrastination in an academic context. The current study also extends the literature on the study of the PF model applied to procrastination by suggesting that when working with procrastinators, committed action can be seen as an important variable in assessing student's tendency to procrastinate and a relevant process from a prevention perspective (i.e., improved valued-based actions) to reduce academic procrastination.

## References

- Allison, P. D. (2002). *Missing data*. Thousand Oaks, CA: Sage Publications.
- Beswick, G., Rothblum, E. D., & Mann, L. (1988). Psychological antecedents of student procrastination. *Australian Psychologist*, 23(2), 207–217.
- Blunt, A. K., & Pychyl, T. A. (2000). Task aversiveness and procrastination: a multi-dimensional approach to task aversiveness across stages of personal projects. *Personality and Individual Differences*, 28(1), 153–167.
- Bond, F. W., Hayes, S. C., Baer, R. A., Carpenter, K. M., Guenole, N., Orcutt, H. K., ... Zettle, R. D. (2011). Preliminary psychometric properties of the Acceptance and Action Questionnaire-II: a revised measure of psychological inflexibility and experiential avoidance. *Behavior Therapy*, 42(4), 676–688.
- Brown, T. A., Chorpita, B. F., Korotitsch, W., & Barlow, D. H. (1997). Psychometric properties of the Depression Anxiety Stress Scales (DASS) in clinical samples. *Behaviour Research and Therapy*, 35, 79–89.
- Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology*, 84(4), 822.
- Chase, J. A., Houmanfar, R., Hayes, S. C., Ward, T. A., Vilardaga, J. P., & Follette, V. (2013). Values are not just goals: online ACT-based values training adds to goal setting in improving undergraduate college student performance. *Journal of Contextual Behavioral Science*, 2(3), 79–84.
- Day, V., Mensink, D., & O'Sullivan, M. (2000). Patterns of academic procrastination. *Journal of College Reading and Learning*, 30(2), 120–134.
- Dionne, F., & Duckworth, K. (2011, July). Acceptance and commitment therapy in the treatment of academic procrastination: a perfect fit. *Poster session presented at the ACBS world conference IX*. Parma, Italy.
- Dionne, F., Gagnon, J., Balbinotti, M., Morais-Peixoto, E., Martel, M.-E., Gillanders, D., Monestès, J.-L. Buying into Thoughts: Validation of a French Translation of the Cognitive Fusion Questionnaire. *Canadian Journal of Behavioural Science*. (in press).
- van Erde, W. (2003). A meta-analytically derived nomological network of procrastination. *Personality and Individual Differences*, 35(6), 1401–1418.
- Ellis, A., & Knaus, W. J. (2002). *Overcoming procrastination*. New York, NY: New American Library.
- Ferrari, J. R. (1991). Self-handicapping by procrastinators: protecting self-esteem, social-esteem, or both? *Journal of Research in Personality*, 25(3), 245–261.
- Ferrari, J. R. (2004). Trait Procrastination in Academic Settings: An Overview of Students Who Engage in Task Delays.
- Fee, R. L., & Tangney, J. P. (2000). Procrastination: a means of avoiding shame or guilt? *Journal of Social Behavior and Personality*, 15(5), 167–184.
- Ferrari, J. R., Parker, J. T., & Ware, C. B. (1992). Academic procrastination: personality correlates with Myers-Briggs types, self-efficacy, and academic locus of control. *Journal of Social Behavior Personality*, 7(3), 495–502.
- Flett, G. L., Stainton, M., Hewitt, P. L., Sherry, S. B., & Lay, C. (2012). Procrastination automatic thoughts as a personality construct: an analysis of the procrastination cognitions inventory. *Journal of Rational-Emotive Cognitive-Behavior Therapy*, 30(4), 223–236.
- Gagnon, J., Dionne, F., Martel, M. E., Scott, W., & McCracken, L. M. (15 July 2015). Validation of the Short Version of the Committed Action Questionnaire (CAQ-8) in a French-Speaking Population. In: *Poster session world-conference XIII of the association for behavioral and contextual science*. Berlin, GER.
- Graham, J. W. (2009). Missing data analysis: Making it work in the real world. *Annual review of psychology*, 60, 549–576.
- Gillanders, D. T., Bolderston, H., Bond, F. W., Dempster, M., Flaxman, P. E., Campbell, et al. (2014). The development and initial validation of the Cognitive Fusion Questionnaire. *Behavior Therapy*, 45(1), 83–101.
- Glick, D. M., & Orsillo, S. M. (2015). An investigation of the efficacy of acceptance-based behavioral therapy for academic procrastination. *Journal of Experimental Psychology: General*, 144(2), 400.
- Glick, D. M., Millstein, D. J., & Orsillo, S. M. (2014). A preliminary investigation of the role of psychological flexibility in academic procrastination. *Journal of Contextual Behavioral Science*, 3, 81–88. <http://dx.doi.org/10.1016/j.jcbs.2014.04.002>.
- Gustavson, D. E., Miyake, A., Hewitt, J. K., & Friedman, N. P. (2014). Genetic relations among procrastination, impulsivity, and goal-management ability implications for the evolutionary origin of procrastination. *Psychological Science*, 25(6), 1178–1188.
- Hayes, S. C. (1993). *Analytic goals and the varieties of scientific contextualism*. Context press.
- Hayes, S. C., Barnes-Holmes, D., & Roche, B. (2001). *Relational frame theory: A post-Skinnerian account of human language and cognition*. New York, NY: Kluwer, Academic/ Plenum Publishers.
- Hayes, S. C., Luoma, J. B., Bond, F. W., Masuda, A., & Lillis, J. (2006). Acceptance and commitment therapy: Model, processes and outcomes. *Behaviour Research and Therapy*, 44(1), 1–25.
- Hayes, S. C., Strosahl, K. D., & Wilson, K. G. (2012). *Acceptance and commitment therapy: The Process and practice of Mindful Change* ((2nd ed.). New York, NY: Guilford Press.
- Henry, J. D., & Crawford, J. R. (2005). The short-form version of the Depression Anxiety Stress Scales (DASS-21): Construct validity and normative data in a large non-clinical sample. *British Journal of Clinical Psychology*, 44(2), 227–239.
- Jermann, F., Billieux, J., Larøi, F., d'Argembeau, A., Bondolfi, G., Zermatten, A., & Van der Linden, M. (2009). Mindful Attention Awareness Scale (MAAS): psychometric properties of the French translation and exploration of its relations with emotion regulation strategies. *Psychological Assessment*, 21(4), 506.
- Kim, K. R., & Seo, E. H. (2015). The relationship between procrastination and academic performance: a meta-analysis. *Personality and Individual Differences*, 82, 26–33.
- Klassen, R. M., Krawchuk, L. L., & Rajani, S. (2008). Academic procrastination of undergraduates: low self-efficacy to self-regulate predicts higher levels of procrastination. *Contemporary Educational Psychology*, 33(4), 915–931.
- Klingsieck, K. B. (2013). Procrastination: when good things don't come to those who wait. *European Psychologist*, 18(1), 24–34.
- Kraha, A., Turner, H., Nimon, K., Zientek, L. R., & Henson, R. K. (2011). Tools to support interpreting multiple regression in the face of multicollinearity. *Frontiers in Psychology*, 3(44), 1–16.
- McCracken, L. M., Chilcot, J., & Norton, S. (2015). Further development in the assessment of psychological flexibility: a shortened Committed Action Questionnaire (CAQ-8). *European Journal of Pain*, 19(5), 677–685.
- McCracken, L., & Morley, S. (2014). The psychological flexibility model: a basis for integration and progress in psychological approaches to chronic pain management. *The Journal of Pain*, 15(3), 221–234.
- McCown, B., Blake, I. K., & Keiser, R. (2012). Content analyses of the beliefs of academic procrastinators. *Journal of Rational-Emotive and Cognitive-Behavior Therapy*, 30(4), 213–222. <http://dx.doi.org/10.1007/s10942-012-0148-6>.
- Monestès, J.-L., Villatte, M., Mouras, H., Loas, G., & Bond, F. W. (2009). Traduction et validation française du questionnaire d'acceptation et d'action (AAQ-II). *Revue Européenne Délelött Psychologie Appliquée/European Review of Applied Psychology*, 59(4), 301–308.
- Morrison, K. L., Madden, G. J., Odum, A. L., Friedel, J. E., & Twohig, M. P. (2014). Altering impulsive decision making with an acceptance-based procedure. *Behavior Therapy*, 45(5), 630–639.
- Pistorello, J. (Ed.). (2013). *Mindfulness and acceptance for counseling college students: Theory and practical applications for intervention, prevention, and outreach*. New Harbinger Publications.
- Pychyl, T. A., & Flett, G. L. (2012). Procrastination and self-regulatory failure: an introduction to the special issue. *Journal of Rational-Emotive Cognitive-Behavior Therapy*, 30(4), 203–212.
- Pychyl, T. A., & Sirois, F. M. Procrastination, emotion regulation & well-being. In: F.M. Sirois, & T.A. Pychyl (Eds.), *Procrastination, Health and Well-Being*. New York, NY: Elsevier. (in press).
- Rebetez, M. M. L., Rochat, L., Gay, P., & Van der Linden, M. (2014). Validation of a French version of the Pure Procrastination Scale (PPS). *Comprehensive Psychiatry*, 55(6), 1442–1447.
- Scent, C. L., & Boes, S. R. (2014). Acceptance and commitment training: a brief intervention to reduce procrastination among college students. *Journal of College Student Psychotherapy*, 28(2), 144–156.
- Schouwenburg, H. C., Lay, C., Pychyl, T. A., & Ferrari, J. R. (2004). *Counseling the procrastinator in Academic Settings*. Washington, DC: American Psychological Association.
- Sirois, F. M. (2007). "I'll look after my health, later": a replication and extension of the procrastination-health model with community-dwelling adults. *Personality and Individual Differences*, 43(1), 15–26.
- Sirois, F. M., & Kitner, R. (2015). Less adaptive or more maladaptive? A meta-analytic investigation of procrastination and coping. *European Journal of Personality*, 29, 433–444.
- Sirois, F., & Pychyl, T. (2013). Procrastination and the priority of short-term mood regulation: consequences for future self. *Social and Personality Psychology Compass*, 7(2), 115–127.
- Sirois, F. M., Melia-Gordon, M. L., & Pychyl, T. A. (2003). "I'll look after my health, later": an investigation of procrastination and health. *Personality and Individual Differences*, 35(5), 1167–1184.
- Sirois, F. M., & Tosti, N. (2012). Lost in the moment? An investigation of procrastination, mindfulness, and well-being. *Journal of Rational-Emotive Cognitive-Behavior Therapy*, 30(4), 237–248. <http://dx.doi.org/10.1007/s10942-012-0151-y>.
- Solomon, L. J., & Rothblum, E. D. (1984). Academic procrastination: frequency and cognitive-behavioral correlates. *Journal of Counseling Psychology*, 31(4), 503.
- Steel, P. (2007). The nature of procrastination: a meta-analytic and theoretical review of quintessential self-regulatory failure. *Psychological Bulletin*, 33, 65–94.
- Steel, P. (2010). Arousal, avoidant and decisional procrastinators: do they exist? *Personality and Individual Differences*, 48(8), 926–934.
- Tabachnick, B. G., & Fidell, L. S. (2012). *Using multivariate statistics* ((6<sup>th</sup> ed.). New York, NY: Harper Collins.
- Thompson, B. (2006). *Foundations of behavioral statistics: an insight-based approach*. New York: Guilford Press.
- Tice, D. M., & Baumeister, R. F. (1997). Longitudinal study of procrastination, performance, stress, and health: The costs and benefits of dawdling. *Psychological Science*, 8(6), 454–458.
- Tice, D. M., & Bratslavsky, E. (2000). Giving in to feel good: the place of emotion regulation in the context of general self-control. *Psychological Inquiry*, 11(3), 149–159.
- Tuckman, B. W., & Sexton, T. L. (1992). Self-believers are self-motivated; self-doubters are not. *Personality and Individual Differences*, 13(4), 425–428.
- Wang, S., Zhou, Y., Yu, S., Ran, L. W., Liu, X. P., & Chen, Y. F. (2015). Acceptance and commitment therapy and cognitive-behavioral therapy as treatments for academic procrastination: a randomized controlled group session. *Research on Social Work Practice* (pp. 1–11), 1–11 doi: 1049731515577890.
- Wesley, J. C. (1994). Effects of ability, high-school achievement, and procrastinatory behavior on college performance. *Educational and Psychological Measurement*, 54, 404–408.