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Do adaptive perfectionism and self-determined motivation reduce academic procrastination?

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ABSTRACT

College students vary in their procrastinating behavior with some completing their work promptly and others constantly delaying/failing to meet deadlines. We investigated students' striving for perfectionism and self-determined motivation as predictors of their academic procrastination. Undergraduates (393) completed a survey including a 35-item Multidimensional Perfectionism Scale, a 28-item Academic Motivation Scale, and a 35-item Procrastination Assessment Scale. Using hierarchical regression analyses we found that different facets of perfectionism significantly predicted various types of procrastination (exam preparation, writing papers, and completing reading assignments), and self-determined motivation explained incremental, unique variance. Specifically, students who doubted their ability to succeed, viewed mistakes as a sign of failure, and did not set high personal standards, were more likely to report that their procrastinating behavior was problematic. Further, students who were more organized and self-determined in their motivation were less likely to procrastinate. Finally, mediation analyses portrayed students with stronger self-determined motivation as less likely to procrastinate and more likely to achieve higher GPAs because of high personal standards. Our findings suggest that educators who can help college students become more organized, pursue higher personal standards of achievement, and become more self-determined in their motivation could potentially reduce procrastination and facilitate higher academic performance.

1. Introduction

Despite accompanying discomfort and anxiety, over 50% of all college students procrastinate and delay or fail to complete their academic tasks (Klingsieck, 2013; Solomon & Rothblum, 1984). It appears that students are not completely aware of the severity of their own procrastination habits, as faculty members find that students procrastinate more than what they self-report (Senecal, Koestner, & Vallerand, 1995). Educators agree that it is crucial to reduce academic procrastination as it results in several poor outcomes including missed deadlines, withdrawing from courses, and low course grades (Beswick, Rothblum, & Mann, 1988; Rothblum, Solomon, & Murakami, 1986; Semb, Glick, & Spencer, 1979). Various explanations have been offered towards understanding the root causes of procrastination and these include problematic personality traits, motivational deficits, clinical issues, and situational factors (Klingsieck, 2013). Specifically, some researchers have linked procrastination to perfectionism or striving for the unachievable (Hewitt & Flett, 2007), and others have examined it in relation to students' varied motivations in pursuing a college education (Wolters, 2003). Is it possible that adaptive perfectionism and self-determined motivation can provide a buffer against academic procrastination? Given the call for a thorough investigation of these relationships, we examined answers to this question by investigating the link between various facets of perfectionism (concern over mistakes, personal standards, parent expectations, parental criticism, doubting of actions, and need for organization) and self-determined motivation (intrinsic, extrinsic, and amotivation) in predicting academic procrastination and academic performance (Steel, 2007).

2. Prior research

2.1. Adaptive/maladaptive perfectionism and procrastination

Perfectionism is defined as the pursuit of extremely high performance expectations, which are often referred to as high personal standards (Slaney, Rice, & Ashby, 2002). Perfectionism is a complex and multifaceted personality trait that includes an excessive concern over mistakes, self-doubt about abilities and actions, overly critical and high parental expectations, rigorous personal standards for self-evaluation, and a desire for orderliness (Frost, Marten, Lahart, & Rosenblat, 1990). Perfectionism has been carefully scrutinized as a predictor of procrastinating behavior and its nuanced role has been recognized by a recent distinction between healthy and unhealthy perfectionism (Bieling, Israeli, & Antony, 2004).

Adaptive, "healthy" perfectionists are described as striving towards achievement and experiencing pride in accomplishments. Adaptive perfectionism has also been defined as including very high-performance

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expectations with low levels of negative self-evaluation (Rice & Ashby, 2007). Maladaptive, "unhealthy" perfectionists are described as displaying evaluative concerns such as worrying about making mistakes, having self-doubt, internalizing others' high expectations for oneself, and experiencing guilt and shame (Fedewa, Burns, & Gomez, 2005). Maladaptive perfectionism has been defined as having high-performance expectations with extreme self-blame when failing to meet standards (Rice & Ashby, 2007). Maladaptive perfectionists report lower estimated GPA due to low self-esteem and being concerned about negative evaluations (Blankstein, Dunkley, & Wilson, 2008). In addition, negative perfectionists seem to suppress emotions as a way of coping, show excessive concern about failing, an obsessive desire for others' approval, and report feeling depressed following poorer performance (Bergman, Nyland, & Burns, 2007). Thus, simply setting high standards and pursuing them can be adaptive; however, setting high standards and making self-worth contingent on achieving those high standards is what appears to lead to more pathology (DiBartolo, Frost, Chang, LaSota, & Grills, 2004).

The distinction drawn between adaptive and maladaptive perfectionism appears to have some conceptual overlap with the mastery and performance goal orientation that is displayed in situations demanding achievement behaviors. A mastery goal orientation is typically associated with a sustained level or quality of performance whereas a performance goal orientation fosters a failure-avoiding pattern of motivation (Ames, 1992). Further, with mastery goals, pride and satisfaction are associated with successful effort (Jagacinski & Nicholls, 1987) and guilt is associated with inadequate effort (Wentzel, 1989). With performance goals, there is an avoidance of challenging tasks, negative affect following failure, which is accompanied by a judgment of a lack of one's abilities, and positive affect following success with little effort (Ames, 1992). Thus, a mastery goal orientation appears to show some conceptual overlap with adaptive perfectionism and a performance goal orientation with maladaptive perfectionism.

Similar to the distinction drawn between adaptive and maladaptive perfectionism, some researchers distinguish between the self-oriented and socially-oriented facets of perfectionism (Frost et al., 1990; Hewitt & Flett, 1991). Socially oriented perfectionists believe that others expect them to be perfect and report more procrastination relative to self-oriented perfectionists who are inclined to set high standards for themselves (Flett, Blankstein, Hewitt, & Koledin, 1992). Adaptive perfectionists are less likely to procrastinate because they are achievement oriented, confident, diligently pursue the goals they set for themselves (Seo, 2008), make effective use of cognitive and metacognitive learning strategies (Mills & Blankstein, 2000), have stronger time management skills (Klibert, Langhinrichsen-Rohling, & Saito, 2005), and higher self-efficacy (Locicero & Ashby, 2000). Such adaptive behavior in self-oriented perfectionists is also associated with the facet of conscientiousness that includes achievement striving, feeling satisfied with good performance, and adjusting expectations in the face of failure (Hewitt & Flett, 2007), and with agentic qualities that include a strong desire to perform, exert self-control, and receive acknowledgment for high achievement (Mackinnon, Sherry, & Pratt, 2013). Thus, adaptive aspects of perfectionism overlap with self-oriented perfectionism as well as mastery goal orientation and are linked with the productive behaviors that buffer individuals from procrastination.

2.2. Self-determined motivation and procrastination

Traditionally, researchers have described procrastination as a coping mechanism with underlying motivations that make it adaptive (i.e., seeking a peak experience, pleasure in rushing to meet a deadline, cognitively efficient) or maladaptive in nature (i.e., fearing failure, negative information about personal performance or self-worth) (Ferrari, 2001; Schraw, Wadkins, & Olafson, 2007). However, drawing on a large-scale meta-analysis of 691 correlations, Steel (2007) concluded that procrastination is more of a motivational problem as it is basically a failure of self-regulation. Procrastinators seem to lack goal-orientation and self-regulation (Wolters, 2003) and self-regulation also explains unique variance in procrastination beyond what is explained by anxiety, depression, and low self-esteem (Senecal, Koestner, & Vallerand, 1995).

Self-regulated behavior is explained by Deci and Ryan's (2000, 2002) theory of autonomous or self-determined motivation as a continuum with intrinsic motivation and amotivation at both ends, and extrinsic motivation in the middle. Individuals who are more self-determined engage in an activity with a sense of choice or out of free will, whereas individuals who are less self-determined engage in an activity to achieve a desired outcome or consequence (Ryan & Deci, 2000). Factors that enhance autonomy, competence, and relatedness are likely to enhance self-determined motivation (Grouzet, Vallerand, Thill, & Provencher, 2004) and acting under pressure or feeling obligated to act is likely to increase feelings of being incompetent, helpless, withdrawn, and apathetic. Researchers have operationalized self-determined motivation using the Academic Motivations Scale (AMS; Vallerand et al., 1992) which consists of three subscales (intrinsic, extrinsic, and amotivation) and note that students with stronger intrinsic motivation and self-regulation report lower procrastination, deeper engagement, and higher persistence at learning activities (Vansteenkiste, Lens, & Deci, 2006). In contrast, students who lack motivation also report higher levels of procrastination, have a weaker sense of control over their learning process, and do not experience a state of flow or intrinsic engagement (Lee, 2005). High procrastinators also report a lack of extrinsic and intrinsic motivation, an external locus of control, and tend to make more external attributions for their success (Brownlow & Reasinger, 2000).

Being able to self-regulate motivation appears to be an important quality in managing procrastination as self-regulated learners show stronger self-efficacy, know how to study, have the meta-cognitive skills to supervise, manage, and direct resources to increase learning (Klassen, Krawchuk, & Rajani, 2008). Competence appears to be a central factor as less competent rather than highly competent students seem to procrastinate from a fear of failure and a breakdown in self-regulation (Haghbin, McCaffrey, & Pychyl, 2012). However, it is the higher level of self-determined motivation that mediates the relationship between self-efficacy and procrastination, suggesting that self-confident students are less likely to procrastinate because they feel more autonomous and in control of their motivation (Katz, Eilot, & Nevo, 2013). Overall, it appears that it is important for students to experience strong self-determined motivation and confidence so as to fend off tendencies to procrastinate.

2.3. Current study: adaptive perfectionism, self-determined motivation, and procrastination

The purpose of this study was to investigate the intricate link between facets of perfectionism and self-determined motivation in explaining academic procrastination. Prior research suggests that individuals displaying attributes of adaptive perfectionism that are similar to the Big Five personality trait of conscientiousness (Hewitt & Flett, 2007), such as higher personal standards, achievement striving, goal pursuit, and pride in accomplishments (Klibert et al., 2005; Locicero & Ashby, 2000; Mills & Blankstein, 2000; Rice & Ashby, 2007; Seo, 2008), are less likely to procrastinate. Further, prior research also indicates that individuals with stronger self-determined motivation show a greater sense of engagement, control, competence, and an ability to self-regulate more effectively, and are less likely to procrastinate (Vansteenkiste et al., 2006; Wolters, 2003). Thus, we tested the following hypotheses:

1. Students who score higher on the adaptive facets of perfectionism (organization and personal standards) will be less likely to procrastinate.
2. Students who score higher on self-determined motivation will be less likely to procrastinate.

Although previous research indicates that adaptive perfectionism (a personality attribute) and self-determined motivation (a motivational

orientation) are independently linked with academic procrastination there are few studies that have examined their combined role in explaining procrastination (Hewitt & Flett, 2007). Based on the logic that perfectionism is one of the most well established predictors of procrastination and because it is an enduring personal attribute that is likely to remain consistent across situations, we predicted that adaptive perfectionism would be the explanatory mechanism that mediates the relationship between self-determined motivation (self-regulating behavior) and procrastination/academic performance. Thus, we tested the following hypothesis:

3. Personal standards (a facet of perfectionism) will mediate the relationship between self-determined motivation and academic procrastination as well as self-determined motivation and academic performance (GPA).

3. Method

3.1. Participants

Participants included 393 undergraduates at a large Midwestern university who received extra credit or course credit for their participation. Participants had a mean age of 21 years, and included 48% females, 77% European Americans, 13% African Americans and 10% other race/ethnicities, 39% seniors, 28% juniors, 10% sophomores, and 23% freshmen.

3.2. Measures

Students responded to a questionnaire including demographic items and the following three scales.

Multidimensional Perfectionism Scale (Frost et al., 1990). This 35-item scale asks participants to describe reasons for striving for perfection on a five point Likert-type rating scale ranging from 1 = strongly disagree to 5 = strongly agree. The scale provides an overall perfectionism score, as well as six subscale scores. The subscales include: Concern over Mistakes (e.g., I should be upset if I make a mistake) with 9 items; Personal Standards (e.g., I have extremely high goals) with 7 items; Parent Expectations (e.g., My parents set very high standards for me) with 6 items; Parental Criticism (e.g., My parents never tried to understand my mistakes) with 4 items; Doubting of Actions (e.g., I usually have doubts about the simple everyday things I do) with 4 items; and Organization (e.g., I am a neat person) with 6 items. The overall scale showed good reliability in the current study with Cronbach's alpha = .93 and subscale alpha values ranging from .73 to .94.

Academic Motivation Scale (Vallerand et al., 1992). This scale consists of 28 statements and participants to respond to items asking them why they are attending college. Responses reflecting three subscales, intrinsic motivation (For the pleasure that I experience in broadening my knowledge about subjects which appeal to me), extrinsic motivation (In order to have a better salary later on) and amotivation (Honestly, I don't know; I really feel that I am wasting my time in school), are provided on a seven point scale ranging from 1 = does not correspond at all to 7 = corresponds exactly. The internal consistency, Cronbach's alpha values for the three subscales range from 0.83 to 0.92. A self-determination index (SDI), a measure of self-determined motivation, was calculated based on weights for each of the three subscales of the Academic Motivation Scale. Higher scores on this index indicate higher self-determined motivation which implies higher levels of intrinsic motivation and lower levels of amotivation (Vallerand, 2011, personal communication).

Procrastination Assessment Scale (Solomon & Rothblum, 1984). This 35-item scale consists of nine items related to procrastination behavior in three areas (writing a term paper, studying for exams, keeping up with weekly reading assignments) and 26 items related to various reasons for procrastination. We used the nine items directly related to procrastination behavior that are based on a five point Likert-type rating scale from 1 = never procrastinate to 5 = always procrastinate. First, we used the three single items that each assess the degree to which an individual procrastinates in writing a term paper, studying for exams, and keeping up with weekly reading assignments. Next, we used the subscale, procrastination is a problem that is a summed score of three items and is obtained from the question, "To what degree is procrastination on this task a problem for you?" asked after each area (writing a term paper, studying for exams, and keeping up with weekly reading assignments). Finally, we also used the subscale, desire to change procrastination habits that is a summed score of three items obtained from the question, "To what extent do you want to decrease your tendency to procrastinate on this task?" asked after each area. Participants responded on a Likert type scale from 1 = not at all a problem/do not want to decrease to 5 = always a problem/definitely want to decrease. Each of these subscales showed good reliability in the current study, with Cronbach's alphas of .75 and .76 respectively.

4. Results

4.1. Descriptive and correlation analyses

A majority of participants (over 60%) scored higher than the midpoint on all the procrastination variables indicating that students do procrastinate in preparing for exams, writing papers or completing reading assignments (see Table 1). It is noteworthy that students perceive their procrastination to be problematic and express a desire to change it. Correlation analyses revealed an interesting pattern of significant relationships (see Table 2). After using a Bonferroni correction for multiple comparisons, we found that self-determined motivation is negatively correlated with procrastination (exam procrastination, paper procrastination, reading procrastination, and procrastination is problematic) and positively correlated with the personal standards facet of perfectionism. In addition, GPA is significantly and positively related to personal standards perfectionism. As other significant correlations between

Table 1
Sample size, range of scores, mean, standard deviation and Cronbach alpha values for all the variables.

Variable	N	Items	Range	Mean	SD	Alpha
Procrastination variables						
Exam	393	1	1–5	3.55	.98	–
Paper	392	1	1–5	3.70	.93	–
Reading	393	1	1–5	3.95	1.05	–
Procrastination is a problem	393	3	3–15	9.23	2.58	.75
Desire to change procrastination	393	3	3–15	10.86	2.95	.76
Perfectionism subscales						
Personal standards	393	7	7–35	23.09	5.84	.87
Parents expectations	393	6	6–30	14.81	4.53	.81
Parental criticism	393	4	4–20	8.98	3.82	.82
Concern over mistakes	393	9	9–45	22.79	7.47	.88
Doubting	393	4	4–20	10.97	3.46	.73
Organization	393	6	6–30	21.56	5.78	.94
Self-determined motivation						
Intrinsic total	393	11	1–7	4.05	1.21	.92
Extrinsic total	393	12	1–7	5.20	1.03	.83
Amotivation total	393	4	1–7	1.72	1.09	.87
Self-determined index motivation (SDI)	393	–	–	−2.45	3.09	–

Table 2
Intercorrelations of GPA, self-determined motivation index, procrastination subscales and perfectionism subscales.

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. GPA	–												
2. Self-determined index	.10	–											
Procrastination subscales													
3. Exam	−.13	−.23**	–										
4. Paper	−.01	−.21**	.16**	–									
5. Reading	−.07	−.17**	.42**	.15**	–								
6. Procrastination is a problem	−.07	−.14	.41**	.16**	.32**	–							
7. Desire to change	−.06	−.03	.23**	.17**	.22**	.48**	–						
Perfectionism subscales													
8. Personal standards	.17*	.20**	−.19**	−.15*	−.09	−.17**	−.08	–					
9. Parents expectation	−.02	−.05	−.04	.01	.02	.04	−.06	.40**	–				
10. Parental criticism	−.08	.09	.06	−.03	.02	.09	.03	.22**	.58**	–			
11. Concern over mistakes	−.01	.01	.05	.02	.01	.13*	.00	.54**	.46**	.55**	–		
12. Doubting	.04	−.00	.06	.05	.03	.21**	.09	.32**	.31**	.42**	.64**	–	
13. Organization	.07	.00	−.29**	−.26**	−.13	−.06	.01	.38**	.08	−.09	.11	.08	–

* $p < .05$.
** $p < .01$ after using Bonferroni correction for multiple comparisons.

procrastination and perfectionism subscales provided sufficient evidence to test the hypotheses we used hierarchical regression analyses to obtain a more parsimonious model of the relationships.

4.2. Regression analyses

4.2.1. Exam, paper, and reading procrastination

We conducted three hierarchical regressions to test our hypotheses, using the stepwise method to enter participant gender in block 1, all the perfectionism subscale scores in block 2, and self-determination index scores (SDI) in block 3 as predictors of various types of procrastination and GPA (see Table 3). The logic for this sequence is to first control for gender effects, investigate the role of perfectionism in block 2 as this is the most well established predictor of procrastination and is also a personal attribute that is likely to be more enduring. Finally, as we were also interested in testing whether self-determined motivation explained incremental variance in procrastination, beyond perfectionism, we entered it in block 3.

First, in predicting exam procrastination, participant gender (block 1) was not a significant predictor, in block 2 the perfectionism subscale, organization, $\beta = -.291$, $t(391) = -6.01$, $p < .001$, predicted a significant 8% of the variance, $R^2 = .08$, $F(1, 391) = 36.17$ $p < .001$ and in block 3, the self-determined motivation index, $\beta = -.230$, $t(390) = -4.90$, $p < .001$, explained an additional 6% of the variance, $R^2 = .08$, $F(1, 390) = 31.16$, $p < .001$.

Next, in predicting procrastination in writing papers, in block 1, participant gender, $\beta = -.140$, $t(390) = -2.79$, $p = .006$, predicted 2% of variance, $R^2 = .02$.$F(1, 390) = 7.76$, $p = .006$, in block 2 the perfectionism subscale, organization, $\beta = -.244$, $t(389) = -4.80$, $p < .001$, explained an additional 5% of variance, $R^2 = .07$.$F(2, 389) = 15.61$, $p < .001$ and in block 3, the self-determined motivation index, $\beta = -.214$, $t(388) = -4.49$, $p < .001$, explained an additional 5% of incremental variance, $R^2 = .12$, $F(3, 388) = 17.63$ $p < .001$.

Finally, in predicting procrastination in completing reading assignments, in block 1, gender was not a significant predictor, while in block 2, the perfectionism subscale, organization, $\beta = -.127$,

Table 3
Hierarchical regression analyses with perfectionism subscales and self-determined motivation index as the predictors of various types of Procrastination and Procrastination is a problem.

Outcome	Step	Variable	*B*	*SE B*	β	R^2	Adjusted R^2
Exam procrastination	1	Gender	−.144	.099	−.074ns	.074	.005
	2	Organization	−.049	.008	−.291***	.085	.082
	3	Organization	−.049	.008	−.291***	.138	.133
		Self-determined index	−.073	.015	−.230***		
Paper procrastination	1	Gender	−.260	.093	−.140**	.020	.017
	2	Gender	−.132	.094	−.071ns	.074	.070
		Organization	−.039	.008	−.244***		
	3	Gender	−.144	.092	−.078ns	.120	.113
		Organization	−.039	.008	−.242***		
		Self-determined index	−.064	.014	−.214***		
Reading procrastination	1	Gender	−.042	.107	−.020ns	.020	−.002
	2	Organization	−.023	.009	−.127*		
	3	Organization	−.023	.009	−.127*	.046	.041
		Self-determined index	−.059	.017	−.173**		
Procrastination is a problem	1	Gender	.013	.261	.003ns	.000	−.003
	2	Doubting	.154	.037	.207**	.123	.116
		Personal standards	−.117	.022	−.264***		
		Concern over mistakes	.067	.024	.195**		
	3	Doubting	.141	.046	.189**	.129	.120
		Personal standards	−.140	.026	−.316***		
		Concern over mistakes	.063	.024	.183**		
		Self-determined index	−.067	.041	−.80ns		

* $p < .05$.
** $p < .01$.
*** $p < .001$.
ns $p > .05$.

Table 4
Hierarchical regression analyses with perfectionism subscales, self-determined motivation index, and various types of Procrastination and Procrastination is a problem as predictors of GPA.

Outcome	Step	Variable	*B*	*SE B*	β	R^2	Adjusted R^2
GPA	1	Gender	.373	.124	.155**	.024	.021
	2	Gender	.355	.122	.147**	.062	.054
		Personal standards	.034	.010	.165**		
		Parental criticism	−.039	.016	−.105*		
	3	Gender	.324	.123	.135**	.068	.057
		Personal standards	.036	.011	.175***		
		Parental criticism	−.034	.016	−.108*		
		Self-determined index	.031	.020	.079ns		
	4	Gender	.323	.125	.134**	.073	.052
		Personal standards	.034	.011	.165**		
		Parental criticism	−.031	.017	−.098ns		
		Self-determined index	.025	.021	.064ns		
		Exam procrastination	−.087	.080	−.071ns		
		Paper procrastination	.006	.082	.004ns		
		Reading procrastination	−.017	.066	−.015ns		
		Procrastination as a problem	.004	.027	.009ns		

* $p < .05$.
** $p < .01$.
*** $p < .001$.
ns $p > .05$.

$t(391) = -2.54$, $p = .012$, predicted 2% of variance, $R^2 = .02$, $F(1, 391) = 6.45$ $p = .012$, and in block 3, the self-determined motivation index, $\beta = -.173$, $t(390) = -3.49$, $p = .001$, explained 3% of incremental variance, $R^2 = .03$, $F(1, 390) = 9.40$ $p < .001$.

4.2.2. Procrastination is a problem

In predicting procrastination as a problem, in block 1, gender did not explain a significant about of the variance, in block 2, the perfectionism subscale, doubting, $\beta = .207$, $t(391) = 4.17$, $p < .001$, explained 4% of the variance, $R^2 = .04$, $F(1, 391) = 17.42$ $p < .001$; personal standards, $\beta = -.264$, $t(390) = -5.24$, $p < .001$, explained 6% of the variance, $R^2 = .06$, $F(1, 390) = 23.01$ $p < .001$; and concern over mistakes, $\beta = .195$, $t(389) = 2.77$, $p = .006$, explained 2% of the variance, $R^2 = .02$, $F(1, 389) = 18.16$, $p < .001$. Further, in block 3, self-determined motivation failed to significantly explain any incremental variance.

4.2.3. Grade Point Average (GPA)

In predicting GPA, in block 1, gender, $\beta = .155$, $t(370) = 3.01$, $p = .003$, explained 2% of the variance, $R^2 = .02$, $F(1, 370) = 9.07$, $p = .003$, in block 2, the perfectionism subscale, personal standards, $\beta = .165$, $t(369) = 3.25$, $p < .001$, explained 3% of the variance, $R^2 = .05$, $F(2, 369) = 9.95$, $p < .001$ and parental criticism, $\beta = -.105$, $t(368) = -.02$, $p = .044$, explained 1% of the variance, $R^2 = .06$, $F(3, 368) = 8.05$, $p < .001$ (See Table 4). Next, in block 3, self-determined motivation failed to significantly explain any incremental variance. Further, in block 4, including procrastination scores failed to significantly explain any incremental variance.

4.3. Mediation analyses

Finally, to test whether the personal standards facet of perfectionism mediated the relationship between self-determined motivation index and procrastination scores (exam and paper) as well as GPA, we conducted mediation analyses. Since we had a sufficiently large sample size and data were normally distributed we used the three steps established by Baron and Kenny (1986) and the Sobel test of mediation that is recommended based on adequate power and a type 1 error rate that is appropriate (Pituch, Whittaker, & Stapleton, 2005). The predictor variable (self-determined motivation index) was used in the regression equation to predict the outcome variable (procrastination scores and GPA); next the predictor (self-determined motivation index) was used to predict the mediator (personal standards perfectionism subscale); finally, the predictor and mediator (self-determined index and personal standards perfectionism subscale) were used to predict the outcome variable (procrastination scores and GPA).

4.3.1. Exam procrastination mediation analysis

We first tested the mediation of the relationship between self-determined motivation and exam procrastination (see Fig. 1). Self-determined motivation significantly predicted exam procrastination, $R^2 = .05$, $F(1, 391) = 22.01$, $p = .001$, $\beta = -.231$, $t(391) = -4.69$, $p < .001$.Next, self-determined motivation, $\beta = .197$, $t(391) = 3.97$, $p < .001$ significantly predicted 4% of the variance, $R^2 = .04$, $F(1, 391) = 15.79$, $p < .001$, in the personal standards, the perfectionism subscale. A final regression showed that while personal standards perfectionism predicted exam procrastination, $\beta = -.150$, $t(390) = -3.03$, $p = .003$, accounting for 4% of the variance of GPA, $R^2 = .04$, $F(1, 391) = 14.66$, $p < .001$, self-determined motivation index was still a significant predictor of exam procrastination, $\beta = -.201$, $t(390) = -4.05$, $p < .001$, with the model including both variables accounting for 8% of the variance of GPA, $R^2 = .08$, $F(2, 390) = 15.82$, $p < .001$. These analyses indicated personal standards perfectionism partially mediates the relationship between self-determined motivation index and exam procrastination using the Sobel test, $z = -2.46$, $p = .014$.

4.3.2. Paper procrastination mediation analysis

Similarly, self-determined motivation significantly predicted paper procrastination, $\beta = -.212$, $t(390) = -4.27$, $p < .001$, accounting for 5% of the variance in GPA, $R^2 = .05$, $F(1, 390) = 18.27$, $p < .001$ (see Fig. 2). Next, self-determined motivation, $\beta = .197$, $t(391) = 3.97$, $p < .001$ significantly predicted 4% of the variance, $R^2 = .04$, $F(1, 391) = 15.79$, $p < .001$, in the personal standards (perfectionism subscale). Finally, while personal standards procrastination significantly predicted paper procrastination, $\beta = -.148$, $t(390) = -2.96$, $p = .003$, accounting for 2% of the variance, $R^2 = .02$, $F(1, 390) = 8.75$, $p = .003$, self-determined index still significantly predicted paper procrastination, $\beta = -.190$, $t(389) = -3.78$, $p < .001$. This model accounted for 6% of the variance of paper procrastination, $R^2 = .06$, $F(2, 389) = 11.66$, $p < .001$. A Sobel test showed that personal standards perfectionism partially mediated the relationship between self-determined motivation and paper procrastination, $z = -1.96$ $p = .050$.

4.3.3. GPA mediation analysis

Finally, in testing the mediation of the relationship between self-determined motivation and GPA, self-determined motivation

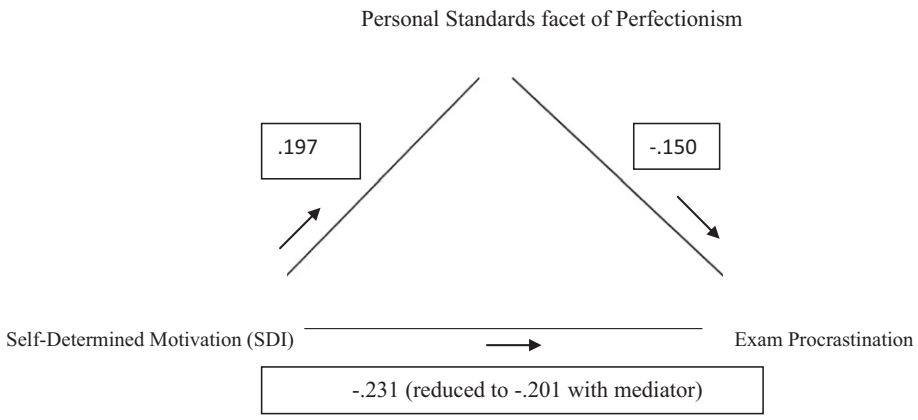

Fig. 1. Self-determined motivation (SDI) and exam procrastination partially mediated by personal standards facet of perfectionism.

significantly predicted GPA, $R^2 = .01$, $F(1, 370) = 3.77$, $p = .05$, $\beta = .10$ $t(370) = 1.94$, $p = .05$ (see Fig. 3). Again, self-determined motivation, $\beta = .197$, $t(391) = 3.97$, $p < .001$ significantly predicted 4% of the variance, $R^2 = .04$, $F(1, 391) = 15.79$, $p < .001$, in the perfectionism subscale, personal standards. Finally, results showed that when both the mediating and predictor variable were included in the model to predict GPA, personal standards perfectionism, $\beta = .159$, $t(369) = 3.06$, $p = .002$, significantly predicted 3% of the variance in GPA, $R^2 = .03$, $F(1, 370) = 6.61$, $p = .002$, while self-determined motivation (the predictor variable) was not a significant predictor of GPA, $\beta = .07$, $t(369) = 1.40$, $p = .162$. These results show a full mediation and suggest that the relationship between students' self-determined motivation and academic performance is explained by their adherence to high personal standards.

5. Discussion

Our results demonstrate that students who are organized and strive to achieve high personal standards are less likely to procrastinate when preparing for exams, writing papers, and completing reading assignments, and also less likely to experience procrastination as a problem behavior. We also identified self-determined motivation as explaining unique variance in academic procrastination beyond perfectionism facets, suggesting that it plays a critical role. Hence, students who are more self-determined in their motivation are also less likely to procrastinate. Finally, our mediation analyses indicated that students who are more self-determined in their motivation are less likely to procrastinate and more likely to achieve higher grades because they strive to achieve high personal standards.

Specifically, the adaptive aspects of perfectionism (personal standards and organization) were significantly correlated with various types of procrastination and organization, in particular, emerged as the sole predictor of procrastination highlighting its key role in accomplishing tasks in a timely manner. Students who aspire to achieve high quality work, are goal oriented, agentic, orderly, organized and plan ahead, are more likely to manage their time skillfully and display fewer procrastination tendencies. In addition, students with stronger self-determined motivation likely find their exam preparation, writing, and reading assignments to be more pleasurable and intrinsically interesting and are less likely to postpone these tasks. These findings are supported by prior research that establishes the important adaptive role of high personal standards and achievement striving as displayed in conscientiousness, academic self-discipline, and several facets of conscientiousness including being organized, self-controlled, and achievement oriented as important predictors of students' academic performance indicating that greater self-regulation is critical for remaining motivated and for achieving academic success (Komarraju, Karau, & Schmeck, 2009; Komarraju, Ramsey, & Rinella, 2013; Senecal et al., 1995; Steel, 2010). It is interesting to note that whereas having high personal standards seems to serve as a buffer, the maladaptive facets of perfectionism (having self-doubts and being concerned about making mistakes), emerged as significant predictors of experiencing procrastination as a problem and desiring to reduce it. Students who worry that the errors they make will reflect negatively on them and who feel less sure of their capabilities, are more worried about their procrastinating tendencies.

Although our results have important implications for educators, future researchers can improve upon our study by obtaining longitudinal data that include measures of students' ability, behavioral measures of procrastination, official records of academic performance, and using a

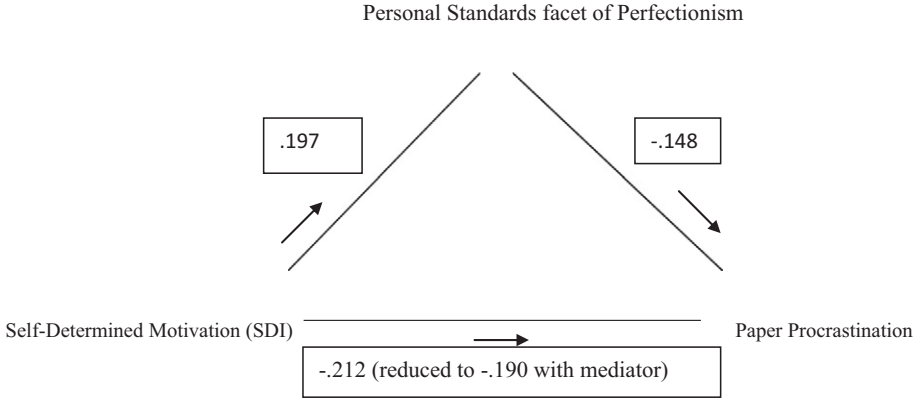

Fig. 2. Self-determined motivation (SDI) and paper procrastination partially mediated by personal standards facet of perfectionism.

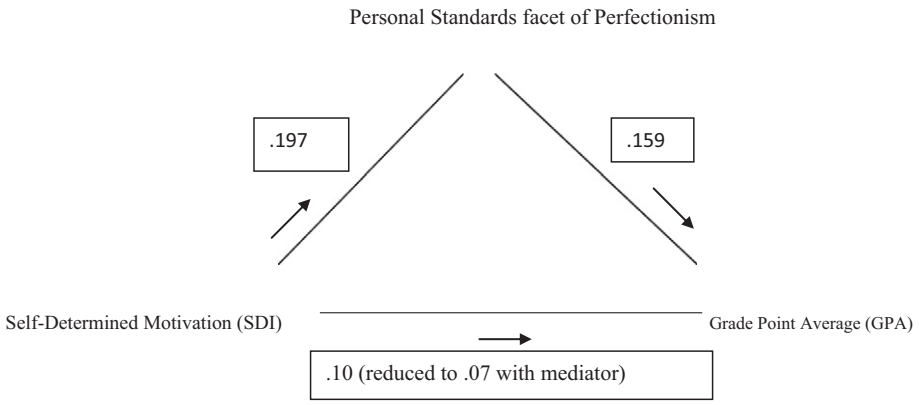

Fig. 3. Self-determined motivation (SDI) and Grade Point Average (GPA) fully mediated by personal standards facet of perfectionism.

path or structural equation model to include correlations across the criterion measures. Instructors, coaches, and parents can draw on our results to develop strategies for reducing academic procrastination. Potential interventions include promoting self-determined motivation in students through course design and assignments that increase students' intrinsic enjoyment, feelings of competence, and choice or autonomy.

Encouraging students to plan ahead, teaching them how to manage their time more efficiently, and helping them to be more organized, will help ensure that they do not feel overwhelmed and avoid task completion. Providing reinforcement and role models who set high personal standards for performance will likely foster adaptive aspects of perfectionism. Thus, our findings make an important contribution by highlighting the intricate link between the adaptive aspects of perfectionism (being organized and adhering to high personal standards) and self-determined motivation, and establishing these factors as buffers against academic procrastination. Students who are self-determined in their motivation, pursue excellence, and are methodical and structured, are less likely to procrastinate and more likely to succeed academically.

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