Available online at www.sciencedirect.com
ScienceDirect
Personality and Individual Differences 43 (2007) 167–178
PERSONALITY AND INDIVIDUAL DIFFERENCES
www.elsevier.com/locate/paid

Procrastination: Associations with achievement goal orientation and learning strategies

Andrew J. Howell *, David C. Watson

Department of Psychology, Grant MacEwan College, P.O. Box 1796, Edmonton, Alta., Canada T5J 2P2

Received 15 June 2006; received in revised form 13 November 2006; accepted 21 November 2006
Available online 10 January 2007

Abstract

Conceptualizations of procrastination as self-regulation failure have received considerable empirical support. However, procrastination has only occasionally been examined in relation to variables emphasized in models of self-regulated learning. We examined relations between procrastination, achievement goal orientations, and learning strategies. One hundred and seventy undergraduates completed measures of procrastination, goal orientation, and learning strategies usage. Bivariate correlations revealed that procrastination related negatively to a mastery-approach goal orientation and positively to a mastery-avoidance goal orientation. Procrastination was also related to greater disorganization and less use of cognitive and meta-cognitive strategies. Multiple regression analyses revealed that disorganization and cognitive strategies usage were most predictive of procrastination. Results are interpreted within a self-regulation perspective.
© 2006 Elsevier Ltd. All rights reserved.

Keywords: Procrastination; Achievement goal orientation; Learning strategies; Self-regulation

1. Introduction

Procrastination is the tendency to delay initiation or completion of important tasks to the point of discomfort (Solomon & Rothblum, 1984). Procrastination is increasingly viewed as involving a

* Corresponding author. Tel.: +1 780 497 5329.
E-mail address: howella@macewan.ca (A.J. Howell).

0191-8869/$ - see front matter © 2006 Elsevier Ltd. All rights reserved.
doi:10.1016/j.paid.2006.11.017

failure in self-regulation, defined as the ability to exert control over thoughts, emotions, impulses, and task performances in regard to preferred standards (Vohs & Baumeister, 2004). Self-regulation failure is implicated, for example, when procrastinators reveal a tendency toward *temporal discounting*, wherein the value of distant, large rewards is downplayed relative to more immediately available, smaller rewards (Dewitte & Schouwenburg, 2002; Howell, Watson, Powell, & Buro, 2006; Schouwenburg, 2004; Schouwenburg & Groenewoud, 2001; Steel, in press). According to Temporal Motivation Theory (Steel, in press), procrastination reflects features of situations which promote temporal discounting, such as delayed rewards and task aversiveness, as well as personal characteristics which promote temporal discounting, such as low trait Conscientiousness and associated attributes including low self-control, disorganization, an intention-action gap, and low achievement motivation.

Characteristics of self-regulation failure in procrastination, such as low achievement motivation and disorganization, invoke concepts central to models of self-regulated learning. As defined by Pintrich (2000b), self-regulated learning refers to the "active, constructive process whereby learners set goals for their learning and then attempt to monitor, regulate, and control their cognition, motivation, and behaviour, guided and constrained by their goals and the contextual features in the environment" (p. 453). The nomological net of procrastination has only occasionally been extended to variables emphasized in models of self-regulated learning (e.g., Schouwenburg, 2004). In the current research, we examined procrastination in relation to two such variables: achievement goal orientation and learning strategies usage.

1.1. Procrastination and achievement goal orientation

The achievement goal framework posits that students differ from each other in the purpose of their achievement behaviour and that these differences are associated with distinctive emotional, motivational, cognitive, and behavioural outcomes (e.g., Covington, 2000; Elliot, 2005; Pintrich, 2000b). Most recently, Elliot and McGregor (2001) conceptualized a "2×2 achievement goal framework", in which four types of goal orientation are derived by combining a *mastery versus performance* dimension and an *approach versus avoidance* dimension. The *mastery-approach* goal orientation describes those seeking to learn all there is to learn; the *mastery-avoidance* orientation (newly added to the achievement goal taxonomy) describes those motivated to avoid not learning what there is to learn; the *performance-approach* orientation describes those motivated to perform better than their peers; and the *performance-avoidance* orientation describes those looking to avoid performing poorly relative to others.

Procrastination should be inversely correlated with approach goal orientations, given that approach orientations, especially mastery-approach, are associated with relatively adaptive self-regulatory processes including perceived competence and need for achievement (Moller & Elliot, in press). These processes may reduce the tendency to engage in temporal discounting (e.g., by reducing task aversiveness or by providing short-term rewards for diligent work). In past research, procrastination has been shown to correlate negatively with a general mastery orientation (i.e., making no distinction between approach and avoidance forms; Scher & Osterman, 2002; Wolters, 2003, 2004; but see McGregor & Elliot, 2002, Study 2 for a null finding). A performance-approach orientation has emerged as uncorrelated with procrastination (McGregor & Elliot, 2002, Study 2; Wolters, 2004) or as positively correlated with procrastination (Wolters, 2003). Finally, self-hand-

icapping, a significant correlate of procrastination (van Eerde, 2003), negatively correlates with a general mastery orientation and a performance-approach orientation (e.g., Pintrich, 2000a).

Procrastination should correlate positively with avoidance forms of goal orientation, given that such orientations are associated with relatively maladaptive self-regulatory processes rooted in concerns about failure and incompetence (Moller & Elliot, in press), processes which may facilitate temporal discounting (e.g., by enhancing task aversiveness). Empirically, no research has examined procrastination in relation to the mastery-avoidance orientation. However, Elliot and McGregor (2001) showed that a mastery-avoidance orientation correlated with fear of failure and related traits, suggesting that such goals may be associated with greater procrastination (Ferrari, 2004; Steel, in press). Procrastination correlates positively with a performance-avoidance orientation (McGregor & Elliot, 2002, Study 2; Wolters, 2003, 2004). Finally, self-handicapping positively correlates with a performance-avoidance orientation (e.g., Urdan, 2004).

1.2. Procrastination and learning strategies usage

The achievement goal framework posits that one consequence of goal orientation adoption is differential usage of various strategies for learning (e.g., Pintrich, 2000b). Therefore, learning strategies are a second domain relevant to self-regulated learning and, potentially, to procrastination. Learning strategies are "mental processes that learners can deliberately recruit to help themselves learn and understand something new" (Resnick, cited in Brandt, 1988–1999, p. 12) and are frequently operationalized with measures of disorganization (i.e., whether a methodical approach to learning is adopted), deep versus surface processing (i.e., whether new knowledge is carefully evaluated and integrated vs. merely rehearsed and memorized; Entwistle & Ramsden, 1983), or usage of various cognitive (e.g., rehearsal and elaboration) and meta-cognitive (e.g., planning and regulating) strategies (Pintrich, Smith, Garcia, & McKeachie, 1993). Given the effortful and time-consuming nature of learning strategies, students who are relatively unmotivated toward distant tasks may resort to the use of such strategies less often. Indeed, Schouwenburg (2004) showed that procrastination is inversely correlated with adoption of a systematic and disciplined approach to one's work and with planning and managing of one's time, suggestive of poor organization. Organization, as a component of trait Conscientiousness, is also inversely correlated with procrastination (Steel, in press; van Eerde, 2004). Finally, Wolters (2003, 2004) showed that procrastination correlates with low use of cognitive and meta-cognitive strategies. Thus, some evidence of associations between learning strategies usage and procrastination has emerged, although additional associations (e.g., with deep vs. surface processing) have yet to be tested.

1.3. The current study

Only Wolters (2003) has examined both achievement goal orientation and learning strategies usage in relation to undergraduates' procrastination tendencies. However, no study has examined procrastination in relation to all four achievement goal orientations comprising the 2×2 achievement goal taxonomy. Also, few studies have examined procrastination in relation to a variety of learning strategies. Finally, research on procrastination and self-regulated learning has thus far measured procrastination with small numbers of face-valid items emphasizing task postponement but not the adverse impact of such postponement on functioning (Wolters, 2003; see Scher & Os-

terman, 2002, for an exception). We therefore employed validated self-report measures of procrastination in order to determine relationships with the achievement goal orientations composing the 2×2 taxonomy and a diverse set of learning strategies. We predicted that procrastination would inversely correlate with the mastery-approach and performance-approach goal orientations and would positively correlate with the mastery-avoidance and performance-avoidance goal orientations. We also predicted that procrastination would correlate with less use of cognitive and meta-cognitive strategies, less deep and more superficial information processing, and greater disorganization.

2. Method

2.1. Participants

Participants were 170 introductory psychology students at a 4-year undergraduate college in Canada, of which 119 were female and 49 were male; 2 participants did not specify their sex. Ages ranged from 17 to 47 years ($M = 20.13$, SD $= 3.92$). Students were enrolled in one of four course sections, in which grades were based on absolute cut-offs.

2.2. Measures

On the 12-item Procrastination Assessment Scale – Students (PASS; Solomon & Rothblum, 1984), students rated the extent to which they procrastinate in six academic areas (writing a term paper, studying for exams, keeping up with weekly reading assignments, academic administrative tasks, attendance tasks, and school activities in general) and the extent to which procrastination in these areas is a problem for them, using five-point scales with endpoints labeled 1 (*never procrastinate*) and 5 (*always procrastinate*) for the prevalence items and 1 (*not at all a problem*) and 5 (*always a problem*) for the perceived problem items. Responses are summed across the 12 items, with higher scores indicating greater procrastination. Howell et al. (2006) reported an alpha coefficient .75 across prevalence and perceived problem ratings for the PASS, and demonstrated a significant correlation between PASS scores and a behavioural measure of procrastination (i.e., submission times for on-line assignments; $r = -.24$).

The 16-item Procrastination Scale (Tuckman, 1991) measures the tendency to delay task initiation or completion, as well as tendencies toward indecisiveness and poor time management in the completion of tasks. Items are rated on 4-point scales with endpoints labeled 1 (*that's me for sure*) and 4 (*that's not me for sure*). In producing total scores, we reversed the rating scale prior to summing across the 16 items, so that higher scores indicated greater procrastination. Tuckman (1991) demonstrated internal consistency of the Procrastination Scale ($\alpha = .90$) and both Tuckman (1991) and Howell et al. (2006) reported significant associations between Procrastination Scale scores and behavioural measures of procrastination (r's $= -.54$ and $-.38$, respectively).

The Achievement Goal Questionnaire (Elliot & McGregor, 2001) is comprised of 12 items, with three items composing each of the four achievement goal orientations. Items are rated on scales ranging from 1 (*not at all true of me*) to 7 (*very true of me*). Scores for each goal orientation are calculated by averaging across the three items. Elliot and McGregor (2001) reported evidence

attesting to the reliability of mastery-approach ($\alpha = .87$), mastery-avoidance ($\alpha = .89$), performance-approach ($\alpha = .92$) and performance-avoidance ($\alpha = .83$) goal orientations.

Cognitive and meta-cognitive strategies were assessed with items adapted by Wolters (2003) from the Motivated Strategies for Learning Questionnaire (Pintrich et al., 1993). Fifteen items assessed use of cognitive strategies such as rehearsal, elaboration, and organization and 14 items assessed use of meta-cognitive strategies such as planning, monitoring, and regulating. Items are rated on scales with endpoints 1 (*strongly disagree*) and 7 (*strongly agree*). Scores on each scale are averaged across scale items. Wolters (2003) reported evidence of the internal consistency of these scale scores ($\alpha = .83$ and .90 for cognitive and meta-cognitive strategies, respectively).

Deep processing, surface processing, and disorganization were assessed with a measure devised by Elliot, McGregor, and Gable (1999). Five items assessed each of these study characteristics, with responses made on a 1 (*not at all true of me*) to 7 (*very true of me*) scale. Scores for each scale are averaged across the items. Elliot et al. (1999) reported internal consistency coefficients of .74, .66, and .84 for deep processing, surface processing, and disorganization, respectively.

2.3. Procedure

In the final week of classes, students were invited to complete the questionnaire package during a one-hour class period and to release their course grade for the purpose of the research. No incentive for participation was offered. The Achievement Goal Questionnaire was completed first, followed by the measure of cognitive and meta-cognitive strategies, the measure of disorganization, deep processing, and surface processing, the PASS, and the Procrastination Scale.

3. Results

3.1. Descriptive statistics for measures

Results were analyzed using SPSS for Windows, Release 11.5.1. Descriptive statistics for all measures are reported in Table 1. Reliability coefficients were above .80, with the exception of the deep and surface processing scales and the performance-avoidance goal orientation scale. Age was not a correlate of any of the variables listed in Table 1. Women scored higher than men on performance-avoidance goal orientation ($M = 5.59$, $SD = 1.13$ vs. $M = 5.12$, $SD = 1.41$; $t(166) = 2.25$, $p < .05$), meta-cognitive strategies usage ($M = 4.78$, $SD = 0.85$ vs. $M = 4.39$, $SD = 1.00$; $t(166) = 2.55$, $p < .05$), cognitive strategies usage ($M = 4.77$, $SD = 0.78$ vs. $M = 4.41$, $SD = 0.88$; $t(166) = 2.61$, $p < .01$), and disorganization ($M = 3.20$, $SD = 1.45$ vs. $M = 2.69$, $SD = 1.11$; $t(166) = 2.23$, $p < .05$). No gender differences emerged on the measures of procrastination.

3.2. Inter-correlations among variables

Inspection of scatter-plots supported the assumption that relationships between variables were linear. As reported in Table 2, scores on both the PASS and the Procrastination Scale correlated negatively with the mastery-approach goal orientation, as predicted. Also as predicted, the

Table 1
Descriptive statistics for all variables

Variable	*N*	*M*	SD	Observed range	Possible range	α
Mastery-approach	170	5.73	0.97	2.33–7.00	1.00–7.00	.86
Mastery-avoidance	170	4.28	1.39	1.00–7.00	1.00–7.00	.83
Performance-approach	170	4.34	1.68	1.00–7.00	1.00–7.00	.93
Performance-avoidance	170	5.45	1.23	1.00–7.00	1.00–7.00	.63
Cognitive strategies	170	4.64	0.86	2.00–6.27	1.00–7.00	.82
Meta-cognitive strategies	170	4.66	0.93	2.14–6.86	1.00–7.00	.85
Deep processing	170	3.98	0.96	1.80–6.20	1.00–7.00	.62
Surface processing	170	5.18	1.06	1.00–7.00	1.00–7.00	.68
Disorganization	170	3.04	1.38	1.00–6.60	1.00–7.00	.89
PASS	170	34.58	7.44	16.00–60.00	12.00–60.00	.83
Procrastination scale	169	40.51	8.54	16.00–62.00	16.00–64.00	.92
Grade	165	74.27	11.25	36.00–96.00	0.00–100.00	–

Table 2
Pearson inter-correlations among variables

Variable	1	2	3	4	5	6	7	8	9	10	11
1. Mastery-approach	–										
2. Mastery-avoidance	.13	–									
3. Performance-approach	.28**	.10	–								
4. Performance-avoidance	.06	.34**	.14	–							
5. Cognitive strategies	.45***	.21**	.26***	.19**	–						
6. Meta-cognitive strategies	.48***	.10	.32***	.15	.72***	–					
7. Deep processing	.26***	.02	.27***	−.03	.39***	.43***	–				
8. Surface processing	.14	.23**	.13	.27***	.37***	.18*	−.01	–			
9. Disorganization	−.26***	.48***	−.13	.25***	−.08	−.16*	−.14	.20**	–		
10. PASS	−.18*	.19**	−.04	.07	−.28***	−.29***	−.06	.01	.34***	–	
11. Procrastination scale	−.25***	.14	.01	.05	−.35***	−.40***	−.14	.02	.41***	.67***	–
12. Grade	.28***	−.29***	.27**	−.15	.03	.00	.07	.03	−.48***	−.12	−.07

Note: PASS = Procrastination Assessment Scale – Students.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

mastery-avoidance orientation correlated positively with PASS scores and, in a trend falling short of statistical significance, with Procrastination Scale scores ($p = .08$). Procrastination scores did not correlate with the performance-approach and performance-avoidance orientations. As predicted, PASS and Procrastination Scale scores were each inversely related with both cognitive strategies usage and meta-cognitive strategies usage, and were each positively associated with disorganization. No associations emerged between procrastination scores and measures of deep and surface processing.

Although not directly related to our predictions, positive associations emerged between all goal orientations and cognitive strategies usage. Positive associations emerged between meta-cognitive

strategies usage and the mastery-approach and performance-approach orientations. A tendency to engage in deep processing was related to the mastery-approach and performance-approach orientations, whereas surface processing correlated with the mastery-avoidance and performance-avoidance orientations. Disorganization was positively associated with the mastery-avoidance and performance-avoidance orientations and negatively associated with the mastery-approach orientation. Finally, grades were positively associated with mastery-approach and performance-approach orientations and negatively associated with mastery-avoidance and performance-avoidance orientations (for the latter, $p = .058$). Grades were inversely correlated with disorganization but were not associated with measures of deep and surface processing or procrastination.

3.3. Multiple regression analyses

Following Wolters (2003), we conducted two-step hierarchical regression analyses in which procrastination scores were regressed on the four goal orientations in the first step and learning strategies variables were added in the follow-up step. Separate regressions were conducted for PASS and Procrastination Scale scores (summarized in Tables 3 and 4, respectively). Given gender differences on some variables, both regressions were re-conducted entering gender first; only one statistically significant finding changed, as noted below.

For PASS scores, results from the first step revealed that the four goal orientations together accounted for 8% of variance in procrastination, $F(4, 165) = 3.57$, $p < .01$. Procrastination was significantly predicted by the mastery-avoidance orientation ($\beta = .22$, $p < .01$) and the mastery-approach orientation ($\beta = -.21$, $p < .01$). Results for the second step revealed that 22% of variance was accounted for when the additional learning strategies variables were added,

Table 3
Summary of hierarchical regression analysis predicting scores on the procrastination assessment scale – students

Variable	*B*	*SE B*	*β*
Step 1			
Mastery-approach	−1.58	.60	−.21**
Mastery-avoidance	1.17	.43	.22**
Performance-approach	−.01	.35	.00
Performance-avoidance	.02	.48	.00
Step 2			
Mastery-approach	.04	.65	.01
Mastery-avoidance	.63	.46	.12
Performance-approach	.26	.34	.06
Performance-avoidance	.10	.47	.02
Cognitive strategies	−2.24	.96	−.26*
Meta-cognitive atrategies	−1.25	.86	−.16
Deep processing	.93	.63	.12
Surface processing	.33	.56	.05
Disorganization	1.35	.48	.26**

Note: $R^2 = .08$ ($p < .01$) for Step 1; $\Delta R^2 = .14$ ($p < .001$) for Step 2.
* $p < .05$.
** $p < .01$.

Table 4
Summary of hierarchical regression analysis predicting scores on the procrastination scale

Variable	*B*	*SE B*	*β*
Step 1			
Mastery-approach	−2.61	.68	−.30***
Mastery-avoidance	1.00	.49	.16*
Performance-approach	.37	.39	.07
Performance-avoidance	.05	.55	.01
Step 2			
Mastery-approach	−.07	.70	−.01
Mastery-avoidance	.01	.50	.00
Performance-approach	.87	.36	.17*
Performance-avoidance	.04	.50	.01
Cognitive strategies	−2.13	1.03	−.21*
Meta-cognitive strategies	−2.60	.92	−.28**
Deep processing	.66	.67	.07
Surface processing	.44	.60	.06
Disorganization	2.22	.51	.36***

Note: $R^2 = .10$ ($p < .01$) for Step 1; $\Delta R^2 = .23$ ($p < .001$) for Step 2.
* $p < .05$.
** $p < .01$.
*** $p < 001$.

$\Delta F(5, 160) = 5.54$, $p < .001$. In this model, disorganization ($\beta = .26$, $p < .01$) and cognitive strategies usage ($\beta = -.264$, $p < .05$) significantly predicted PASS scores.

For Procrastination Scale scores, results from the first step revealed that the four goal orientations together accounted for 10% of variance in procrastination, $F(4, 164) = 4.50$, $p < .01$. The strongest individual predictor of Procrastination Scale scores was the mastery-approach orientation ($\beta = -.30$, $p < .001$), with the mastery-avoidance orientation also significantly predicting procrastination ($\beta = .16$, $p < .05$; this became $\beta = .15$, $p = .06$ in the analysis including gender). Results for the second step revealed that 33% of variance was accounted for when the additional learning strategies variables were added, $\Delta F(5, 159) = 10.79$, $p < .001$. In this model, disorganization was the strongest predictor of Procrastination Scale scores ($\beta = .36$, $p < .001$), with meta-cognitive strategies usage ($\beta = -.28$, $p < .01$), cognitive strategies usage ($\beta = -.21$, $p < .05$), and the performance-approach goal orientation ($\beta = .17$, $p < .05$) also emerging as significant predictors.

4. Discussion

Procrastination was negatively associated with the mastery-approach orientation and positively associated with the mastery-avoidance orientation, as predicted. Students who adopted the goal of learning everything there is to learn tended not to procrastinate, whereas those who adopted the goal of avoiding failing to learn what there is to learn tended to procrastinate. These findings speak to the importance of separately assessing the approach and avoidance forms of mastery orientation when determining their relationship to procrastination. From the perspective of Tempo-

ral Motivation Theory (Steel, in press), the finding that mastery-approach orientated students tended not to procrastinate may reflect their greater intrinsic motivation (Elliot & Harackiewicz, 1996), providing greater short-term rewards for studying and thereby reducing temporal discounting. In contrast, the mastery-avoidance orientation suggests that academic pursuits are associated with greater task aversiveness (Moller & Elliot, in press), thereby facilitating temporal discounting. In addition, evidence that approach and avoidance forms of mastery orientation are differentially related to procrastination suggests that related constructs, such as behavioural approach and behavioural inhibition tendencies (see review by Corr, 2004), may relate to procrastination and to achievement goals. Examining such relationships would further explicate connections between dispositions, such as approach and avoidance tendencies or trait procrastination, and more situation-specific social-cognitive concepts such as achievement goals (see Elliot & Thrash, 2002).

Results did not reveal consistent evidence of associations between procrastination and the performance goal orientations. Wolters (2003, 2004) and McGregor and Elliot (2002, Study 2), on the other hand, revealed positive associations between procrastination and performance-avoidance (and, at times, performance-approach) goal orientations. This divergence may hinge upon the measure of procrastination employed in the different studies. In earlier research, the tendency to delay academic work was assessed independent of the impact of such postponement. In these cases, benign forms of delay (e.g., purposefully leaving things to the last minute) may reflect the pragmatic concerns of performance-oriented students (e.g., last-minute preparation is perhaps seen as sufficient for performing well relative to one's peers). In contrast, when the deleterious impact of delay behaviour is assessed, as in the current study, associations emerge with approach and avoidance forms of mastery orientation but not with performance orientations. A focus on mastery of course material is associated with reduced (for mastery-approach students) or heightened (for mastery-avoidance students) problematic dilatory behaviour, perhaps because mastery learning requires deliberate, sustained effort which is vulnerable to disruption by postponement.

Bivariate correlations revealed that procrastination was associated with lower cognitive and meta-cognitive strategies usage and with disorganization. Regression analyses also revealed disorganization, cognitive strategies usage, and meta-cognitive strategies usage as significant predictors of procrastination. Low scores on cognitive and meta-cognitive strategy usage and high scores on disorganization among procrastinating students are consistent with a characterization of such students as less self-regulated in their approach to learning and are also suggestive of reduced Conscientiousness as a substantial predictor of procrastination, consistent with Temporal Motivation Theory (Steel, in press). The strong association between procrastination and disorganization may clarify other recent findings concerning procrastination as self-regulation failure. For example, Howell et al. (2006) revealed an association between procrastination and low say-do correspondence (the tendency to do what we say we will do), whereas implementation intentions (determining the when, where and how of our behaviour in relation to accomplishing a personal goal) were *not* associated with procrastination. This suggests that disorganization may be more closely related to not following-up on plans earlier formulated rather than to the absence of a plan in the first place (Ariely & Wertenbroch, 2002; van Eerde, 2000).

Our findings also revealed a distinct pattern of correlates associated with the mastery-avoidance goal orientation, newly added to the achievement goal framework. The mastery-avoidance orientation was shown, for the first time, to correlate positively with procrastination. The mastery-avoidance orientation was also associated with cognitive (but not meta-cognitive) strategy use,

surface (but not deep) processing, disorganization, and lower grades. Our findings also point to a uniquely positive set of correlates of the mastery-approach orientation – low procrastination, greater organization, higher cognitive and meta-cognitive strategy usage, deep processing, and higher grades – suggesting that this orientation is most conducive to a self-regulated approach to learning (Pintrich, 2000b).

4.1. Limitations and future directions

Our sample comprised first-year, English-speaking undergraduates enrolled in an introductory psychology course. Thus, the extent to which findings generalize to more advanced undergraduates or to students in different courses, years of study, or cultures is uncertain. Although the achievement goal framework argues that goal orientation determines strategies usage and other consequences such as procrastination, no causal inferences can be drawn in the current study concerning the direction of relationships between these variables. A further limitation of our research concerns the reliance on self-report measures of procrastination. This area of research could be strengthened by including a behavioural index of task postponement (e.g., Howell et al., 2006).

In the current study, procrastination did not correlate with grades, whereas van Eerde's (2003) meta-analysis revealed that procrastination typically has a small but significant inverse association with performance. This likely reflects the highly structured nature of the course in which current participants were enrolled (i.e., students wrote weekly chapter quizzes and completed weekly chapter assignments), thereby counteracting any general tendency to engage in temporal discounting. Another issue concerns the nature of the procrastination tendencies assessed in the current study. Chu and Choi (2005) provided evidence for an adaptive type of procrastination engaged in by those who "suspend their actions deliberately and focus their attention on other important tasks at hand" (p. 247). The positive cognitive, affective, and behavioural correlates of this form of procrastination could be further explored in relation to goal orientation and learning strategies usage. Future research could also examine additional concepts from models of self-regulated learning as to their relation to procrastination. For example, mastery-approach oriented students tend to adopt an *incremental* view of ability (i.e., viewing ability as amenable to change) as opposed to an *entity* view (i.e., viewing ability as innate; Cury, Elliot, Da Fonseca, & Moller, 2006). Reduced temporal discounting may be associated with adoption of an incremental conception of one's ability.

References

Ariely, D., & Wertenbroch, K. (2002). Procrastination, deadlines, and performance: self-control by precommitment. *Psychological Science, 13*, 219–224.

Brandt, R. (1988–1999). On learning research: a conversation with Lauren Resnick. *Educational Leadership, 46*, 12–16.

Chu, A. H. C., & Choi, J. N. (2005). Rethinking procrastination: positive effects of "active" procrastination behavior on attitudes and performance. *Journal of Social Psychology, 145*, 245–264.

Corr, P. J. (2004). Reinforcement sensitivity theory and personality. *Neuroscience and Biobehavioural Reviews, 28*, 317–332.

Covington, M. V. (2000). Goal theory, motivation, and school achievement: an integrative review. *Annual Review of Psychology, 51*, 171–200.

Cury, F., Elliot, A. J., Da Fonseca, D., & Moller, A. C. (2006). The social-cognitive model of achievement motivation and the 2 × 2 achievement goal framework. *Journal of Personality and Social Psychology, 90*, 666–679.

Dewitte, S., & Schouwenburg, H. C. (2002). Procrastination, temptations, and incentives: the struggle between the present and the future in procrastinators and the punctual. *European Journal of Personality, 16*, 469–489.

Elliot, A. J. (2005). A conceptual history of the achievement goal construct. In A. J. Elliot & C. S. Dweck (Eds.), *Handbook of competence motivation* (pp. 52–72). New York: Guildford Press.

Elliot, A. J., & Harackiewicz, J. M. (1996). Approach and avoidance achievement goals and intrinsic motivation: a mediational analysis. *Journal of Personality and Social Psychology, 70*, 461–475.

Elliot, A. J., & McGregor, H. A. (2001). A 2 × 2 achievement goal framework. *Journal of Personality and Social Psychology, 80*, 501–519.

Elliot, A. J., McGregor, H. A., & Gable, S. (1999). Achievement goals, study strategies, and exam performance. *Journal of Educational Psychology, 91*, 549–563.

Elliot, A. J., & Thrash, T. M. (2002). Approach-avoidance motivation in personality: approach and avoidance temperaments and goals. *Journal of Personality and Social Psychology, 82*, 804–818.

Entwistle, N. J., & Ramsden, P. (1983). *Understanding student learning*. New York: Nichols.

Ferrari, J. R. (2004). Trait procrastination in academic settings: an overview of students who engage in task delays. In H. C. Schouwenburg, C. H. Lay, T. A. Pychyl, & J. R. Ferrari (Eds.), *Counseling the procrastinator in academic settings* (pp. 19–27). Washington: American Psychological Association.

Howell, A. J., Watson, D. C., Powell, R. A., & Buro, K. (2006). Academic procrastination: the pattern and correlates of behavioural postponement. *Personality and Individual Differences, 40*, 1519–1530.

McGregor, H. A., & Elliot, A. J. (2002). Achievement goals as predictors of achievement-relevant processes prior to task engagement. *Journal of Educational Psychology, 94*, 381–395.

Moller, A. C., & Elliot, A. J. (in press). The 2 × 2 achievement goal framework: an overview of empirical research. *Progress in Educational Psychology Research*.

Pintrich, R. R. (2000a). Multiple goals, multiple pathways: the role of goal orientation in learning and achievement. *Journal of Educational Psychology, 92*, 544–555.

Pintrich, R. R. (2000b). The role of goal orientation in self-regulated learning. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 451–502). New York: Academic Press.

Pintrich, R. R., Smith, D. A. F., Garcia, T., & McKeachie, W. J. (1993). Reliability and predictive validity of the motivated strategies for learning questionnaire (MSLQ). *Educational and Psychological Measurement, 53*, 801–813.

Scher, S. J., & Osterman, N. M. (2002). Procrastination, conscientiousness, anxiety, and goals: exploring the measurement and correlates of procrastination among school-aged children. *Psychology in the Schools, 39*, 385–398.

Schouwenburg, H. C. (2004). Procrastination in academic settings: general introduction. In H. C. Schouwenburg, C. H. Lay, T. A. Pychyl, & J. R. Ferrari (Eds.), *Counseling the procrastinator in academic settings* (pp. 3–17). Washington: American Psychological Association.

Schouwenburg, H. C., & Groenewoud, J. T. (2001). Study motivation under social temptation: effects of trait procrastination. *Personality and Individual Differences, 30*, 229–240.

Solomon, L. J., & Rothblum, E. D. (1984). Academic procrastination: frequency and cognitive-behavioural correlates. *Journal of Counseling Psychology, 31*, 504–510.

Steel, P. (in press). The nature of procrastination: A meta-analytic and theoretical review of quintessential self-regulatory failure. *Psychological Bulletin*.

Tuckman, B. W. (1991). The development and concurrent validity of the procrastination scale. *Educational and Psychological Measurement, 5*, 473–480.

Urdan, T. C. (2004). Predictors of academic self-handicapping and achievement: examining achievement goals, classroom structures, and culture. *Journal of Educational Psychology, 96*, 251–264.

van Eerde, W. (2000). Procrastination: self-regulation in initiating aversive goals. *Applied Psychology: An International Review, 49*, 372–389.

van Eerde, W. (2003). A meta-analytically derived nomological network of procrastination. *Personality and Individual Differences, 35*, 1401–1418.

van Eerde, W. (2004). Procrastination in academic settings and the Big Five model of personality: a meta-analysis. In H. C. Schouwenburg, C. H. Lay, T. A. Pychyl, & J. R. Ferrari (Eds.), *Counseling the procrastinator in academic settings* (pp. 29–40). Washington: American Psychological Association.

Vohs, K. D., & Baumeister, R. F. (2004). Understanding self-regulation: an introduction. In R. F. Baumeister & K. D. Vohs (Eds.), *Handbook of self-regulation* (pp. 1–12). New York: Guildford Press.

Wolters, C. A. (2003). Understanding procrastination from a self-regulated learning perspective. *Journal of Educational Psychology, 95*, 179–187.

Wolters, C. A. (2004). Advancing achievement goal theory: using goal structures and goal orientations to predict students' motivation, cognition, and achievement. *Journal of Educational Psychology, 96*, 236–250.