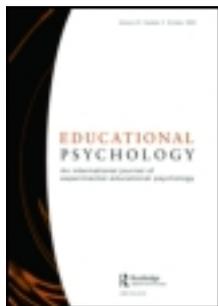


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Examining 'active' procrastination from a self-regulated learning perspective

Li Cao ^a

^a Educational Innovation, University of West Georgia, Carrollton, GA, USA

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Examining ‘active’ procrastination from a self-regulated learning perspective

Li Cao*

Educational Innovation, University of West Georgia, Carrollton, GA, USA

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This study examined the notion that active procrastinators are a positive type of procrastinators who possess desirable characteristics similar to non-procrastinators, but different from the traditional passive procrastinators. A two-step procedure was followed to categorise university students ($N=125$) as active procrastinators, passive procrastinators and non-procrastinators. The results show that active procrastination was related mostly with the maladaptive motivational and behavioural characteristics described in the self-regulated learning literature. Active procrastinators reported low mastery-approach goal, high performance-avoidance and work-avoidance goal, and low intrinsic motivation and task value. They selected less effective strategies and performed the lowest on tests among the three groups. The results challenged the notion that active procrastination is conducive to learning. Future research directions and implications to teaching and learning are discussed.

Keywords: procrastination; self-regulated learning; motivation; learning strategy; college students

Procrastination remains to be a prevalent practice among students. More than 50% of American college students procrastinate consistently and problematically on academic tasks (Day, Mensink, & O’Sullivan, 2000; Ellis & Knaus, 1977; Ferrari, O’Callaghan, & Newbegin, 2005; Harriott & Ferrari, 1996). Although there is no universally accepted definition, academic procrastination can be defined as the lack or absence of self-regulated performance and the tendency to put off or completely avoid an activity under one’s control (Tuckman, 1991; Tuckman & Sexton, 1989). Procrastination frequently results in students’ underestimating the time necessary to complete tasks and prepare for examinations, missing deadlines for submitting assignments, low course grades and course withdrawal (Jiao, DaRos-Voseles, Collins, & Onwuegbuzie, 2011; Muszynski & Akamatsu, 1991; Wang & Englander, 2010).

Because of its negative impact on students’ well-being and academic performance, academic procrastination has been studied extensively in the past four decades (e.g. Ellis & Knaus, 1977; Ferrari, 1994; Ferrari & Tice, 2000; Solomon & Rothblum, 1984; Steel, 2007). Research shows that procrastination is associated with low levels of academic self-efficacy and self-esteem, and high levels of anxiety (Ferrari & Tice, 2000; Howell & Watson, 2007; Milgram, Dangour, & Raviv, 1992;

*Email: lcao@westga.edu

Wolters, 2003). It frequently results in unsatisfactory performance (Solomon & Rothblum, 1984). Due to the maladaptive characteristics, both researchers and practitioners have long regarded procrastination as a pernicious form of self-regulatory failure and a dysfunctional self-handicapping behaviour that has a significant negative impact on learning and achievement (Baumerster, Heatherton, & Tice, 1994; Ferrari & Tice, 2000; Knaus, 2000; Lay & Schouwenburg, 1993; Rhodewalt, 1994; Senecal, Koestner, & Vallerand, 1995; Steel, 2007; Tice & Baumeister, 1997). Despite considerable efforts in describing its deleterious consequences and curtailing this problem, the prevalence of procrastination appears to be growing (Kachgal, Hansen, & Nutter, 2001; Klassen et al., 2010). It is clear that procrastination is not entirely understood and continued research into procrastination should not be delayed (Steel, 2007).

Starting in the early 1990s, a few investigators have taken an alternative approach and examined the adaptive values associated with procrastination (Bernstein, 1998; Ferrari, 1993). This research shows that procrastination is related to intrinsic motivation (Senecal et al., 1995). Students reported that course materials become less boring, more interesting and more engaging when they procrastinate (Schraw, Wadkins, & Olafson, 2007). Other benefits of procrastination include freeing up time for planning and other activities, more concentrated effort, greater amount of flow-like experiences and eliminated distractions (Knaus, 2000; Lay, Edwards, Parker, & Endler, 1989; Schraw et al., 2007). Furthermore, procrastination does not necessarily affect the quality of performance (Ferrari, 1992; Tice & Baumeister, 1997). These results suggest that not all procrastination behaviours are due to failure of self-regulation. Procrastinators may also include those who choose to delay a task for the adaptive values of procrastination.

In line with this alternative view, Chu and Choi (2005) identified a new 'positive' group of procrastinators – active procrastinators – who are significantly different from passive procrastinators described in the traditional sense. Chu and Choi (2005) maintained that active procrastinators choose to procrastinate because they prefer to work under pressure. They are able to complete tasks before deadlines, and they are more likely to accomplish tasks with satisfactory outcomes than passive procrastinators. In contrast, passive procrastinators do not intend to procrastinate, but they often end up postponing tasks because of their inability to make decisions and act on them quickly. They are often paralysed by indecision regarding action and haunted by past failure to complete tasks.

Chu and Choi (2005) further posited that even though 'active procrastinators procrastinate to the same degree as do passive procrastinators, their personal characteristics and outcomes are quite more similar to non-procrastinators' (p. 260). Active procrastinators demonstrated time perceptions, attitudes, coping styles and academic performances that were nearly identical to, or even better, than those of non-procrastinators. Both groups tend to have higher levels of purposive use of time, time control and self-efficacy than passive procrastinators, and are more likely to experience positive outcomes (Chu & Choi, 2005). In a follow-up study, Choi and Moran (2009) specified preference for pressure, intentional decision, the ability to meet deadlines and outcome satisfaction as the four dimensions that characterised active procrastination. Based on these findings, Chu and Choi (2005) called for a more sophisticated understanding of procrastination that includes active procrastination. They further proposed reevaluating the implications of procrastination and suggested 'Why NOT Procrastinate?' (Choi & Moran, 2009).

Without doubt, Chu and Choi's (2005) concept of active procrastination presented a novel idea in the study of procrastination. This concept is a step that moves further from acknowledging some short-term benefits associated with procrastination (Tice & Baumeister, 1997) to identifying a qualitatively different type of procrastinators. In the spirit of scientific inquiry in general, and in the research on a complex phenomenon such as procrastination in specific, it is appropriate to explore alternative ideas and challenge the conventional view that procrastination is ineffective, undesirable and hinders learning (Blunt & Pychyl, 1998; Ferrari & Tice, 2000; Steel, 2007; Wolters, 2003). However, it seems problematic to promote the notion that delaying one's work can actually be helpful and related to positive characteristics (Bui, 2007) before the concept of active procrastination is solidly grounded in the scientific evidence. It seems even more questionable to encourage procrastination before active procrastination is tried and proved beneficial to student learning and well-being.

The purpose of the present study was to test this notion and investigate whether active procrastination entails desirable motivational and behavioural characteristics as Chu and Choi (2005) described. Contrary to Chu and Choi's (2005) description, the present study hypothesised that active procrastinators and passive procrastinators share similar characteristics in the motivation, affect and behavioural dimensions because both groups irrationally delay their academic tasks and face the consequences of procrastination. Consequently, both active procrastinators and passive procrastinators would be significantly different in these dimensions from non-procrastinators who do not delay starting of academic tasks (Ellis & Knaus, 1977; Ferrari, 2001; Ferrari & Tice, 2000; Howell & Watson, 2007; Pintrich, 2000; Steel, 2007). Results to these hypotheses would help address the question: Is procrastination conducive to learning and therefore be encouraged among students? Addressing these questions will not only enhance our understanding of procrastination, but also have significant implications to teaching and learning.

Theoretical framework

Early research on procrastination focused on the nature, antecedents, aetiology and consequences of academic procrastination (Jiao et al., 2011; Knaus, 2000; Sommer, 1990; Steel, 2007). More recently, this research has shifted its focus from treating academic procrastination as a self-defeating personality flaw (Ferrari, 1991; Lay, 1990; Milgram et al., 1992) to viewing it as the lack of self-regulated performance which involves cognitive, affective and behavioural components (Rothblum, Solomon, & Murakami, 1986; Senecal et al., 1995; Tuckman & Sexton, 1989; Wolters, 2003). Based on this perspective shift, the present study used a self-regulated learning (SRL) perspective (Pintrich, 2000; Zimmerman, 2008) to examine characteristics of active procrastinators in comparison with those of passive procrastinators and non-procrastinators. The SRL perspective was selected because it focuses on the motivational, cognitive, metacognitive and behavioural dimensions of student learning (Pintrich, 2000; Wolters & Pintrich, 2001; Zimmerman & Schunk, 2001); and provides a theoretical framework to examine differences of the motivational, cognitive and behavioural characteristics among different types of procrastinators.

Current literature offers many models of SRL. Each model sheds some light on the rather broad area of SRL by addressing how each of these cognitive, motivational and contextual factors influences the learning process (e.g. Pintrich, 2000;

Winne & Hadwin, 1998; Zimmerman, 2008). Rooted in cognitive psychology, Winne and Hadwin's (1998) four-stage model of SRL focused on the specific cognitive processes of a learner's self-regulation such as defining a task, setting of goals and plans, using tactics to learn and utilizing metacognitive processes to adapt learning both within the task and more globally. This model characterizes SRL 'as a cognitively inherent aspect of learning' (Winne, 1995, p. 186). In this view, SRL is principally comprised of knowledge, beliefs and learned skills malleable in response to environmental influences. Winne (1995) stressed that this model is particularly useful for probing into how studying proceeds when learners study mainly by themselves; and that obtaining details of knowledge and aspects of cognitive and metacognitive processing inherent in SRL leads to understanding of the full nature and varied roles of SRL in academic learning.

Different from Winne and Hadwin's (1998) Information Processing-based metacognitive model that highlights the function of knowledge and cognitive processes of SRL, Zimmerman (1998, 2000) focused on the intersection of motivational and social aspects of SRL. From this social cognitive perspective, Zimmerman (1998) posits that SRL involves feedback loops of three cyclical phases. The forethoughts phase refers to learning processes and sources of motivation that precede efforts and influence students preparation and willingness to self-regulate their learning. The performance phase involves processes that occur during learning and affect concentration and performance. The self-reflection phase involves processes that follow learning efforts but influence a learner's reaction to that experience. These self-reflections, in turn, influence forethought regarding subsequent learning efforts, which completes the self-regulatory cycle. Zimmerman's (1998) model highlights importance of the cyclic interrelations between metacognitive process and motivational sources during the ongoing efforts to learn in real contexts (Kitsantas & Zimmerman, 2002).

Building on both the metacognitive and social cognitive models of SRL (Winne, 1995, 2001; Zimmerman, 1998), Pintrich (2000, 2004) proposed a conceptual framework for classifying the different phases and areas for SRL. The four phases include task identification and planning, the monitoring and control of learning strategies, and a reaction and reflection phase. The four areas in which self-regulation can occur fall into four broad categories: cognition, motivation, behaviour and context. By crossing the phases and areas, Pintrich (2000) presented a (4 × 4) grid that cannot only identify different phases of SRL, but also a specific domain in which SRL occurs. In particular, this model expands the prior models of SRL by including students' self-regulation of the context which involves students' perceptions of the task and context, and their understanding, monitoring and control of the contextual factors.

Pintrich's (2000) framework was selected for the present study because it presents a more inclusive model of SRL that combines the IP perspective and social cognitive perspective on student learning. It offers a broad outline of the different types of self-regulatory strategies that college students might use to control their own cognition, motivation, affect and behaviour, as well as the college context (Pintrich, 2004). Guided by this framework, the present study examined whether active and passive procrastinators possess distinctive characteristics in terms of motivational beliefs and goal orientations, cognitive and metacognitive strategies and test performance, as suggested in recent discussions (Choi & Moran, 2009; Chu & Choi, 2005; Schraw et al., 2007; Steel, 2007; Wolters, 2003; Wolters & Pintrich, 2001).

Also, Pintrich's (2000) framework was selected for the methodological reasons. This framework was used in developing the Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich, Smith, Garcia, & McKeachie, 1993). This widely used questionnaire measure in the study of SRL was used as a primary means of data collection for the present study. The alignment of the theoretical framework and MSLQ would enhance validity of the study. Additionally, the present study aimed at exploring characteristics of student procrastination at the course level. MSLQ was designed to capture student characteristics in the metacognitive, motivational, behavioural and contextual aspect of SRL at the course level. According to Pintrich (2004), the course level is a good compromise between an overly global level focused on college learning in general and a more microanalytic level focused on different tasks within a course. Finally, research (Pintrich, 2000; Winne & Hadwin, 1998) shows that MSLQ, as a self-report instrument, was able to measure general aptitudes or propensities to use different self-regulatory processes. As Pintrich and De Groot (1990) reported, scores on the strategy use and regulation scales of the MSLQ have been related, in theoretically predictable ways, to components of students' motivation including self-efficacy, task value, intrinsic motivation and test anxiety.

Self-efficacy belief

The present study focused on three motivation variables often used to describe self-regulated learners: self-efficacy, achievement goal and motivation orientation. Self-efficacy refers to students' judgment of their capability to accomplish tasks and succeed in activities (Bandura, 1986, 1997; Pajares, 1996). Bandura posited that students possess 'self-directive capabilities that enable them to exercise some control over their thoughts, feelings, and actions by the consequences that they produce for themselves' (1986, p. 335). However, students who are sceptical of their ability to exercise control over their behaviour tend to undermine their own efforts to deal effectively with situations that challenge their capabilities (Bandura, 1986). Bandura (1997) was the first to introduce the relationship between procrastination and self-efficacy beliefs. He suggested that when adequate levels of ability and motivation exist, students' self-efficacy beliefs have a significant impact on their task initiation, self-regulatory efforts and academic performance.

Existing research supports Bandura's position that self-efficacy plays an important role in task initiation and persistence (Pintrich, 2000; Schraw et al., 2007; Schunk & Pajares, 2005). A negative correlation was found between self-efficacy belief and academic procrastination among college students (Ferrari, Parker, & Ware, 1992; Steel, 2007; Tuckman, 1991). Students with less confidence in their abilities to be successful in class were more likely to delay academic tasks (Briody, 1980; Chu & Choi, 2005; Wolters, 2003). In contrast, students who were confident about their abilities to do well tended to start their academic work in a more timely manner (Steel, 2007; Wolters, 2003). In line with these findings, it was expected that non-procrastinators would report the strongest self-efficacy, whereas passive procrastinators would report the weakest self-efficacy among the three groups.

Recent research also demonstrated a more complex relationship of procrastination with motivation and self-efficacy. Schraw et al. (2007) found that low intrinsic motivation and high self-efficacy affect procrastination, and that surprisingly 'higher efficacy students experienced the least amount of motivation. These students felt so

confident in their ability to succeed that they found it difficult or impossible to motivate themselves without a deadline or some external motivator in their lives' (p. 19). Similarly, Chu and Choi (2005) found that self-efficacy was correlated negatively with academic procrastination, but positively with active procrastination. They also found that active procrastinators were more similar to non-procrastinators than to passive procrastinators in self-efficacy belief. They suggested that this is because active procrastinators were confident in their abilities to meet deadlines and complete the tasks under time pressure, so they intentionally postponed academic tasks and directed their attention toward more urgent issues at hand. The results of Schraw et al. (2007) and Chu and Choi (2005) suggest that procrastination may also occur due to high self-efficacy students who seek external motivation such as a deadline, and those who intentionally delay starting of academic work simply because of their high level of confidence about their abilities. Based on these results, it was expected that active procrastinators would report a stronger self-efficacy than passive procrastinators who were sceptical about their ability to complete academic tasks.

Achievement goal

Achievement goals represent different purposes for students to engage in achievement situations (Ames, 1984; Elliot & Dweck, 2007; Pintrich, 2000). These purposes direct student cognition and behaviour across a range of academic tasks or learning situations, and determine how they approach and engage in learning activities (Ames, 1984; Pintrich, Smith, Garcia, & McKeachie, 1993). According to Elliot and McGregor's (2001) model, a mastery-approach goal applies to the students who focus on improving ability, or thoroughly understanding new information. A mastery-avoidance goal applies to the students who strive to avoid failing to learn what there is to learn (Elliot & Harackiewicz, 1996; Pintrich, 2000). A performance-approach goal applies to the students who focus on doing better than their peers, or proving their self-worth to other people (Ames & Archer, 1988; Dweck, 1992; Moller & Elliot, 2006). A performance-avoidance goal applies to the students who strive to avoid demonstrating a lack of competence with a particular topic (McGregor & Elliot, 2002; Midgley, Kaplan, & Middleton, 2001). In addition, a work-avoidance goal applies to the students who try to get away with putting as little efforts as possible into achieving tasks (Elliot & Dweck, 2007; Nicholls, Patashnick, & Nolen, 1985).

Current literature views procrastination as one specific self-handicapping behaviour (Ferrari, 1992, 1994; Ferrari & Tice, 2000; Wolters, 2004). This view is supported by findings of the achievement goal research. For instance, the mastery-approach orientation was found to be negatively related to self-handicapping (Midgley, Arunkumar, & Urdan, 1996; Midgley & Urdan, 2001; Pintrich, 2000) and procrastination (Howell & Watson, 2007; Wolters, 2003, 2004), whereas the performance-approach goal orientation was positively correlated to self-handicapping (Ommundsen, 2001; Rhodewalt, 1994) and procrastination (Wolters, 2003). Similarly, Midgley and Urdan (2001) found that self-handicapping was predicted negatively by a mastery orientation, but positively by performance-avoidance orientation. Other research shows that students may procrastinate more and have a higher test anxiety under conditions that foster a mastery-avoidance orientation (Elliot & McGregor, 2001; Howell & Buro, 2009; Howell & Watson, 2007), a per-

formance-avoidance orientation (McGregor & Elliot, 2002) or work-avoidance orientation (Blunt & Pychyl, 1998; Clark & Hill, 1994; Ferrari, 1991; Ferrari & Tice, 2000; Wolters, 2003).

Contrary to the popular view of procrastination as a dysfunctional self-handicapping behaviour, Chu and Choi (2005) argued that active procrastination is a self-regulatory behaviour that some procrastinators intentionally engage for adaptive values and positive outcomes. They described active procrastinators as possessing desirable characteristics similar to non-procrastinators who maintain positive motivation toward the tasks, and intend to learn and perform well in class. However, achievement goals were not examined in their study. The present study built on the existing research by examining the relationships between goal orientations and procrastination. Based on the assumption that active and passive procrastinators both procrastinate and face similar consequences, it was expected that active procrastinators would possess achievement goals that are similar to those of passive procrastinators who were oriented more to task avoidance, but different to those of non-procrastinators who were oriented more to learning and mastery.

Motivation orientation

The SRL theory also posits that adoption of different levels of self-efficacy beliefs and academic goals impact students' motivation orientations and learning strategies that they select to deal with challenges of different academic tasks (Pintrich, 2000; Zimmerman, 2008). Deci and Ryan (1985, 1991) have offered a comprehensive theory of self-regulation, particularly in regard to motivation. They identified two types of motivation based on the degree of self-determination: intrinsic motivation and extrinsic motivation. According to Ryan and Deci (2000), intrinsic motivation refers to doing an activity for the inherent satisfaction of the activity itself. Intrinsic motivation includes both cognitive and affective components and its hallmarks are self-determination and competence. In contrast, extrinsic motivation occurs whenever action is taken to attain some separable outcome such as high grades or public praise.

Research shows that motivation plays an important role in academic procrastination (Brownlow & Reasinger, 2000; Senecal et al., 1995). Less autonomous forms of motivation were associated with higher levels of procrastination. More specifically, students who had intrinsic reasons for pursuing their studies were likely to procrastinate less, whereas those who had extrinsic reasons were likely to procrastinate more. Also, students who were amotivated or helpless in regulating academic behaviours were likely to give up on their efforts when they encountered an obstacle and procrastinate more (Micek, 1982; Steel, 2007). Similarly, Pychyl, Morin, and Salmon (2000) found that students scoring high on procrastination commenced studying later and studied less than students scoring low on procrastination. In addition, academic procrastination apparently leads to various types of academic-related anxiety, such as test anxiety (Carden, Bryant, & Moss, 2004; Wang & Englander, 2010), writing anxiety (Fritzsche, Rapp, & Hickson, 2003) and statistics anxiety (Onwuegbuzie, 2004). On the basis of these results, it was expected that non-procrastinators would have a higher level of intrinsic motivation than passive and active procrastinators. Since procrastinators have difficulty with self-regulation (setting goals and implementing a plan to achieve results) (Steel, 2007; Wolters, 2003) and rely heavily on external sources of motivation, such as deadlines, in order to

get their work done (Ellis & Knaus, 1977; Ferrari, 2001; Tice & Baumeister, 1997), both passive and active procrastinators were expected to have a higher level of extrinsic motivation and test anxiety than non-procrastinators. Passive procrastinators were the least motivated and most helpless among the three procrastinator groups, so they were expected to have the lowest intrinsic and extrinsic motivation.

Learning strategy and test performance

Students' motivation and the extent to which they procrastinated were also significantly associated with their learning strategies (Pintrich, 2000; Senecal et al., 1995; VanZile-Tamsen & Livingston, 1999; Winne & Hadwin, 1998; Zimmerman, 2008). Learning strategies refer to any behaviours or thoughts that facilitate encoding in such a way that knowledge integration and retrieval are enhanced (Weinstein, 1988; Weinstein & Mayer, 1986). These thoughts and behaviours constitute organised plans of action designed to achieve a certain goal. Students' selection of different learning strategies not only reflects their purposes and levels of motivation, but also reveals different cognitive processes and behaviours that they engage in the learning process.

Research shows that students who demonstrate procrastination tendencies were often unable to effectively manage learning (Ellis & Knaus, 1997; Ferrari, 2001). Compared to non-procrastinators, procrastinators were relatively unmotivated toward distant tasks and appreciated less of the value of academic tasks (Pintrich, 2000; Schraw et al., 2007; Steel, 2007). They were less likely to adopt a systematic and disciplined approach to the work and select effective strategies that demanded effort and time to develop (Howell & Watson, 2007; Schouwenburg, 2004; Steel, 2007; Wolters, 2003, 2004). Consequently, they tended to attain lower academic achievement (Jiao et al., 2011; McCown, Petzel, & Rupert, 1987; Onwuegbuzie, 2004; Semb, Glick, & Spencer, 1979). It was expected that both passive and active procrastinators would use less learning strategies, select strategies that are less time and effort consuming, and achieve a lower test performance than non-procrastinators.

Chu and Choi (2005) posited that active procrastinators differed qualitatively from passive procrastinators in motivation and strategy use. They found that active procrastinators reported not only less avoidance-coping behaviour, but also a greater use of the task-coping strategy than passive procrastinators. Chu and Choi's (2005) investigation was limited to stress coping strategies and did not address whether active procrastinators use different learning strategies than passive procrastinators. The present study addressed this gap and used a SRL perspective to examine differences in cognitive, metacognitive and resources management strategies among different types of procrastinators. It was expected that active and passive procrastinators would both face consequences associated with a lack of motivation to start early and time loss due to their delay of academic tasks. The low level of motivation and increased time pressure would negatively impact on their learning strategies and academic performance. Therefore, active procrastinators would not use more learning strategies, nor achieve a higher test performance than passive procrastinators.

In summary, the purpose of the present study was to examine the notion (Chu & Choi, 2005) that active procrastinators are a positive type of procrastinators who possess desirable characteristics that are similar to those of non-procrastinators, but

distinctively different from those of passive procrastinators from a SRL perspective (Pintrich, 2000; Zimmerman, 2008). Specifically, the following hypotheses were tested to examine differences in motivation (self-efficacy, achievement goals, intrinsic and extrinsic motivation), cognition and metacognition (learning strategies) and behaviour (strategy and test performance) among active, passive and non-procrastinators.

Hypothesis 1: Both active procrastinators and passive procrastinators would report weaker self-efficacy beliefs than non-procrastinators. Active procrastinators would report stronger self-efficacy beliefs than passive procrastinators.

Hypothesis 2a: Both active procrastinators and passive procrastinators would report a weaker mastery-approach goal than non-procrastinators. There would be no difference on this dimension between active procrastinators and passive procrastinators.

Hypothesis 2b: Both active procrastinators and passive procrastinators would report a weaker performance-approach goal than non-procrastinators. There would be no difference on this dimension between active procrastinators and passive procrastinators.

Hypothesis 2c: Both active procrastinators and passive procrastinators would report stronger avoidance goals than non-procrastinators. There would be no difference in the avoidance goals between active procrastinators and passive procrastinators.

Hypothesis 3a: Both active procrastinators and passive procrastinators would report a lower intrinsic motivation, but a higher extrinsic motivation than non-procrastinators. There would be no difference in intrinsic motivation and extrinsic motivation between active procrastinators and passive procrastinators.

Hypothesis 3b: Both active procrastinators and passive procrastinators would report a higher level of test anxiety than non-procrastinators. There would be no difference in test anxiety between active procrastinators and passive procrastinators.

Hypothesis 4: Both active procrastinators and passive procrastinators would use less effective learning strategies and achieve a lower test performance than non-procrastinators. There would be no difference in strategy use and test performance between active procrastinators and passive procrastinators.

Method

Participants

One hundred twenty-nine university students enrolled in an undergraduate level educational psychology course in the southeastern USA voluntarily participated in the study. Standard Institutional Review Board procedures were followed to ensure the privacy and anonymity of the participants. Participants included 101 females (78%) and 28 males (22%). They were 69% of White, 27% of Black, and 4% of Hispanic and other ethnic backgrounds. They majored respectively in early childhood (32%), middle grades (23%), secondary (2%), special education (5%) and other majors in a pre-service teacher education programme. Students' ages ranged from 20 to 56 ($M=29$, $SD=8.77$).

Measures and procedures

Participants were invited to participate in a study of motivation, strategy and time use during the course. They were asked to respond to a survey packet during the last class of the semester. The survey packet included the following measures.

Educational psychology self-efficacy inventory

This consisted of eight items answered on a Likert scale. Participants were asked to indicate their level of agreement on each statement ranging from 1 (nothing like me) to 5 (a great deal like me). The scale has been shown to be internally reliable in the previous studies (e.g. Nietfeld, Cao, & Osborne, 2006). Sample items include 'I am sure that I can learn educational psychology'. 'I think I have good skills and strategies to learn educational psychology'. The internal consistency (Cronbach α) of the inventory was .76 for the present study.

Academic procrastination

The 16-item Procrastination Scale (Tuckman, 1991) was used to measure 'the tendency to waste time, delay and intentionally put off something that should be done' (p. 479; Cronbach α = .85). Participants were asked to rate a statement on a 7-point scale ranging from 1 (not at all true to me) to 7 (very true to me). Sample items include 'I needlessly delay finishing jobs, even when they're important'. 'When I have a deadline, I wait till the last minute'. Tuckman (1991) established the internal consistency of the Procrastination Scale (α = .90), and reported significant associations between Procrastination Scale scores and a behavioural measure of procrastination. In producing total scores, the rating scale was reversed prior to summing across the 16 items, so that higher scores indicated greater procrastination.

Active procrastination

The 16-item scale (Choi & Moran, 2009) was used to distinguish active procrastinators from passive procrastinators (α = .81). According to Choi and Moran (2009), this 7-point Likert scale measures four defining characteristics of active procrastinators: (a) preference for pressure (e.g. I tend to work better under pressure), (b) intentional procrastination (e.g. I intentionally put off work to maximise my motivation), (c) ability to meet deadlines (e.g. 'Since I often start working on things at the last moment, I have trouble finishing assigned tasks most of the time' [reverse coded]) and (d) outcome satisfaction (e.g. 'I feel that putting work off until the last minute does not do me any good' [reverse coded]). Choi and Moran (2009) established the internal consistency of the Scale of Active Procrastination (α = .80) and reported significant associations between the Scale of Active Procrastination scores and, personality traits and measures of time use and perceptions. A composite measure of these four subscales was used to assess the overall level of the tendency of individuals toward active procrastination.

Achievement Goal Questionnaire

This consisted of 16 items (α = .79). For each item, the participants read a short statement and then chose a number from 1 to 7 to indicate how strongly they agree

(7) or disagree (1) with the statement. The questionnaire included 12 items of achievement goals (Elliot & McGregor, 2001) with three items composing each of the four subscales that measure: mastery-approach ($\alpha = .87$), performance-approach ($\alpha = .93$), mastery-avoidance ($\alpha = .93$) and performance-avoidance ($\alpha = .82$) goal orientations. In addition, the questionnaire included four items measuring work-avoidance goal orientation ($\alpha = .83$, Wolters, 2004). A sample item of mastery-approach goal orientation read 'I want to learn as much as possible from this class'. A sample mastery-avoidance goal orientation item included 'I worry that I may not learn all that I possibly could in this class'. A sample performance-approach goal orientation item is 'My goal in this class is to get a better grade than most of the other students'. A sample performance-avoidance goal orientation item included 'I just want to avoid doing poorly in this class'. A sample work-avoidance goal orientation item read 'I like the class work best that I can finish quickly'. Elliot and McGregor (2001) validated the questionnaire by showing that endorsement of avoidance goals positively correlated with measures of negative affect whereas endorsement of approach goals positively correlated with need for achievement.

Motivated Strategies for Learning Questionnaire

The MSLQ (Pintrich et al., 1993) is based on Pintrich's (2000, 2004) framework that includes motivation, metacognition, behaviour and context of SRL. MSLQ is composed of two major sections that assess student motivation orientations and learning strategies in a college-level course. Students were asked to rate each item using a 7-point scale that ranged from 1 (*not at all true of me*) to 7 (*very true of me*). The motivation section ($\alpha = .88$) includes scales that involve valuing, expectancy and affect. The valuing scales include intrinsic-extrinsic goal orientation and task value. The expectancy scales include self-efficacy and control of learning, and the affect section includes test anxiety. Sample motivation items included 'In a class like this, I prefer course material that really challenges me so I can learn new things'. 'It is my own fault if I don't learn the material in this course'. The learning strategies section ($\alpha = .94$) is further divided into a cognitive-metacognitive section, which includes rehearsal, elaboration, organisation, critical thinking, and metacognitive self-regulation and a resource management section, which includes such behaviours as managing time and study environment, effort management, peer learning and help-seeking. Sample strategy items included 'When I study for this class, I practice saying the material to myself over and over'. 'If I get confused taking notes in class, I make sure I sort it out afterwards'. 'I try to identify students in this class whom I can ask for help if necessary'.

Test performance

This was measured through three quizzes and one comprehensive final exam. Each quiz consisted of 25 four-option multiple-choice items and covered a unit of the course content. The final exam contained 50 multiple-choice items and measured all the content covered in the course. Students were expected to complete a quiz in about 30 min and the final in 1 h. The test items were either created by the instructor or selected from the test bank accompanying the textbook (Ormrod, 2010). They varied in difficulty from simple recall and recognition to more difficult application questions (Appendix A). Student test performance on two of the three quizzes

(counting for 100 points, Quiz 1 $M=82.16$, $SD=.98$; Quiz 2 $M=87.57$, $SD=1.45$; and Quiz 3 $M=85.55$, $SD=1.92$) and the final exam (counting for 100 points, $M=84.16$, $SD=.98$) were summed as a total test performance score. The total test scores were then converted to a 100-point scale in the analysis (Tables 2 and 3).

Results

An initial screening of the data was conducted for outliers and normality using methods described by Tabachnick and Fidell (2001) and Osborne and Overbay (2004). Participants whose scores on relevant variables were between $z=-3$ and $z=3$ were identified as outliers. A total of four cases were deleted based on this criterion, leaving 125 participants in the dataset. Table 1 reports the properties of the major predictor variables of the study. As can be seen, the skewness scores of two variables (i.e. task value and self-efficacy for learning and performance) and the Kurtosis score of one variable (organisation) exceed 2.5 times of their standard errors respectively (Morgan, Leech, Gloechner, & Barrett, 2011). In order to improve the dataset normality and identify influential cases, the Mahalanobis and Cook's distance tests (Field, 2009) were performed and the results were reported later in this section.

Relationships among the major variables

Pearson correlation procedures were used to examine the relationships between procrastination types and the selected motivation and performance variables. As expected, correlations involving active procrastination and passive procrastination were in the hypothesised directions. Table 2 shows that active procrastination was positively correlated with academic procrastination ($r=.32$, $p<0.001$) and educational psychology self-efficacy ($r=.39$, $p<0.001$). Academic procrastination was correlated positively with performance-approach goal ($r=.20$, $p<0.03$), performance-avoidance goal, ($r=.33$, $p<0.01$) and work-avoidance goal ($r=.51$, $p<0.001$); but negatively with the mastery-approach goal ($r=-.33$, $p<0.01$).

Comparing the three groups

One-way ANOVA procedures were used to test the present hypotheses that compared the three procrastination groups: non-procrastinators, passive procrastinators and active procrastinators. In order to examine the group differences, Chu and Choi's (2005) two-step procedure was replicated to categorise the participants into three distinct groups of procrastinators. First, non-procrastinators were separated from procrastinators. The participants who scored less than the median score (3.50) on the Tuckman (1991) Academic Procrastination Scale were categorised as non-procrastinators, and those who scored equal or greater than 3.50 as procrastinators. Among the 125 participants, 61 were categorised as non-procrastinators and 64 as procrastinators. In the second step, the procrastinators were differentiated into two groups: passive procrastinators and active procrastinators. Among the 64 procrastinators, those who scored less than the median score (3.69) on the Choi and Moran's (2009) Active Procrastination Scale were grouped as passive procrastinators ($n=31$), and those who scored equal or greater than 3.69 were grouped as active procrastinators ($n=33$). Chu and Choi (2005) acknowledged the limitation of using

Table 1. Properties of the major predictor variables ($N=125$).

	<i>M</i>	<i>Mdn</i>	<i>SD</i>	Skewness (<i>SE</i> = .22)	Kurtosis (<i>SE</i> = .43)
Educational psychology efficacy	3.56	3.50	.62	.42	-.43
Mastery approach	5.23	5.33	1.29	-.47	-.62
Mastery avoidance	4.43	4.33	1.71	-.24	-.82
Performance approach	2.97	2.33	1.69	.54	-.89
Performance avoidance	4.82	5.00	1.65	-.48	-.63
Work avoidance	3.39	3.25	1.38	.35	-.45
Intrinsic goal	4.79	5.00	1.27	-.50	-.18
Extrinsic goal	4.81	4.75	1.11	-.35	-.02
Task value	5.32	5.67	1.32	-.75*	-.13
Control learning beliefs	5.60	5.50	1.08	-.49	-.40
Self-efficacy for learning and performance	5.27	5.50	1.20	-.66*	.08
Test anxiety	3.83	3.80	1.49	-.05	-.89
Rehearsal	4.55	4.75	1.19	-.20	-.72
Elaboration	4.94	5.00	1.25	-.34	-.74
Organisation	4.41	4.25	1.50	.09	-1.14**
Critical thinking	3.98	4.00	1.29	-.25	-.26
Metacognitive self-regulation	4.35	4.33	.90	-.03	-.44
Time and environment management	4.62	4.62	.57	-.20	.73
Effort regulation	4.20	4.00	.59	.03	.25
Peer learning	3.61	3.67	1.62	.16	-.73
Help-seeking	4.35	4.50	1.04	-.31	-.54

Note: *Skewness $>2.5 \times .22$ SE of Skewness; **Kurtosis $>2.5 \times .43$ SE of Kurtosis.

the median scores to distinguish the three procrastinator groups. The present study intentionally followed the same procedure in order to replicate their methods to examine differences among these groups.

Table 3 presents means, standard deviations and the results of one-way ANOVA analyses. As expected, there was a significant difference on academic procrastination ($F_{(2,122)} = 123.66$, $p = .00$; $\eta^2 = .67$) and active procrastination ($F_{(2,122)} = 37.61$, $p = .00$; $\eta^2 = .38$) among the three groups. Bonferroni pair-wise comparisons show that active procrastinators ($M = 4.52$, $p < .001$) and passive procrastinators ($M = 4.10$, $p < .001$) both reported a significantly higher level of academic procrastination than non-procrastinators ($M = 2.66$). These findings support the distinction between procrastinators and non-procrastinators. Furthermore, active procrastinators ($p < .001$) reported a significantly higher level of academic procrastination than passive procrastinators. Also as expected, active procrastinators ($M = 4.82$, $p < .001$) reported a significant higher level of active procrastination than passive procrastinators ($M = 3.28$, $p < .001$) and non-procrastinators ($M = 3.45$, $p < .001$). No significant difference was found in active procrastination between passive and non-procrastinators. These results support the distinction between active and passive procrastinators.

Self-efficacy

Hypothesis 1 suggested that both active procrastinators and passive procrastinators would report weaker self-efficacy beliefs than non-procrastinators, and that active procrastinators would report stronger self-efficacy than passive procrastinators. As Table 3 shows, the present study did not find a significant difference in educational

Table 2. Inter-correlations among procrastinations, educational psychology self-efficacy and achievement goal orientations.

	1	2	3	4	5	6	7	8	9
1 Active procrastination	1.00								
2 Academic procrastination	.32**	1.00							
3 Educational psychology self-efficacy	.39**	-.14	1.00						
4 Mastery approach	-.09	-.33**	.29**	1.00					
5 Mastery avoidance	.08	.06	-.19*	.09	1.00				
6 Performance approach	.02	.20*	-.03	.02	.16	1.00			
7 Performance avoidance	.06	.33**	-.26**	-.12	.26**	.22**	1.00		
8 Work avoidance	.07	.51**	-.24**	-.47**	.18*	.38**	.36**	1.00	
9 Test performance	.04	-.17	.38**	.25*	-.24**	.04	-.23**	-.24**	1.00

Note: $N = 125$; * $p < .05$ level; ** $p < .01$ level (two-tailed).

Table 3. Mean, SD and one-way ANOVA results of educational efficacy, achievement goals and test performance by procrastination types.

	Non-procrastinators (<i>n</i> = 61)	Passive procrastinators (<i>n</i> = 31)	Active procrastinators (<i>n</i> = 33)	Total (<i>n</i> = 125)	<i>F</i> (2, 122)	<i>P</i>	η^2
Academic procrastination	2.66 (.58)	4.10 (.45)	4.52 (.73)	3.51 (1.03)	123.66	.00*	.67
Active procrastination	3.45 (.99)	3.28 (.34)	4.82 (.76)	3.77 (1.03)	37.61	.00*	.38
Educational psychology self-efficacy	3.64 (.65)	3.36 (.51)	3.61 (.62)	3.56 (.62)	2.19	.12	.04
Mastery approach	5.55 (1.18)	4.96 (1.32)	4.91 (1.36)	5.23 (1.29)	3.88	.02*	.06
Mastery avoidance	4.28 (1.73)	4.54 (1.32)	4.59 (1.78)	4.43 (1.71)	.42	.66	.01
Performance approach	2.61 (1.72)	3.45 (1.64)	3.20 (1.55)	2.97 (1.69)	3.10	.05	.05
Performance avoidance	4.34 (1.74)	5.23 (1.46)	5.32 (1.44)	4.82 (1.65)	5.33	.00*	.08
Work avoidance	2.70 (1.11)	4.19 (1.42)	3.90 (1.15)	3.38 (1.38)	19.80	.00*	.25
Test score	87.85 (7.41)	85.26 (7.39)	84.94 (9.11)	86.44 (7.94)	1.92	.15	.03

Note: * Significant at the $p < .05$ level.

Table 4. Mean, SD and ANOVA Results of MSLQ motivation subscales and MSLQ learning strategy subscales by procrastination patterns.

MSLQ motivation subscales	Non-procrastinators (n = 61)		Passive procrastinators (n = 31)		Active procrastinators (n = 33)		Total (N = 125)	F (2, 122)	P	η^2
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)					
Intrinsic goal	5.11 (1.25)	4.49 (1.35)	4.47 (1.11)	4.79 (1.27)	4.04	.02*	.06			
Extrinsic goal	4.83 (1.20)	4.63 (1.22)	4.94 (.78)	4.81 (1.11)	.65	.53	.01			
Task value	5.76 (1.07)	4.87 (1.52)	4.92 (1.28)	5.31 (1.32)	7.44	.01*	.11			
Control learning beliefs	5.67 (1.16)	5.65 (1.06)	5.42 (.93)	5.60 (1.08)	.65	.52	.01			
Self-efficacy for learning and performance	5.45 (1.10)	5.15 (1.20)	5.06 (1.35)	5.27 (1.20)	1.37	.26	.02			
Test anxiety	3.46 (1.53)	4.08 (1.42)	4.28 (1.34)	3.83 (1.49)	4.04	.02*	.06			
<i>MSLQ learning strategy subscales</i>										
Rehearsal	4.85 (1.02)	4.38 (1.23)	4.16 (1.32)	4.55 (1.89)	4.25	.02*	.07			
Elaboration	5.34 (1.18)	4.52 (1.54)	4.60 (1.20)	4.94 (1.25)	6.55	.00*	.10			
Organisation	5.05 (1.52)	3.78 (1.26)	3.82 (1.18)	4.41 (1.50)	12.79	.00*	.17			
Critical thinking	4.08 (1.23)	3.82 (1.46)	3.94 (1.24)	4.00 (1.29)	.43	.65	.01			
Metacognitive self-regulation	4.85 (.90)	4.00 (1.02)	4.09 (.83)	4.44 (.99)	11.96	.00*	.16			
Time and environment management	5.60 (.95)	4.24 (.90)	4.59 (.87)	5.00 (1.09)	27.04	.00*	.31			
Effort regulation	5.93 (.88)	4.76 (.95)	4.93 (.95)	5.38 (1.06)	22.00	.00*	.27			
Peer learning	3.87 (1.53)	3.13 (1.71)	3.58 (1.64)	3.61 (1.62)	2.22	.11	.04			
Help-seeking	4.32 (1.23)	3.56 (1.55)	4.08 (1.07)	4.07 (1.30)	3.60	.03*	.06			

Note: * Significant at the $p < .05$ level.

psychology self-efficacy among the three procrastination groups ($F_{(2,122)}=2.19$, $p=.12$; $\eta^2=.04$). Neither active procrastinators ($M=3.61$) nor passive procrastinators ($M=3.36$) reported a significantly weaker level of self-efficacy than non-procrastinators ($M=3.64$). In addition, no significant difference was found in self-efficacy beliefs between active procrastinators and passive procrastinators. Hypothesis 1 was not supported. Regression procedures were later used to cross examine these unexpected findings, and investigate the predictability of self-efficacy and other major variables on active procrastination and academic procrastination, as demonstrated in Chu and Choi's (2005) study.

Academic goal

Hypothesis 2a suggested that active procrastinators and passive procrastinators would report a weaker mastery-approach goal than non-procrastinators. There would be no difference in the mastery-approach goal between active procrastinators and passive procrastinators. Table 3 shows there was a significant difference in mastery-approach goals ($F_{(2,122)}=3.88$, $p=.02$; $\eta^2=.06$) among the three procrastination groups. However, neither active procrastinators nor passive procrastinators reported a weaker mastery-approach goal than non-procrastinators ($M=5.55$). Even though active procrastinators ($M=4.91$) reported a lower mastery-approach goal than passive procrastinators ($M=4.96$), no difference was found between the two groups. Hypothesis 2a was partially supported.

Hypothesis 2b suggested that both active procrastinators and passive procrastinators would report a weaker performance-approach goal than non-procrastinators. There would be no difference on this dimension between active procrastinators and passive procrastinators. No significant difference was found among the three groups. This hypothesis was partially supported.

According to Hypothesis 2c, both active procrastinators and passive procrastinators would report stronger avoidance goals than non-procrastinators. There would be no difference in the avoidance goals between active procrastinators and passive procrastinators. The present data largely confirmed this hypothesis. Even though no significant difference was found in mastery-avoidance goals, significant differences were found in performance-avoidance ($F_{(2,122)}=5.33$, $p=.00$; $\eta^2=.08$) and work-avoidance goals ($F_{(2,122)}=19.80$, $p=.00$; $\eta^2=.25$) among three groups. As expected, active ($M=5.32$, $p=.02$) and passive procrastinators ($M=5.23$, $p=.04$) reported a significantly higher level of performance-avoidance goals than non-procrastinators ($M=4.34$). Similarly, active ($M=3.90$, $p=.00$) and passive procrastinators ($M=4.19$, $p=.00$) reported a significantly higher level of work-avoidance goals than non-procrastinators ($M=2.70$). No significant difference was found in performance-avoidance goals and work-avoidance goals between active and passive procrastinators.

Motivation orientation

Hypothesis 3a posited that both active procrastinators and passive procrastinators would report a lower intrinsic motivation, but a higher extrinsic motivation than non-procrastinators. There would be no difference in intrinsic motivation and extrinsic motivation between active procrastinators and passive procrastinators. Results in Table 4 largely confirmed this hypothesis. A significant difference was found in

intrinsic motivation ($F_{(2,122)}=4.04$, $p=.02$; $\eta^2=.06$) and task value ($F_{(2,122)}=7.44$, $p=.01$; $\eta^2=.11$) among the three groups. Although no significant difference was found in the pair-wise comparisons on intrinsic motivation, active ($M=4.92$, $p=.01$) and passive procrastinators ($M=4.87$, $p=.01$) reported a significantly lower level of task value than non-procrastinators ($M=5.76$). No significant difference was found in task value between active and passive procrastinators.

Hypothesis 3b suggested that both active procrastinators and passive procrastinators would report a higher level of test anxiety than non-procrastinators. There would be no difference in test anxiety between active procrastinators and passive procrastinators. A significant difference was found in test anxiety ($F_{(2,122)}=4.04$, $p=.02$; $\eta^2=.06$) among the three groups. Active procrastinators ($M=4.28$, $p=.01$) reported a significantly higher level of test anxiety than non-procrastinators ($M=3.46$). No significant difference was found in test anxiety between active and passive procrastinators ($M=4.08$). Hypothesis 3b was supported.

Learning strategy and test performance

According to Hypothesis 4, both active procrastinators and passive procrastinators would use less effective learning strategies and achieve a lower test performance than non-procrastinators. There would be no difference in strategy use and test performance between active procrastinators and passive procrastinators. Table 4 shows that although no significant difference was found in test performance, a significant difference was found in all strategies, except critical thinking and peer learning, among the three groups. Active procrastinators and passive procrastinators both reported a significantly lower usage of rehearsal, elaboration, organisation, metacognitive self-regulation, environment management and effort regulation than non-procrastinators. The effect size measured by eta squared of 0.31 for the time and environment strategies, and 0.27 for the effort regulation strategies indicated that the magnitude of the difference in these strategies between non-procrastinators and the two procrastinator groups was not small in the practical significance. Passive procrastinators ($M=3.56$, $p=.03$) reported a significantly lower usage of help seeking than non-procrastinators ($M=4.32$). No significant difference was found in any learning strategies between active and passive procrastinators. Hypothesis 4 was largely supported.

Predicting active procrastination

Following Chu and Choi's (2005) data analysis methods, multiple regression procedures were conducted to examine how self-efficacy, achievement goals, motivation orientations, learning strategies used in the study predicted active procrastination and academic procrastination. The forced entry method of the multiple regression was selected over a stepwise or hierarchic method, because this method relies on theoretical reasons for including the predictors; and 'was viewed as the only appropriate method for theory testing' (Studenmund & Cassidy, 1987 cited in Field, 2009, p. 212).

A series of diagnostic statistics were examined to address the concerns of normality of the dataset in the regression of active procrastination and passive procrastination on the selected motivational and behavioural variables of the study. First, the residual statistics were examined for extreme cases. The model predicting academic procrastination revealed a standardised residual (Std. R) of 2.01 for Case 69,

2.06 for Case 72, -2.43 for Case 100 and 3.19 for Case 104. According to Field (2009), it is reasonable to expect 5% of the cases to have Std. Rs less than -2 or larger than 2. With three cases (2.4%) out of the 125 participants outside the Std. $R > 2$ or < -2 limit and one case (0.80%) with a Std. R greater than 3, the study sample appeared to conform to a fairly accurate model. Further, Mahalanobis and Cook's distances were examined to identify influential cases in the model for academic procrastination. The Mahalanobis and Cook's distances were 11.25 and .02 for Case 69, 18.34 and .04 for Case 72, 22.17 and .07 for Case 100, 18.05 and .09 for Case 104 respectively. Although the Mahalanobis distances of Case 72, 100 and 104 exceeded the limit of 15 and was a concern, their Cook's distances were below the limit of 1 (Field, 2009, p. 217, 245), suggesting that these cases did not have an undue influence on the model.

Similarly, in the model for active procrastination, Case 65 had (Std. $R = 2.41$) and Case 93 had (Std. $R = 2.39$), counting 1.6% of the total 125 participants. The study sample appeared to conform to a fairly accurate model. Further, the Mahalanobis and Cook's distances were 19.96 and .65 for Case 65, and 15.12 and .045 for Case 93 respectively. Although the Mahalanobis distances for both cases exceeded the limit of 15 which was a concern, their Cook's distances were well below the limit of 1. These cases appeared to not have an undue influence on the model.

As shown in Table 5, all the variables included in the study were used as predictors in each model, except test performance because it is conceptually unlikely

Table 5. Regression analysis predicting academic procrastination and active procrastination.

Predictor variable	Academic procrastination	Active procrastination
Educational psychology self-efficacy	.11	.62**
Mastery approach	.11	-.04
Mastery avoidance	-.13	.01
Performance approach	-.01	-.09
Performance avoidance	.07	.03
Work avoidance	.20	.03
Intrinsic goal	.02	.01
Extrinsic goal	-.03	.12
Task value	-.16	.07
Control learning beliefs	.05	-.05
Self-efficacy for learning and performance	.12	-.16
Test anxiety	.29**	.12
Rehearsal	.10	-.00
Elaboration	.26	-.01
Organisation	-.29*	-.12
Critical thinking	.02	.18
Metacognitive self-regulation	-.07	-.29
Time and environment management	-.29*	.07
Effort regulation	-.18	-.12
Peer learning	-.14	.18
Help-seeking	-.01	-.01
ΔR^2	.41	.23
$F(21, 124)$	5.17**	2.81**

Notes: Entries are standardised regression coefficients (β). * $p < .05$; ** $p < .001$.

that an outcome variable, e.g., test performance, would determine procrastination behaviour. The results show that the regression model predicting academic procrastination was significant ($F_{(21,124)}=5.17, p<.001$) and explained 41% of the variance in the total academic procrastination score. Academic procrastination was predicted positively by test anxiety ($\beta=.29, p<.001$) but negatively by the strategy of organisation ($\beta=-.29, p<.02$) and time and environment management ($\beta=-.29, p<.01$). Also, the regression model predicting active procrastination was significant ($F_{(21,124)}=2.81, p<.001$) and explained 23% of the variance in the total active procrastination score. Active procrastination was predicted positively by educational psychology self-efficacy ($\beta=.62, p<.001$).

Discussion

The current results disputed the notion that active procrastinators are a positive type of procrastinators who possess desirable attitudinal and behavioural characteristics that are similar to those of non-procrastinators, but distinctively different from those of passive procrastinators (Chu & Choi, 2005; Choi & Moran, 2009). Based on a SRL perspective (Pintrich, 2000, Zimmerman, 2008), the study examined self-efficacy, achievement goal, motivation, learning strategy and test performance of active procrastinators in comparison with those of passive procrastinators and non-procrastinators in a college-level educational psychology class. The results contribute to the discussion (Chu & Choi, 2005; Schraw et al., 2007; Senecal et al., 1995; Steel, 2007; Wolters, 2003) whether there is a new type of procrastinators such as active procrastinators, and more importantly, whether procrastination should be encouraged among students.

In general, the present results challenged the notion that active procrastinators possess desirable motivational and behavioural characteristics so that active procrastination should be encouraged (Chu & Choi, 2005; Choi & Moran, 2009). The significant correlation found between active procrastination and academic procrastination indicates that active procrastination is not conceptually independent to the traditional academic procrastination. The fact that active procrastinators reported a significantly higher score on academic procrastination than passive procrastinators suggests that active procrastinators engaged in the traditional negative procrastination to a greater extent than passive procrastinators. The present results largely supported the proposed hypotheses that predicted maladaptive characteristics of active procrastinators in the cognitive, affective and behavioural dimensions.

Self-efficacy

The present results did not support Chu and Choi's (2005) observation that active procrastinators were more similar to non-procrastinators than to passive procrastinators in self-efficacy belief. In fact, the present results show that active procrastinators were not significantly more confident in their abilities to meet deadlines and complete the tasks under time pressure than passive procrastinators, while passive procrastinators were not significantly more sceptical about their academic abilities than active procrastinators. These results support the general assumption of the present study that active procrastinators and passive procrastinators were both procrastinators, and they shared a similar level of judgment of their capability to accomplish tasks and succeed in activities (Bandura, 1986, 1997; Pajares, 1996).

Although the present results suggest that self-efficacy was not a good indicator separating different types of procrastinators, these results revealed complex relationships between self-efficacy and procrastination. The positive correlation between student self-efficacy and active procrastination found in the present study is consistent with Chu and Choi's (2005) observation. This correlational result was also confirmed by the regression analysis showing that self-efficacy as the sole predictor explained 32% of the variance of active procrastination. These results suggest that students tended to procrastinate when they felt more confident with their abilities to accomplish academic tasks. According to Chu and Choi (2005), this is because active procrastinators were confident in their abilities to meet deadlines and complete the tasks under time pressure, so they intentionally postponed academic tasks and directed their attention toward more urgent issues at hand. However, these results are inconsistent with the prior observations that students who were confident about their abilities to do well tended to start their academic work in a more timely manner (Steel, 2007; Wolters, 2003).

Apparently, more research is needed to sort out the tendency of procrastination among the high self-efficacy students. One way to achieve this purpose is to conduct multivariate studies of procrastination that include ability and motivation. As Bandura (1997) suggested, students' self-efficacy beliefs have a significant impact on their task initiation, self-regulatory efforts and academic performance, when adequate levels of ability and motivation exist. This position suggests that the relationship of self-efficacy with task initiation, efforts and academic performance is not straightforward, but mediated by a certain level of ability and motivation. Future research needs to examine to what extent students' ability and motivation would be adequate so that self-efficacy enables them to exercise some control over their thoughts, feelings and actions. At the same time, this research could also identify to what extent, and under what conditions, students' ability and motivation would become inadequate so that their self-efficacy leads to underestimation of the difficulty of a task while simultaneously overestimating the positive benefits of procrastination (Schraw et al., 2007). This line of research would advance research of procrastination and SRL. Practically, results of this research would help design interventions to help students avoid overconfidence of their ability and consequently failing to self-regulate their learning (Pintrich, 2000; Senecal et al., 1995; Steel, 2007; Wolters, 2003).

Achievement goal

In regard to achievement goals, the present results show that active procrastinators and passive procrastinators share undesirable motivational attitudes and purposes to engage in academic tasks, and challenged the description of active procrastinators as a positive type of procrastinators (Chu & Choi, 2005). As predicted, a negative correlation was found between the mastery-approach goal and both passive procrastination and active procrastination (not significant). The inverse relationship between academic procrastination and the mastery-approach goal is consistent with the previous research that students who procrastinate tended not to adopt the learning goal and make the effort to learn everything there is to learn (Howell & Buro, 2009; Howell & Watson, 2007; Wolters, 2003). Likewise, the inverse relationship between active procrastination and the mastery-approach goal suggests that the more students engage in active procrastination, they are less likely to possess a learning goal.

Active procrastinators and passive procrastinators share the tendency of not focusing on thoroughly understanding new information and improving their abilities in the class.

Second, active procrastinators reported the lowest mastery-approach goal among the three groups. The fact that no significant difference was found in the mastery-approach goal and the performance-approach goal between active and passive procrastinators supports the observation that active and passive procrastinators were not different in the learning goal, or in the tendency to perform better than peers. In addition, these findings suggest that active procrastinators and passive procrastinators would share a lack of advantageous correlates, such as higher self-efficacy, higher intrinsic motivation and effective learning strategies, associated with the mastery-approach and the performance-approach goal, as discussed in other parts of this section (Elliot & McGregor, 2001; Moller & Elliot, 2006; Pintrich, 2000; Schunk & Zimmerman, 2008).

Again, the similarity between active procrastinators and passive procrastinators was supported by the lack of difference between the two groups in the avoidance goals. As Hypothesis 2c predicted, active procrastinators and passive procrastinators both reported stronger performance-avoidance and work-avoidance goals than non-procrastinators; and no significant difference was found in the avoidance goals between the two groups. These results demonstrate that active procrastinators were not different from passive procrastinators in the tendencies of avoiding the demonstration of a lack of ability or preventing the perception that they are not competent with a particular topic or skill (McGregor & Elliot, 2002; Midgley et al., 2001). Their intention was also to minimize the effort they must provide for academic tasks, and they prefer not working too hard (Meece & Holt, 1993; Middleton & Midgley, 1997; Wolters, 2003, 2004). These results did not support Chu and Choi's (2005) position that active procrastination is a self-regulatory behaviour and that active procrastinators intentionally delay starting of tasks for adaptive values and positive outcomes. In contrast, these findings concurred with the positive relationship between procrastination and the performance-avoidance goal (McGregor & Elliot, 2002) and the work-avoidance goal (Blunt & Pychyl, 1998; Clark & Hill, 1994; Ferrari, 1991; Ferrari & Tice, 2000; Wolters, 2003, 2004). These findings suggest that similar to the traditional academic procrastination, active procrastination is a self-handicapping behaviour (Ferrari, 1992, Ferrari & Tice, 2000; Ommundsen, 2001; Rhodewalt, 1994; Wolters, 2004).

Motivation orientation

In the aspect of motivation orientations, Chu and Choi (2005) did not find a significant difference to support the hypothesis that 'non-procrastinators would exhibit higher intrinsic motivation than both types of procrastinators' (p. 258). However, Chu and Choi took this non-significant finding as an indication that active and non-procrastinators are similar without explaining why active procrastinators were equally motivated when compared to non-procrastinators. Unfortunately, this serious limitation was ignored and their unconfirmed hypothesis was used subsequently as an empirical support. In their follow-up study, Choi and Moran (2009, p. 197) stated that:

When confronted with last-minute time pressure, active procrastinators tend to enjoy the feeling of being challenged, which results in increased motivation (Chu & Choi, 2005). Active procrastinators seem to prefer pressure and thus are motivated by both an intrinsic need to deal with challenge and external demands to complete the task on time. (Deci & Ryan, 1985)

The association between active procrastination and intrinsic motivation suggested by Chu and Choi (2005; Choi & Moran, 2009) was not supported by the findings of their own study or by the present results. In the present study, active procrastinators reported the lowest level of intrinsic motivation among the three groups, suggesting that they were the least motivated to study for the reasons such as challenge, curiosity and mastery in the class. In addition, their appreciation of the class as an interesting, important, and useful course was significantly lower than non-procrastinators. With little support of intrinsic motivation and appreciation of importance of the class, it is not a surprise that their test anxiety was significantly higher than non-procrastinators, and actually the highest among the three groups. These results correspond to the above discussion of the correlates of motivation and behaviour associated with self-efficacy and the achievement goals, and are also consistent with the prior research that a higher incidence of procrastination among students who viewed a task as aversive or unimportant tended to express greater amounts of anxiety or fear of failure at a task (Clark & Hill, 1994; Lay, 1994; Onwuegbuzie, 2004; Schouwenburg, 1992; Solomon & Rothblum, 1984).

The characteristics of active procrastinators found in the present study support Howell and Watson's (2007) observation that students who procrastinate due to self-regulation failure are relatively unmotivated toward distant tasks. The fact that active procrastinators were not different from passive procrastinators in intrinsic motivation, extrinsic motivation, task value and test anxiety in the present study suggests that active procrastinators did not possess adaptive motivational and affective values conducive to learning (Pintrich, 2000; Wolters, 2003; Zimmerman, 2008). Just as Senecal et al. (1995) observed, the present results suggest that less autonomous forms of academic self-regulation are associated with less persistence, negative emotions and inconsistency between attitudes and behaviours, and all these factors lead to procrastination. These results disproved the assumed positive association between active procrastination and desirable motivation (Chu & Choi, 2005), and the speculation that procrastination may lead to increased motivation among active procrastinators (Choi & Moran, 2009).

Learning strategy and test performance

Regarding learning strategy, the present results yielded strong support for the hypotheses that both active procrastinators and passive procrastinators would use less learning strategies than non-procrastinators, and that both types of procrastinators would not differ on this dimension. These results corroborate the prior research that students' motivation and the extent to which they procrastinated were significantly associated with learning strategies (Howell & Buro, 2009; Pintrich, 2000; Winne & Hadwin, 1998; Zimmerman, 2008). Considering the similarities between active and passive procrastinators in maladaptive motivational beliefs and orientations, it is not a surprise that the two procrastinator groups shared a significant lower use of the cognitive (rehearsal, elaboration and organisation), metacognitive

(self-regulation, such as planning, monitoring and regulating) and resource management (time and environment management, effort regulation and help-seeking) strategies than non-procrastinators. Both active and passive procrastinators also shared the deficiency in using these strategies to manage their efforts and regulate their learning.

These results are consistent with VanZile-Tamsen and Livingston's (1999) observation that an unmotivated student may be less likely to exert strategic effort. They disagree with Chu and Choi's (2005) suggestion that active procrastinators would be different from passive procrastinators in strategy use because of their task-oriented goals and external reference for motivation. These results also corroborate the association of procrastination with maladaptive motivation and lower cognitive and metacognitive strategy usage (Ferrari & Tice, 2000; Howell & Watson, 2007; Milgram et al., 1992; Steel, 2007; Wolters, 2003). More importantly, they demonstrate that active procrastinators were similar to the traditional passive procrastination in low levels of self-regulation of effort and management of time and learning environment (Senecal et al., 1995; Pintrich, 2000).

Contrary to Chu and Choi's (2005) finding that active procrastinators reported a significantly higher grade point average (GPA) than passive procrastinators, the present study did not find a significant difference in test performance between active and passive procrastinators. The contradictory results regarding student academic performance between Chu and Choi's (2005) and the present study might be explained by how academic performance was measured in each study. While students' actual performances on the four tests were used in the present study, self-reported GPA was used to measure academic performance in Chu and Choi (2005) study. Self-reported GPA has been viewed as a questionable measure of academic performance in education research (Coutinho, 2007). Without verification, participants may have reported inflated or inaccurate GPAs. Therefore, self-reported GPAs may not be accurate measures of actual earned grades; or reflect student learning, ability, persistence and achievement that actual grades reflect (Kuncel, Credé, & Thomas, 2005). Furthermore, due to the GPA being cumulated across academic subject areas and over semesters, it provides an overall academic standing for students rather than an accurate measure of academic performance in a class. This reflects the chronic concern with the appropriate grain size in the measurement of academic ability and performance in SRL (Pintrich, 2004). Perhaps the deleterious consequences of procrastination on academic performance are cumulative, or are limited to the students who need treatment on procrastination (Ferrari, Johnson, & McCown, 1995). However, the discrepancy noted between present results and Chu and Choi's (2005) finding indicates a need for further research on the impact of procrastination on academic performance (Pychyl et al., 2000). More specifically, how and when procrastination affects students' academic performance on specific tasks at the course level, as well as at the overall level of their academic performance.

Unexpectedly, two procrastinator groups did not perform significantly lower on the tests than non-procrastinators. This finding corroborates the correlation results of the present study that test performance is not related to academic or to active procrastination. These results speak to the mixed findings of the previous research regarding the relationship between procrastination and academic performance. On the one hand, the present results are contrary to the findings of the negative impact of procrastination on academic performance (Jiao et al., 2011; Muszynski &

Akamatsu, 1991; Rothblum et al., 1986; Solomon & Rothblum, 1984; Tice & Baumeister, 1997; Tuckman, 1991; Wang & Englander, 2010). On the other hand, these results are consistent with the observations that there was no relationship between procrastination and students' course grades (Ferrari, 1992; Pychyl et al., 2000; Schraw et al., 2007; Solomon & Rothblum, 1984). Again, the present results call for additional research to explore the complex relationships among motivation, learning strategy, and academic performance in relation to procrastination, and particularly the influence of procrastination on academic performance.

Conclusion and future directions

The present study used a SRL perspective (Pintrich, 2000; Zimmerman, 2008) to examine a recently-developed notion of active procrastination (Chu & Choi, 2005). Contrary to Chu and Choi's (2005, p. 262) suggestion that active procrastination 'may actually enhance the well-being and performance' and be 'beneficial or even necessary' for university students, the present results demonstrated that active procrastinators mostly possessed undesirable motivational and behavioural characteristics that were not conducive to a self-regulated approach to learning (Howell & Buro, 2009; Pintrich, 2000; Senecal et al., 1995; Steel, 2007; Wolters, 2003). The present results questioned the notion (Chu & Choi, 2005) that active procrastinators were qualitatively different from passive procrastinators in motivation and strategy use, and raised a serious concern about the construct validity of active procrastination.

The present study extended Wolters' (2003) research and investigated active procrastination (Chu & Choi, 2005) from a SRL perspective. At the same time, the present study also suffered from similar limitations of the correlational design. The present results assumed that procrastination resulted from students' achievement goals, motivation orientation, and use of learning strategies. However, the observed relations could be reversed. It may be that students adopted a performance-avoidance, work-avoidant orientation or experienced lowered self-efficacy after repeated episodes of procrastinating and failing to do well on the tests in the class. This ambiguous relation also applied to students' use of cognitive and metacognitive strategies. It may be that students who used fewer metacognitive strategies failed to plan the time needed to complete tasks. In contrast, it may be that students who put off getting started on their school work had to use strategies less often because their study time was limited. Consequently, it was unclear if procrastination should be viewed as a result of or an influence on the motivational beliefs and learning strategies examined in this study. Additional research is needed to identify characteristics of motivation, affect and behaviours of successful and unsuccessful procrastinators in order to resolve the conflict between these views.

In addition, the present study was limited to a relatively small sample observed in one subject area for a short period of time. Studies with larger samples in different subject areas, grade levels and task-specific contexts would generate more insights in consequences of procrastination among students. In particular, further evidence is needed to clarify the complex relationships of self-efficacy with other important variables such as academic ability and motivation, and their compound effects on task initiation, self-regulatory efforts and academic performance (Bandura, 1997; Ferrari, 1992; Pychyl et al., 2000). For instance, future research needs to identify under what conditions low self-efficacy would become motivation for stu-

dents to start earlier and work harder, rather than an excuse to procrastinate or even give up on a challenging task; and to find effective ways to help the students with high efficacy but low motivation (Schraw et al., 2007) to avoid failure in self-regulation of their learning.

Procrastination is likely to remain prevalent among students in the near future. Continuous research is needed to better understand the causes of procrastination and reduce this extensive and harmful phenomenon (Steel, 2007). A key to advance the discussion about the nature of procrastination and differentiation of active procrastination from passive procrastination is to produce direct evidence that procrastination is adaptive to learning. One way to achieve this purpose is to identify the procrastinators who are successful in managing their learning process and achieving superior academic performances; and then examine differences in the beliefs and behaviours of these successful procrastinators as compared to unsuccessful procrastinators and non-procrastinators. However, before replicable evidence is produced to support active procrastination as conducive to learning, it is prudent to implement strategies and interventions to curtail this wide-spread behaviour among the students and delay the encouragement for students to embrace procrastination in learning.

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Appendix A

Sample test items

An example of a recall and recognition question was:

Information in the _____ lasts about only a few seconds unless encoded:

- (A) Sensory register
- (B) Working memory
- (C) Short-term memory
- (D) Long-term memory

A sample application question was:

A math teacher strongly stresses individual responsibility in learning. She has students each set a weekly goal of the number of problems they can complete and explain. She encourages them to gradually increase the difficulty of the problems, and she emphasises their progress. This example is illustrating the teacher's attempt to:

- (A) Display the model for effective direct instruction
- (B) Increase her students' self-efficacy in math
- (C) Emphasise performance goals
- (D) Fulfil her students' deficiency needs