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Trait procrastination, self-efficacy and achievement goals: the mediation role of boredom coping strategies

Mingming Zhou and Chester Chun Seng Kam
Faculty of Education, University of Macau, Taipa, Macau

ABSTRACT
Limited research has examined the mediational role of coping strategy in students’ motivation and procrastination. In this study, we examined the relationships among self-efficacy, achievement goals, boredom coping strategies and procrastination with 506 Chinese college students. Data were collected via questionnaires. Structural equation modelling results showed that both self-efficacy and approach goals significantly predicted approach-oriented coping strategies, and avoidance goals significantly predicted avoidance-oriented coping strategies. Among the different types of boredom coping strategies, only behavioural avoidance coping strategy significantly predicted procrastination. Hence, the mediating link was only found between avoidance goals, behavioural avoidance coping strategy and procrastination. Implications of the mediating role of behavioural avoidance coping strategy in the goal-procrastination relationship were further discussed.

Procrastination has typically been defined as a trait or behavioural disposition to postpone performing a task or making decisions (Milgram, Mey-Tal, & Levison, 1998). It has been studied as a trait variable, along with other traits, such as motives, affect and personality in past literature (Van Eerde, 2003). Past genetic (Arvey, Rotundo, Johnson, & McGue, 2003) and longitudinal (Elliot, 2002) research has suggested that procrastination is sufficiently stable to be treated as a trait. Its cross-temporal and situational stability also shows consistent relations with other traits including weak impulse control, lack of persistence, lack of work discipline, lack of time management skill and the inability to work methodically (Steel, 2007). Hence, a trait-based approach to understand procrastination would allow us to see stable levels of procrastination across time, tasks and contexts. It should be noted that trait procrastination may differ from state procrastination: state procrastination is concerned with task-specific avoidance behaviour, such as doing homework, or submitting assignment; whereas trait procrastination is concerned with the tendency to postpone what is ought to be done to reach goals (Schouwenburg, 2004). Hence, caution is needed in presuming similar results would be found with daily or chronic types of procrastination.

Engagement in procrastinatory behaviour has been found to be pervasive among college students (O’Brien, 2002), with psychological and behavioural consequences such as
difficulties in managing everyday commitments (Pychyl & Flett, 2012), negative well-being (Sirois, Melia-Gordon, & Pychyl, 2003), allocation of inadequate time for work (Morford, 2008), and poorer academic performance (Akinsola, Tella, & Tella, 2007; Tuckman, 2002). A range of factors has been identified in the literature that is related to procrastination. These factors were well summarised and categorised in Steel’s (2007) meta-analytic review: individual differences, task characteristics, outcomes, and demographics. In this study, we focused on the individual differences category because these variables have been listed in prior literature as main reasons for procrastination behaviour (Alexander & Onwuegbuzie, 2007; Brownlow & Reasinger, 2000). Within this category, individuals’ personal characteristics, including their perceptions, beliefs, motives, emotions and behavioural regulation are typically captured. Avoidance-oriented achievement goals (Howell & Watson, 2007), low self-efficacy (Pfister, 2002) and avoidance coping strategies (Sirois & Pychyl, 2002) have all been found to be positively related to procrastinating behaviours. Given that these variables have been proved to play a role in one’s state procrastination behaviour, in this study, we attempted to examine achievement goals, self-efficacy, coping strategies in Chinese college students’ procrastination at a trait level.

Literature review

Despite a large body of research on the causes, correlates and consequences of procrastination over the last 40 years (Klingsieck, 2013), scholars continued their effort to investigate this construct and proposed theoretical models for understanding and managing procrastination. Many scholars take procrastination as a self-regulation failure (Rebetet, Rochat, Barsics, & Van der Linden, 2016), involving characteristics such as low achievement motivation and poor coping styles. This invokes concepts central to self-regulated learning (SRL) models. SRL refers to students’ active participation in learning by setting goals, monitoring and controlling their cognition, motivation and behaviour to achieve the goals (Pintrich, 2000; Zimmerman & Schunk, 2011). Self-regulated learners are characterised by approach-oriented goal adoption (Duffy & Azevedo, 2015), strong and positive beliefs in themselves to achieve these goals (Schmitz & Wiese, 2006), and intentional effort to manage and cope with complicated learning situations (Kauffman, 2004). All these characters point to a lack of tendency to procrastinate. However, the examination of procrastination has only occasionally been extended to variables emphasised in SRL models (e.g. Rebetet et al., 2016; Schouwenburg, 2004; Strunk & Steele, 2011). In the current study, we examined procrastination in relation to three SRL variables: achievement goals, self-efficacy, and coping strategies, covering both motivational and behavioural aspects of SRL. To our knowledge, this study would be the first empirical investigation that examines these factors in the prediction of procrastination under the umbrella of SRL, and delineates the intricate relationships among them based on prior literature. The results would provide insight to understand the types of motivators and behaviours associated with trait procrastination and how it may be reduced.

Motivational predictors of procrastination

Motivation has long been recognised as an important contributor to procrastination, in that a lower level of motivation may increase the likelihood of procrastination by making the
task seem less engaging or personally useful and thus more aversive (Steel, 2007). Previous studies mainly focused on the relationship between intrinsic motivation (vs. extrinsic motivation) and procrastination. By and large, intrinsic motivation was found to reduce procrastination for specific academic tasks (Rakes & Dunn, 2010), whereas extrinsic motivation led to a greater tendency to delay schoolwork (Senécal, Koestner, & Vallerand, 1995). However, it is important to note that motivation is not limited to intrinsic and extrinsic motivation; it also incorporates approach-avoidance motivation. Recent studies on achievement goals exemplify this point by expanding the original competence (i.e. mastery-performance) dimension by proposing a valence (i.e. approach-avoidance) dimension. As Elliot and Thrash (2002) argued, the approach-avoidance distinction ‘is fundamental and integral to the study of affect, cognition, and behaviour (p. 804)’. The inclusion of avoidance goals would allow a more complete depiction of the manner in which goals affect procrastination behaviour. As a further extension of the 2 × 2 goal model above, Elliot, Thrash, and Murayama (2011) proposed a 3 × 2 goal framework wherein three basic evaluative standards were identified: task goals, as a refinement of the original mastery goals; other goals, as a refinement of the original performance goals; and self goals, which focus on personal development by learning. In conjunction with the approach-avoidance valence, the 3 × 2 goal model consists of six dimensions of achievement goals.

Several studies have documented that different types of achievement goals within the 2 × 2 goal model affect procrastination in different ways. For example, procrastination was found to have a negative correlation with mastery-approach goals but a positive correlation with mastery-avoidance goals (Howell & Buro, 2009; Howell & Watson, 2007). The results concerning the performance-approach goals were rather mixed, with various studies finding no correlation (McGregor & Elliot, 2002, Study 2; Wolters, 2004), a positive correlation (Wolters, 2003) and a negative correlation with procrastination (Scher & Osterman, 2002). Performance-avoidance goals have been shown to have no correlation with procrastination (Howell & Watson, 2007). Despite the differences in the sampling and research methods across these studies, their inconsistent findings could also stem from the complexity of the goal variables in the examined relationships. In other words, the correlation patterns may be confusing due to the strong correlations among different types of goals. Therefore, it could be more feasible to examine the relationships between goals and other variables at a higher conceptual level by combining goals that share one dimension (e.g. valence or competence dimension) to reduce the complexity of the role of achievement goals in explaining human intentions and behaviour. With the growing number of goal types as depicted in the 3 × 2 model, this reduction in complexity seems even more applicable. Because no studies have been conducted with the 3 × 2 goal model and the avoidance dimension and procrastination share the conceptual basis of ‘avoiding’, we sought to focus this issue on the valence (i.e. approach-avoidance) dimension alone to obtain a clearer correlation pattern between goals and procrastination through this process of simplification.

Self-efficacy, as another motivational variable of learning (Klassen et al., 2010), captures the subject’s beliefs in his or her ‘capabilities to mobilise the motivation, cognitive resources, and courses of action needed to meet given situational demands’ (Wood & Bandura, 1989, p. 408). Given the critical role of self-efficacy in the initiation and completion of behaviour (Wolters, 2003), it comes as no surprise that many researchers have attempted to establish a link between self-efficacy and procrastination. Students with higher levels of self-efficacy exhibit lower levels of procrastination (Klassen, Krawchuk, Lynch, & Rajani, 2008; Klassen &
Kuzucu, 2009; Steel, 2007). In other words, the more self-efficacious a person feels, the less likely he or she will procrastinate. Most studies on the link between self-efficacy and procrastination have targeted domain-specific efficacy, such as reading and writing. However, self-efficacy can also operate at a general level that is relatively stable over time and across domains of functioning (Scheier & Carver, 1992). Because experiences in various domains of functioning may generate more generalised beliefs of self-efficacy (Bosscher & Smit, 1998), general self-efficacy has great utility for explaining behaviour in less specific contexts (Luszczynska, Gutiérrez-Doña, & Schwarzer, 2005). For example, using a global measure of efficacy expectations, Tuckman (1991) and Ferrari, Parker, and Ware (1992) found a significant negative relationship between efficacy beliefs and procrastination in a sample of college students, that is, a lower degree of efficacy was related to a greater level of procrastination. This efficacy-procrastination relationship showed that subjects who reported wasting of time and avoidance of deadlines typically doubted their own capabilities in performing tasks in life.

**Behavioural predictors of procrastination**

Schouwenburg (2004) noted that procrastination is associated with the adoption of a systematic and disciplined approach to one's study or work. Given that aversive or boring tasks have been identified as an important trigger for procrastination (Ackerman & Gross, 2005; Kachgal, Hansen, & Nutter, 2001; Strongman & Burt, 2000), strategies for coping with boredom are quite relevant to procrastination. Nett, Goetz, and Daniels (2010) proposed four different styles of coping with boredom along two dimensions: the approach-avoidance and cognitive-behavioural dimensions. **Cognitive approach** strategies involve changing one's perception of the situation, but not the situation itself. For instance, a student reminds himself that the math project still needs to be finished because it is important to maintain a high overall math grade, even though he finds the project itself very boring. This reminder may not change the situation (i.e. finishing the project) but it can change his perception of the task as a means of diminishing the feelings of boredom. **Behavioural approach** strategies, on the contrary, involve an attempt to change the actual boring situation by taking action. In the example above, if the student manages to convince his math teacher that he should be exempted from finishing the project, he will have successfully changed the situation and remedied his boredom. **Cognitive avoidance** strategies are concerned with occupying one's mind with something irrelevant to the task on hand. Again, in the example above, if the student tries to avoid his boring math project by thinking about the exciting results of a soccer game last week, he may also avoid his feelings of boredom, although the task to be finished will not disappear. **Behavioural avoidance** strategies are applied when the subject distracts himself from boring situations by doing something else. This is exemplified in a case in which the student in the scenario above diverts his attention from the boring math project to watch a soccer game on television.

By changing the perceived value or usefulness of the task or transforming the task into something valuable, individuals with approach coping schemes tend to see the need to accomplish the task. If individuals resort only to other means that are irrelevant to the task itself, they are more likely to postpone task completion, because the means they adopt have nothing to do with the task. Several researchers have argued that boring activities cannot always be avoided, but they can be combated by seeking interest and meaning in the
activities (Green-Demers, Pelletier, Stewart, & Gushue, 1998; Rana, 2007). Hence, both from a theoretical standpoint and from empirical evidence, cognitive approach strategies may be the most beneficial for reducing boredom, followed by behavioural approach strategies, and avoidance coping is probably the least beneficial in reducing boredom (Nett et al., 2010).

Nonetheless, empirical studies showed that the relationship between cognitive strategy use and procrastination was less clear than expected. Howell and Watson (2007) found that self-reported use of cognitive learning strategies was a strong predictor of procrastination even after controlling for motivational trait variables, such as achievement goal orientations (i.e. mastery approach and mastery avoidance orientations). However, Wolters (2003) observed that the relation between cognitive strategy use and procrastination disappeared when work avoidance goal orientation and self-efficacy were introduced as additional predictors of procrastination. Burns, Dittmann, Nguyen, and Mitchelson (2000) even found a negative correlation of procrastination with avoidant coping. Given the somewhat inconsistent results, it is necessary to put in the effort to further examine this theoretically reasonable relationship between cognitive strategy use and procrastination once again.

Mediating role of coping strategy in the motivation-procrastination relationship

Theoretically, one’s goal orientations would influence his or her coping styles, because the conceptualisation of goal orientations by valence (approach vs. avoidance) suggests the way individual cope with aversive/boring situation (Elliot & Church, 1997). Individuals with approach goal orientations would foster direct tackling of the task, or approach coping (Moneta & Spada, 2009), and actively find means to resolve the situation (Skinner, Edge, Altman, & Sherwood, 2003), whereas individuals with avoidance goal orientations would intentionally prevent engaging themselves in, and even keep themselves away from, the same potentially anxiety/boredom inducing situations (Elliot & Church, 1997). Past studies provided empirical evidence for these arguments. For example, avoidance goals were positively linked with avoidance coping (Elliot et al., 2011), whereas approach goals were positively related to approach coping (Johnson & Nussbaum, 2012).

Further, self-efficacy reflects one’s confidence in carrying out a given action (Bandura, 1997). Stressing situations are much less threatening to those with higher levels of self-efficacy because they tend to believe that they can maintain the performance level despite the presence of stressors (Jex, Bliese, Buzzell, & Primeau, 2001). The choice of coping strategies depends on the appraisal of situation (Moneta & Spada, 2009). As such, individuals will be more likely to adopt adaptive coping strategies when they appraise the situation as challenging yet manageable, and maladaptive coping strategies when the situation is appraised as threatening. Based on these logical reasons, individuals with higher levels of self-efficacy would use approach coping strategies to actively resolve the stressing situation. Empirical studies in the past also lent support for these claims. For example, self-efficacy was found to be positively associated with approach coping (Lyrakos, 2012), but negatively with avoidance coping strategies (Friedel, Cortina, Turner, & Midgley, 2007).

One way of avoiding a situation is to procrastinate, such that the individual does not need to confront a potential threat at the present moment. Avoidant copers typically prefer to avoid or distract themselves from threatening situations (Krohne, 1993). When individuals react with such an avoidance response, procrastination occurs (Van Eerde, 2000). In Van Eerde (2000) model of procrastination, a person’s avoidant coping style was identified as a
personal attribute that determined procrastination. Prior research provided empirical evidence to this relationship. For example, in a study of undergraduate students, Sirois and Pychyl (2002) found that procrastination in undergraduate students was moderately positively related to avoidant coping strategies. Similar results were found in another study of primary school teachers (Verešová, 2013). Chu and Choi (2005) further reported that students’ self-efficacy, intrinsic and extrinsic motivation did not relate to procrastination, but avoidance coping styles did. This seems to further suggest that motivation might not be directly related to procrastination, but indirectly related via a third construct. Therefore, in line with this reasoning, we conceptualised coping styles to be a mediator in the relationship between goal orientations and procrastination.

**Present study**

The present study was carried out for three considerations. First, procrastination, detrimental to students’ academic performance, has been believed to become a lifestyle behaviour for an increasing number of students (Madhan et al., 2012), rather than a transitory phenomenon that only occurred in selected academic and life events (Elliot, 2002). More researchers have found that trait procrastination was a strong predictor of students’ dilatory behaviours (Lay & Schouwenburg, 1993) and lower academic achievement (Schouwenburg & Lay, 1995). Although the above literature review presented a prolific body of research that has explored different possible correlates to procrastination at a state level. Moderate overlaps have been observed, however, between state and trait procrastination in past literature (Lay, 1986; Milgram et al., 1998; Milgram & Naaman, 1996), and the possession of trait procrastination would increase the probability of the occurrence of state procrastination in a variety of instances (Owens, Bowman, & Dill, 2008). As such, the studies of state procrastination would
inform the studies of trait procrastination in significant ways, and provide empirical ground-
ing for our hypotheses.

Second, as Solomon and Rothblum (1984) pointed out, procrastination is not simply a
deficit of study or work habits and time management; it also involves a complex interaction
of affective, cognitive and behavioural elements. As there are few studies that have examined
their combined role in explaining procrastination, this research helps better inform our
understanding of the nature of procrastination by highlighting the role of achievement
motivation, coping strategies and personal beliefs in defining procrastination behaviour.
The aspects of motivation that are most relevant to procrastination and their interaction
with other variables that co-define procrastination beg answers.

Last, to meet the call from Lee, Kelly, and Edwards (2006) for studies to use structural
equation modelling (SEM) to help eliminate ‘third variable’ explanations, we performed SEM
to evaluate how well the critical variables of goals, self-efficacy and coping mechanisms are
relevant to procrastination behaviour. We hypothesised that coping strategies would fully
mediate the relationship between motivational variables and procrastination. Most previous
studies have only tested the direct effects between motivation and procrastination, without
including other possible factors. Therefore, the mediation model has not been verified. It is
important to test whether the effect of motivation on procrastination is fully or partially
mediated by coping strategies so that we can better understand the role of motivation as a
predictor.

Based on the argument above, we aim to provide a preliminary test of the hypotheses
within a cross-sectional design for two purposes: (a) to replicate the same cross-sectional
design as in most studies in this area such that results could be compared and contrasted
(e.g. Howell & Watson, 2007; Van Eerde, 2004; Wolters, 2003); and (b) to form the basis of
conceptualising and designing the necessary experimental and longitudinal studies in the
future (Kraemer, Yesavage, Taylor, & Kupfer, 2000). Thus, in the absence of experimental data,
the main goal of this study was to provide a cross-sectional test of a model integrating
motivation, coping strategies and procrastination such that we could obtain a rough estimate
of the most likely direction of causality.

We proposed coping strategies to be a mediator in the relationship between motivation
and procrastination based on two lines of arguments: (a) research suggests that one’s goal
orientations and self-efficacy are important parameters of one’s coping strategies in face of
a stressor (Skinner et al., 2003), and coping strategies has been repeatedly proved to be one
of the most powerful determinants of procrastination (Steel, 2007); and (b) coping strategies
have been found to mediate the relationship between motivation and approaches to
studying in past studies (Moneta & Spada, 2009) and students’ self-efficacy, intrinsic and
extrinsic motivation did not directly relate to procrastination, but avoidance coping styles
did (Chu & Choi, 2005). As such, we predicted that coping strategies would be the explanatory
mechanism that mediates the relationship between motivation (achievement goals and
self-efficacy) and trait procrastination.

Specifically, we hypothesised that avoidance goals would predict avoidance coping
schemes at both behavioural and cognitive levels because they all emphasise the avoidance
of undesirable outcomes (H1 and H2). Along a similar vein, approach goals were expected
to predict the approach coping schemes at both behavioural and cognitive levels, based on
the common core concept of doing, thinking and planning something to achieve the desired
outcome (H3 and H4). Classic studies have shown that self-efficacy is a significant predictor
of approach behaviour (Bandura, Adams, & Beyer, 1977; Barrios, 1983), therefore, we hypothesized that self-efficacy in general would predict behavioural and cognitive approach coping strategies (H5 and H6). Because boredom is related to procrastination (Blunt & Pychyl, 1998; Vodanovich & Rupp, 1999) by emphasising how unpleasant or unenjoyable a task could be (Blunt & Pychyl, 2000), we hypothesised that cognitive approach and behavioural approach strategies would negatively predict procrastination (H9 and H10), whereas behavioural and cognitive avoidance coping strategies would positively predict procrastination (H7 and H8). Hence, along this line of research, coping strategies were expected to act as mediators of the relationship between motivation and procrastination. The proposed model is illustrated in Figure 1.

**Methods**

**Participants**

The recruitment of participants in this study took place in two different cities in Mainland China. A convenience sample of 199 students was recruited from a public college in northeastern China. Of these students, 20.6% were male undergraduates, and the mean age of the entire cohort was 20.58 years (SD = .80). The questionnaires were administered to the participants as a group during regular classroom periods under the supervision of the research assistant. The purpose of the study was explained, and the participants were informed about the importance and voluntary nature of their participation. Informed consent was obtained before the questionnaire began. Another convenience sample of 307 students was recruited from a public university in southern China. Of these students, 45.3% were male undergraduates, and the mean age of the entire cohort was 20.19 years (SD = 1.51).

**Measures**

**Self-efficacy**

We used 10 items from the Chinese version of General Self-Efficacy Scale (Zhang & Schwarzer, 1995) to assess the subjects’ generalised beliefs about self-efficacy across situations on a 5-point Likert scale ($M = 3.42$, $SD = .52$, $\alpha = .85$). The Chinese version of the scale has shown good validity and reliability in previous studies (e.g. Chan, 2002, 2007).

**Achievement goals**

The Achievement Goal Questionnaire in Chinese was used to assess the students’ types of goal orientation in class with a 7-point Likert scale. It assessed six different types of achievement goals, task-approach ($M = 4.87$, $SD = 1.43$, $\alpha = .77$), task-avoidance ($M = 4.64$, $SD = 1.44$, $\alpha = .74$), other-approach ($M = 4.44$, $SD = 1.56$, $\alpha = .84$), other-avoidance ($M = 4.55$, $SD = 1.53$, $\alpha = .79$), self-approach ($M = 4.86$, $SD = 1.46$, $\alpha = .83$) and self-avoidance goals ($M = 4.66$, $SD = 1.46$, $\alpha = .73$), with two items in each subscale.

**Boredom coping**

The Chinese version of the Boredom Coping Scale (Tze, Daniels, Klassen, & Li, 2013) was used with a 5-point Likert scale to assess four categories of coping with boredom (with three items each): cognitive-approach ($M = 3.32$, $SD = .81$, $\alpha = .78$), behavioural-approach ($M = 2.86$, $SD = .83$, $\alpha = .80$), cognitive-avoidance ($M = 3.01$, $SD = .80$, $\alpha = .80$) and behavioural-avoidance ($M = 2.37$, $SD = .78$, $\alpha = .80$).
SD \( = .79, \alpha = .68 \), cognitive-avoidance \( M = 3.24, SD = .81, \alpha = .81 \) and behavioural-avoidance \( M = 3.13, SD = .82, \alpha = .78 \). This scale has shown adequate reliability and validity in previous studies (e.g. Tze et al., 2013).

**Procrastination**

To assess procrastination \( M = 2.98, SD = .75, \alpha = .83 \) on the trait level, we used the six items with the highest factor loadings in the factor analysis of the pure procrastination scale performed by Steel (2010) and translated them into Chinese following a standardised back-translation procedure (Brislin, 1970). Previous studies have indicated that this measure is reliable and valid (e.g. Corkin, Yu, Wolters, & Wiesner, 2014).

**Analysis strategy**

The proposed theoretical model (see Figure 1) was tested with SEM using the programme R 3.1.0 (R Development Core Team, 2012) with the lavaan library (Rosseel, 2012). Robust
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Maximum likelihood estimation was used because the estimator allows a certain degree of violation of multivariate normality. The fit of the model was assessed by consideration of the model’s chi-square ($\chi^2$) value, root mean square of error approximation (RMSEA), and fit indices, i.e. the comparative fit index (CFI), and the Tucker-Lewis index (TLI). For the CFI and TLI, values greater than .90 indicate acceptable fits. In addition, standardised root mean square residual (SRMR) and RMSEA values of .10 or lower represent an acceptable model fit (Fan & Sivo, 2005; Kline, 2005). Before SEM analysis, missing responses were found in two participants and they were excluded from the analyses. In addition, we tested for possible differences in item factor loadings of the items and model regression paths between the two samples. No significant differences were found (details can be referred to the Results section). Therefore, we collapsed both samples together in the subsequent analyses.

We first tested the psychometric properties of the scales by conducting a confirmatory factor analysis (CFA). Because SEM cannot easily handle a model with too many indicators, we randomly parcelled the item indicators for the self-efficacy scale and procrastination scale. Three parcels were formed for each of the two constructs because at least three observed indicators are recommended in each latent construct for stable results (Kline, 2005), resulting in the indicator-to-participant ratio to be approximately 1:21. The approach goals and avoidance goals each had three indicators to represent the three subtypes of goals, i.e. task, other and self. In addition to loading on its own latent construct, each approach subtype (task, other and self) was allowed to covary with its corresponding avoidance subtype (task, other and self) to capture the domain specificity for each subtype. (That is, the task approach and task avoidance goals may be correlated due to the similarity of their content, and so on for each subtype.) These covariances are necessary in the model to avoid contamination of the meaning of the latent constructs (i.e. approach and avoidance goals) with the domain-specific content from the items (see Cole, Ciesla, & Steiger, 2007, for the consequences of failing to include these design-driven covariances in biasing parameter estimates). Each of the four coping strategies (cognitive approach, behavioural approach, cognitive avoidance and behavioural avoidance) was measured by its three item indicators, and no parcelling was needed. All latent constructs were allowed to covary with the others in the CFA (see Figure 2). After the CFA, we tested our hypothesised model by specification of the structural paths among the latent constructs.

**Results**

**Potential differences between two samples**

Chen (2007) recommended comparing factor loading invariance and non-invariance models and examined changes in fit indices to examine the potential differences between two independent samples. Factor loading invariance was supported when the following criteria were fulfilled: $\Delta$CFI $\leq$ −.010, supplemented by either $\Delta$RMSEA $\leq$ .015 or $\Delta$SRMR $\leq$ .010. In the current data-set, factor loading invariance was successfully fulfilled between our two Chinese samples: $\Delta$CFI = −.003, $\Delta$RMSEA = .001, and $\Delta$SRMR = .003. In the subsequent analyses, we examined any potential differences in the regression paths between the two samples, none was found to be significantly variant in terms of the magnitude of the regression paths, $\Delta\chi^2 = 16.48$, $\Delta$df = 13, $p = .22$. Therefore, we collapsed both samples in subsequent analyses.
Before we conducted the scale validation and model testing, the correlations among all the variables were examined (see Table 1). Results showed that all the variables were weakly to moderately correlated, ranging from −.13 to .84, thus minimised the concern for multicollinearity (Kline, 2005). We first conducted CFA to test the factor loadings of the items. The fit of the model was good ($\chi^2 = 346.00; \text{df} = 221; p < .001$; TLI = .97; CFI = .97; RMSEA = .03 with a confidence interval [CI] of .03 to .04; SRMR = .04). The factor loadings were substantial (see Table 2), implying that the scales were suitable for subsequent analysis.

**Measurement model testing**

Before we conducted the scale validation and model testing, the correlations among all the variables were examined (see Table 1). Results showed that all the variables were weakly to moderately correlated, ranging from −.13 to .84, thus minimised the concern for multicollinearity (Kline, 2005). We first conducted CFA to test the factor loadings of the items. The fit of the model was good ($\chi^2 = 346.00; \text{df} = 221; p < .001$; TLI = .97; CFI = .97; RMSEA = .03 with a confidence interval [CI] of .03 to .04; SRMR = .04). The factor loadings were substantial (see Table 2), implying that the scales were suitable for subsequent analysis.

**Structural model testing**

We then tested our proposed structural model, and the fit remained 496.98; df = 236; $p < .001$; TLI = .94; CFI = .95; RMSEA = .05 [90% CI: .04 to .05], SRMR = .07, see Figure 3). We proceeded to test the link between the types of goals and self-efficacy and the four coping strategies. Approach goals significantly predicted behavioural approach ($b = .13; p = .002; \beta = .22$) and cognitive approach coping strategies ($b = .13; p < .001; \beta = .23$), and avoidance goals significantly predicted behavioural avoidance ($b = .11; p = .001; \beta = .20$) and cognitive avoidance coping strategies ($b = .10; p = .005; \beta = .15$). Self-efficacy was found to significantly predict a behavioural approach ($b = .54; p = .001; \beta = .32$) and a cognitive approach coping strategies ($b = .45; p < .001; \beta = .29$). We then tested the link between the four coping strategies and

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**Table 1. Construct correlations.**

<table>
<thead>
<tr>
<th>Constructs</th>
<th>1</th>
<th>2</th>
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<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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<td>Approach goals</td>
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<td>.84***</td>
<td>–</td>
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<td>Avoidance goals</td>
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<td>–</td>
<td>.14***</td>
<td>–</td>
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<tr>
<td>Self-efficacy</td>
<td>.25***</td>
<td>.15***</td>
<td>–</td>
<td>.29***</td>
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<tr>
<td>Cognitive approach</td>
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<td>.23***</td>
<td>.27***</td>
<td>.31***</td>
<td>–</td>
<td></td>
<td></td>
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<tr>
<td>Behavioural approach</td>
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<td>.14***</td>
<td>.17***</td>
<td>.70</td>
<td>.25***</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Cognitive avoidance</td>
<td>.11*</td>
<td>.15***</td>
<td>.10*</td>
<td>–.05</td>
<td>.33***</td>
<td>.26***</td>
<td>–</td>
</tr>
<tr>
<td>Behavioural avoidance</td>
<td>.04</td>
<td>.14***</td>
<td>–.13*</td>
<td>–.08</td>
<td>.08</td>
<td>.12**</td>
<td>.32***</td>
</tr>
</tbody>
</table>

Notes: $N = 506$. 
* $p < .05$; ** $p < .01$; *** $p < .001$.

**Table 2. Factor loadings (standardised) and correlations in confirmatory factor analysis of main constructs.**

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Factor loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-efficacy</td>
<td>.75, .82, .85</td>
</tr>
<tr>
<td>Approach goals</td>
<td>.84, .94, .71</td>
</tr>
<tr>
<td>Avoidance goals</td>
<td>.87, .89, .76</td>
</tr>
<tr>
<td>Behavioural approach</td>
<td>.68, .64, .61</td>
</tr>
<tr>
<td>Behavioural avoidance</td>
<td>.71, .74, .74</td>
</tr>
<tr>
<td>Cognitive approach</td>
<td>.67, .76, .80</td>
</tr>
<tr>
<td>Cognitive avoidance</td>
<td>.86, .87, .60</td>
</tr>
<tr>
<td>Procrastination</td>
<td>.75, .81, .85</td>
</tr>
</tbody>
</table>

Correlations

| Between task-approach item and task-avoidance item | .53*** |
| Between other-approach item and other-avoidance item | –.15 |
| Between self-approach item and self-avoidance item | .55*** |

Note: All factor loadings were statistically significant at $p < .001$, ***$p < .001$ (for correlation).
procrastination. The only significant predictor was behavioural avoidance coping strategies ($b = .38; p < .001; \beta = .40$); the other three coping strategies did not significantly predict the outcome ($ps > .25$). The model thus suggested that avoidance goals predicted procrastination through behavioural avoidance. Follow-up analyses showed that neither self-efficacy nor approach goals significantly predicted behavioural avoidance coping strategies ($ps > .13$). Therefore, behavioural avoidance coping strategies very likely mediated the relationship between avoidance goal orientation and procrastination, as it was the only mediator with a statistically significant relationship with our theoretically deduced predictor (avoidance goal orientation) and outcome (procrastination).
Discussion

The purpose of this study was to examine the role of coping strategies in the relationship between motivation (i.e. self-efficacy and achievement goals) and procrastination. By and large, the data supported the overall hypothesis that motivational factors were the distal predictors and that a behavioural factor (behavioural avoidance coping strategies) was the mediator of procrastination. Specifically, all of the paths from the achievement goals to the behavioural predictors of procrastination followed the hypothesised directions. In general, in concordance with our expectations, the approach goals were associated with approach behaviour and the avoidance-coping strategies were generally found to have a positive correlation with avoidance motives (H1 to H4). These findings were consistent with previous theories and research on the relationships between coping strategies and approach-avoidance motivation (e.g. Litman, 2006; Moos & Holahan, 2003).

The significant relationship between self-efficacy and behavioural approach coping strategies (H5) aligned with previous results indicating that approach-oriented coping would enhance self-efficacy (Benight, Cieslak, Molton, & Johnson, 2008; Litman & Lunsford, 2009). However, the missing pathway between self-efficacy and cognitive approach coping strategies (H6) highlights the distinction between cognitive and behavioural coping strategies. A re-examination of the concept of general self-efficacy showed that this construct covers two types of efficacy: action self-efficacy and coping self-efficacy (Schwarzer & Renner, 2000; Zhou, 2015). The former concerns the perceived ability to set goals and take initiative, whereas the latter is more concerned with the ability to maintain the effort to achieve goals by recovering from failures. In our view, both action self-efficacy and coping self-efficacy draw more upon the behavioural approach coping strategy than upon the cognitive approach coping strategy by exerting and sustaining effort. This hypothesis, however, deserves further empirical investigation.

Among all types of coping strategies, the use of behavioural avoidance coping strategies was the only significant predictor of procrastination in our model. As Litman and Lunsford (2009) reported, approximately 55% of respondents felt that behavioural avoidance coping made the situation worse. Compared to other types of coping strategies, behavioural avoidance coping strategies are aimed at avoiding the stressor by engaging in another activity to distract the individual from the behaviour he or she wants to escape (Neff, Hsieh, & Dejitterat, 2005). This behavioural disengagement coincides with procrastination in the sense that both involve an attempt at the behavioural level to avoid performing the task. In contrast, mental disengagement (as reflected in the cognitive avoidance coping strategy) did not appear to be a predictor of procrastination.

Consequently, the mediating link between motivation and procrastination was found only in the avoidance-oriented variables. The results showed that avoidance-oriented goals had a positive association with the behavioural avoidance coping strategies of boredom. In turn, behavioural avoidance coping strategies were positively associated with procrastination. In other words, the relationship between avoidance goals and procrastination was strongest in individuals who used the behavioural avoidance coping strategy. One possible explanation for these findings could be that some individuals procrastinate in an attempt to avoid a variety of aversive experiences by engaging in irrelevant behaviour, which is guided by avoidance goal orientations. Support for this notion can be found in a series of studies that suggest that procrastination results from both avoidance motives and avoidance...
coping (Ferrari, Johnson, & McCown, 1995; Urdan & Midgley, 2001; Wiersema, van Harreveld, & van der Pligt, 2012).

**Limitations**

Several limitations should be considered in the interpretation of our findings. The sample was limited in diversity. The participants at the selected college in China typically represented academically weaker groups who suffered from motivational and behavioural problems more than average students. Therefore, it is probably an ideal population in which to study the factors that are related to procrastination. Nevertheless, it will be necessary to examine the current research questions with students with different academic backgrounds to enhance the generalisability of our findings. Furthermore, due to resource limitations, a cross-sectional design was adopted. The cross-sectional nature of the data raises concerns of insensitivity to temporal changes in the variables, ambiguous causal relationships and boosted correlations among variables (Podsakoff & Organ, 1986). Without random assignment and experimental control, we cannot assert that behavioural avoidance coping strategy causes procrastination. The possibility that avoidance goal orientations cause behavioural avoidance coping strategy and in turn causes procrastination is perhaps the most plausible account of our findings. Research into the investigation of the factors that lead to trait procrastination would be strengthened if there were alternative research designs, such as experiments in a well-controlled laboratory settings (Ferrari, 2001) and naturalistic methods to explore procrastination in real life situations (Pychyl, Lee, Thibodeau, & Blunt, 2000), longitudinal examination of procrastination (Tice & Baumeister, 1997), or alternative measurements of procrastination (such as behavioural measures, see Moon & Illingworth, 2005; Steel, Brothen, & Wambach, 2001). Last, the measurement of the constructs in the tested model was all at the trait level, and thus the results might not be able to be applied to specific situations.

**Implications and conclusions**

University students have been found to frequently engage in procrastination behaviour (Rabin, Fogel, & Nutter-Upham, 2011). Each contributor to procrastination demands a very different response, and efforts cannot be made to alter the situation until researchers can more effectively assess procrastination. Krause and Freund (2014) argued that assessment of procrastination by self-report and by behavioural measures would yield different results. Thus, a future study should be conducted to investigate the relationship between various self-reported variables and measures of actual procrastination behaviour (e.g. Rothblum, Solomon, & Murakami, 1986). In addition, a further test of the present model should examine the influence of environmental factors on academic and interpersonal relationship motivations. For example, recent studies have shown that support in autonomy from significant others (i.e. teachers, parents, friends) could enhance self-determined motivation (Hein & Jõesaar, 2015; McEown, Noels, & Saumure, 2014), which consequently could help students to make better choices by prioritising their personal interests and academic tasks as a means to reduce the likelihood of procrastination.

In sum, despite the aforementioned limitations, a mediational model of procrastination was tested and supported by SEM analysis. We believe that our findings outline the
importance of considering motivation and coping mechanisms in explanations of procrastination. As such, it is important that school educators understand important correlates of procrastination and treat it in an effective manner by diminishing avoidance orientation in classrooms.

**Disclosure statement**

No potential conflict of interest was reported by the authors.

**References**


