

Sticks and stones will break my bones but failure feedback may not hurt me: gender differences in the relationship between achievement motive, coping strategies and environmental mastery

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This study investigates the processes through which achievement motivation guides the selection of coping strategies which in turn affects environmental mastery post-failure feedback. Seventy-six college students received failure feedback after completing a professional aptitude test. Findings showed that gender moderated the relationship between Hope of Success (HS) and planful problem-solving coping but not between HS and escape-avoidance coping. No moderated mediation was found when HS was used to predict environmental mastery with gender as the moderator and either planful problem-solving or escape-avoidance coping as the mediator. Simple mediation analyses showed that planful problem-solving did not mediate the relationship between HS and environmental mastery. Instead, higher scores on HS predicted lower use of escape-avoidance coping which in turn predicted higher environmental mastery. Implications for the role of feedback in educational settings are discussed.

Keywords: hope of success motivation; coping strategies; environmental mastery; failure feedback; gender differences

Introduction

Failure feedback, such as receiving poor test grades and criticism about the quality of one's work, is commonplace in school life. While some researchers found a decrease in performance (e.g. Atkinson, 1964), others reported an increase in performance following failure feedback (e.g. Gollwitzer, 1990). This pattern of mixed findings can be explained by individual differences in self-regulatory processes towards task competence in response to failure feedback. Existing literature has described how motivational constructs such as attributions (c.f. Weiner et al., 1971) and theories of intelligence (c.f. Dweck, 1999) guide post-failure feedback achievement strivings. However, little attention has been paid to the study of processes to explain how motivational constructs influence one's level of environmental mastery after receiving failure feedback. The present study aims to provide empirical evidence on the processes through which achievement motivation guides the selection of coping strategies which in turn affects environmental mastery post-failure feedback.

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Weiner et al. (1971) posited that competence-related attributions play a role in guiding subsequent behaviours and motivations following failure. Attributions refer to cognitive representations which are used to explain and interpret the causalities of success and failure (Weiner, 1985). When failure at a competence task is attributed to a lack of ability, the cause is perceived to be internal, stable and uncontrollable. The probability to succeed in future tasks is therefore perceived to be low which in turn decreases task persistence. In contrast, attributing failure to a lack of effort indicates that the cause is internal, stable and controllable. This implies that further action can be taken to remedy the failure outcome which then increases task persistence (Weiner, 1979; Weiner & Kukla, 1970).

The present study offers an alternative framework to study motivational processes that guide psychological states post-failure feedback by moving away from the attribution model and focusing on achievement motives instead. In contrast to attributions, achievement motives orient and drive behaviours on the basis of expectancies brought about by anticipated task success or failure (McClelland, Koestner, & Weinberger, 1989). Motivation theory suggests that need for achievement (nAch) guides post-performance feedback achievement strivings. Specifically, both positive and negative performance feedback have led to better performance in subsequent tasks for individuals who scored high on nAch (McClelland, 1987). This is because performance feedback serves as diagnostic information to arouse achievement-related cognitions and expectancies in individuals who score high on nAch, which in turn guides subsequent behaviours to improve task performance (Fodor & Carver, 2000). In an empirical study to test the association between nAch and the effect of performance feedback, Fodor and Carver (2000) reported that participants with high nAch scores displayed higher levels of creativity following either positive or negative feedback as compared to those who did not receive any feedback.

The present study investigates the processes in which individuals with varying levels of nAch cope with failure feedback, and how the failure feedback influences these individuals' environmental mastery. Experimental manipulations were used in the present study to simulate the effects of an academic failure feedback. Specifically, we focus our attention on the approach-oriented achievement motive, also known as Hope of Success (HS), which is defined as the drive to approach rewards. HS is differentiated from the avoidance-oriented achievement motive, or Fear of Failure (FF), which is defined as the drive to avoid punishments (McClelland, 1951). Since FF is construed as an acquired drive learned from associating shame with prior failure experiences (Birney, Burdick, & Teevan, 1969; McClelland, Atkinson, Clark, & Lowell, 1953), individuals who score high on FF are posited to engage in self-regulatory strategies such as self-handicapping to avoid any anticipated failures and maintain self-esteem (Elliot & Church, 2003; Jones & Berglas, 1978). No prior studies have, however, been conducted on the type of self-regulatory strategies used as a function of HS especially in the presence of failure feedback. The present study aims to address this gap in literature.

In Figure 1, we propose a conceptual model where coping strategies mediate the relationship between self-attributed HS and environmental mastery with gender moderating the effects of self-attributed HS and coping strategies. A review of literature shows that HS has traditionally been studied in relation to achievement-related outcomes such as task persistence and performance levels (e.g. Ollendick, 1974; Smith, 1964). Little data have been collected about how HS affects one's efficacy to overcome failure feedback. Specifically, in the present study, we examine envi-

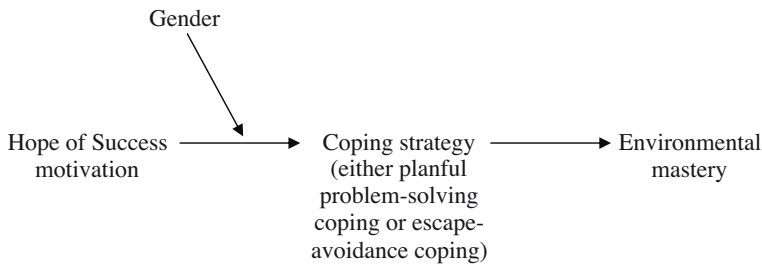


Figure 1. Proposed conceptual model where coping strategy mediates the relationship between HS and environmental mastery with gender moderating the effects of HS and coping strategy.

ronmental mastery, defined as the capacity to cope with situational demands in order to achieve goals successfully (Ryff & Keyes, 1995), in the wake of receiving failure feedback. As HS is characterised by the pursuit to strive for excellence (McClelland et al., 1953), we are interested in the processes in which individuals with varying levels of the HS deal with failure feedback as reflected by their environmental mastery scores measured post-failure feedback.

In our conceptual model, we propose that self-attributed HS acts as a distal predictor in exerting its effects on environmental mastery through coping strategies. This is in line with other self-regulatory models which posit that achievement motives provide the initial energisation for actions and are served by middle-level constructs that provide specific directions for actions (Elliot & Church, 1997; Elliot & Thrash, 2001). In previous studies, coping strategies were used as middle-level constructs mediating the relationship between individuals' psychological states and psychosocial outcomes. In the same vein, we propose that the more abstract achievement motive, HS, does not exert any direct influence on environmental mastery; rather, HS influences environmental mastery through coping strategies which act as proximal predictors of the outcome variable. Our proposition to study the relationship between motivation and coping follows Lazarus' (1991) argument that motivational processes play a role in predicting how individuals cope with stressors on top of their cognitive appraisals and available coping strategies. Researchers have also described coping as an aspect of the achievement motive, specifically characterising the achievement motive as the drive and capacity to cope with and overcome problems (Tziner & Elizur, 1985).

Coping refers to the repertoire of cognitions and actions engaged by individuals in response to stressful situations with a purpose of regulating and minimising the negative effects brought about by stressors (Folkman & Moskowitz, 2004; Lazarus & Launier, 1978). Two classes of strategies have emerged in the coping literature, namely problem-focused coping which emphasises active problem-solving efforts and emotion-focused coping which emphasises moderating emotional responses evoked by the stressor (Folkman & Lazarus, 1986; Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986). In this study, we focus on planful problem-solving and escape-avoidance coping strategies described by Folkman et al. (1986). Planful problem-solving and escape-avoidance coping encompass both cognitive and behavioural strategies within the broader taxonomy of problem-focused and emotion-focused coping strategies respectively. Specifically, planful problem-solving coping represents a form of problem-focused coping which consists of cognitive

strategies such as focusing one's attention on the subsequent step and behavioural strategies such as making changes to improve the situation. On the other hand, escape-avoidance coping represents a type of emotion-focused coping which consists of both cognitive strategies such as wishful thinking and behavioural strategies such as actions to escape from the stressful situation (Folkman & Lazarus, 1986; Folkman et al., 1986).

There are two reasons for suggesting that coping mediates between achievement motivation and environmental mastery. First, previous research has shown that students who score high on HS significantly endorse higher usage of problem-focused coping in dealing with examination stress while no significant relationship was found between HS and emotion-focused coping (Halamandaris & Power, 1999). Second, failure feedback is commonly construed as a stressful event by students. This is in line with Lazarus and Folkman's (1984, 1987) transactional model of stress which posits that an external stressful event is initially appraised in terms of how challenging or controllable the stressor is, which in turn affects one's confidence in overcoming the stressor. In the appraisal process here, an individual who scores high on HS is motivated to approach success in subsequent competence tasks and is therefore likely to discount the failure feedback and work towards improvement.

Problem-focused and emotion-focused coping have been reported to lead to differential outcomes in the academic context. For example, higher usage of problem-focused coping was found to be predictive of lower levels of academic pressure and better states of mental health (Park & Adler, 2003; Smith & Renk, 2007). Emotion-focused coping, when used to avoid problems brought about by stressful situations, was found to predict higher levels of depression and anxiety (Park & Adler, 2003; Stewart et al., 1997). It is therefore important to understand how individuals with different levels of HS engage in either problem-focused or emotion-focused coping, and how this in turn affects their confidence in overcoming the stressor. There is also a need to understand and identify how success-motivated students cope with academic stressors such as failure feedback, particularly since research has shown that academic stress is associated with depression (Hankin, Mermelstein, & Roesch, 2007) and poorer examination performance (Liu & Lu, 2011). The present study could inform educational planning and intervention programmes in targeting stressful college and high school environments where social comparison and grade competition are rife.

Additionally, we propose that gender moderates the effect between HS and coping. Gender differences have been reported for achievement perceptions as well as the type of coping strategies preferred. Specifically, as compared to male students, female students are stereotyped to be less achievement motivated and less competent in academics-related tasks (Broverman, Vogel, Broverman, Clarkson, & Rosenkrantz, 1972; Meece & Courtney, 1992). Consequently, female students may respond by lowering their expectations for success in challenging tasks and avoiding the stressor (i.e. they engage in more escape-avoidance coping) or they may put in more effort to overcome the difficulties as compared to male students (i.e. they engage in more problem-focused coping) (Eccles, 1987; Leggett, 1985). The two possible outcomes arising from traditional gender stereotypes have each been substantiated by contradictory findings. For example, Ptacek, Smith, and Zanas (1992) found that female students are more likely to engage in avoidance coping strategies in the presence of stressors while Yeung (2011) reported that female students displayed greater degree of effort in challenging tasks as compared to male students.

Accordingly, research on gender differences in coping with achievement stressors has been largely equivocal. Although female students were consistently found to engage in emotion-focused coping more than male students (Lawrence, Ashford, & Dent, 2006; Ptacek, Smith, & Dodge, 1994), mixed findings were found in relation to problem-focused coping. Ptacek et al.'s (1994) study showed that male students engaged in problem-focused coping to a greater extent as compared to female students but the opposite pattern holds true in another study conducted by Eschenbeck, Kohlmann, and Lohaus (2007). Yet, in terms of cognitive and behavioural-avoidance coping strategies, higher levels were reported by male as compared to female students when dealing with academic stressors (Brougham, Zail, Mendoza, & Miller, 2009; Eschenbeck et al., 2007).

In the present study, we hypothesise that individuals will differentially adopt either planful problem-solving or escape-avoidance coping strategy, in response to failure feedback, according to their HS motivation. The type of coping strategy adopted would in turn predict post-failure feedback environmental mastery. Although we hypothesise that gender moderates the relationship between HS and coping strategy, no specific directional hypotheses were made for either gender given the absence of a clear pattern of gender differences in the coping literature. Hypotheses for the present study are as follows:

H1: Higher levels of HS would predict greater use of planful problem-solving coping which in turn lead to greater environmental mastery. Additionally, gender would moderate the relationship between HS and planful problem-solving coping such that higher levels of HS would predict greater use of planful problem-solving coping for either male or female students.

H2: Higher levels of HS would predict less escape-avoidance coping which in turn lead to greater environmental mastery. Additionally, gender would moderate the relationship between HS and escape-avoidance coping such that higher levels of HS would predict less escape-avoidance coping for either male or female students.

Method

Participants

Eighty-two (41 males, 40 females and 1 did not report any demographic information) Singapore undergraduates enrolled in the introductory psychology course participated in the study ($M_{\text{age}} = 21.07$ years, $SD_{\text{age}} = 1.40$ years). Participants were recruited through the University Subject Pool system and were either given partial course credit or were paid SGD \$16 for their participation. The ethnic breakdown for the sample was as follows: 89.0% (73 participants) were Chinese, 7.3% (six participants) were Indian, 2.4% (two participants) reported others and 1.2% (one participant) did not specify the ethnicity. Six participants did not complete the coping scale; hence their data were not included in subsequent analyses. Altogether, data from 76 participants were retained for further analyses.

Measures

Hope of Success

The Hope of Success/Fear of Failure Questionnaire (Schultheiss & Murray, 2002) is a measure of self-attributed achievement motivation. As we were only interested in

examining the approach-oriented achievement motive, only the 10-item HS subscale was used. All items were rated on a 7-point Likert scale format ranging from 1 (*very strongly disagree*) to 7 (*very strongly agree*). A sample item from the HS subscale is 'When I have a task to accomplish, I often work hard to do well on it'. Cronbach's alpha for the HS subscale was .78.

Coping

In order to assess participants' coping strategies, we used the planful problem-solving and escape-avoidance coping subscales adapted from the revised Ways of Coping scales (Folkman et al., 1986). The questionnaire was administered to participants directly after they had received news of their poor score on the aptitude test they had completed. Furthermore, participants were instructed to indicate how likely they were to use each of the coping strategies listed in the questionnaire specifically in response to the failure feedback they had received. The planful problem-solving and escape-avoidance coping subscales consist of six and eight items respectively. All items are rated on a 7-point Likert scale ranging from 1 (*not likely at all*) to 7 (*absolutely likely*). A typical item from the planful problem-solving subscale is 'I knew what had to be done, so I doubled my efforts to make things work' while from the escape-avoidance subscale is 'Wished that the situation would go away or somehow be over with'. Cronbach's alphas for the planful problem-solving and escape-avoidance subscales were .72 and .69 respectively.

Environmental mastery

The environmental mastery subscale from Ryff's Scales of Psychological Well-being (Hauser et al. 1992; Ryff, 1989) was administered. The subscale describes being in control of and managing one's environment and activities effectively (e.g. 'In general, I feel I am in charge of the situation in which I live'). The shorter 9-item version of the environmental mastery subscale was used and items are rated on a 7-point Likert scale format ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Cronbach's alpha for the environmental mastery subscale was .83.

Procedures

All participants completed two study sessions scheduled approximately one week apart. Participants were told a cover story that the researchers were interested in investigating students' attitudes to and aptitude in their discipline of study. In the first session, participants completed the self-report measure for HS. In the second session, participants first completed an aptitude test in their respective disciplines of study within a stipulated time period (20 min). Each test was made up of multiple-choice questions selected from previous practice papers of the Graduate Record Examination subject test (GRE; Educational Testing Services, 2010). Instructions stressed that the aptitude test gauged participants' understanding in their chosen area of study and that good performance in the test was generally an indication of potential for admittance into graduate school. The experimenter scored all participants' answers on the spot and informed participants of their score individually. However, regardless of their actual performance on the test, all participants were informed that they had received a test score that ranked them in the bottom 6th–33rd percentile

range. This was to simulate the effect of an academic stressor as well as to serve as a prime for previous similar academic failure experiences. This experimental manipulation was chosen as previous research has shown that failure feedback on one's intelligence and competence is a reliable method of inducing a realistic academic threat in participants (Lazarus & Eriksen, 1952).

A manipulation check was carried out to examine the psychological impact of the poor test scores on participants. This was followed by the administration of questionnaires consisting of measures on coping strategies and environmental mastery. At the end of the study, all participants were thoroughly debriefed that their test was not actually scored and the poor test score was not reflective of their actual performance. They were informed that the true purpose of the study was to investigate the process in which undergraduates cope with failure feedback.

Manipulation check

Two manipulation check questions were administered to assess the extent to which participants were affected by the failure-feedback manipulation. Previous research has shown that stressful situations can trigger an adrenaline rush (Kemeny, 2003) and failure feedback evokes increased achievement activity to improve one's performance (Atkinson, 1964). Accordingly, two items were administered after the failure feedback and rated on a 5-point Likert scale format ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). These questions were 'I feel the adrenaline rush while performing the test' ($M=3.09$, $SD=1.12$) and 'If given the chance to re-do the test, I would want to perform better' ($M=4.14$, $SD=.84$). Participants' ratings on the manipulation check questions indicated that the poor test scores were effective academic stressors and participants had taken the outcome of the test seriously as they were highly motivated to perform better in the test if given a second chance to do so.

Results

Descriptive analyses

The means, standard deviations and inter-correlations of the main variables are presented in Table 1. While HS had a significant negative correlation with escape-avoidance coping, the relationship between HS and planful problem-solving coping was not significant. Additionally, there was a significant positive correlation

Table 1. Means, standard deviations and inter-correlations between the main variables ($N=76$).

Variable	M	SD	Variable			
			1	2	3	4
1 HS	5.27	.70	–			
2 Escape coping	3.18	.90	–.36**	–		
3 Problem coping	4.86	.81	.22	–.10	–	
4 Environmental mastery	4.81	.78	.54***	–.45***	.40***	–

Note: escape coping = escape-avoidance coping; problem coping = planful problem-solving.
* $p < .05$; ** $p < .01$; *** $p < .001$.

between HS and environmental mastery. As expected, we found a significant negative correlation between escape-avoidance coping and environmental mastery and a significant positive correlation between planful problem-solving coping and environmental mastery.

Moderated mediation analyses

In line with Aiken and West's (1991) recommendations to analyse interaction effects using multiple regression, scores on the independent variable (HS) and mediator (either planful problem-solving coping or escape-avoidance coping) were first centred. Additionally, gender, which serves as the moderator in the proposed moderated mediation models, was coded into dummy variables (0 = female, 1 = male). We carried out moderated mediation analyses with environmental mastery as the dependent variable with the use of the SPSS Statistics macro (Model 2) designed by Preacher, Rucker, and Hayes (2007), which is made up of two multiple regression models predicting the mediator and dependent variable individually.

We first tested for moderated mediation using planful problem-solving coping as the mediator and gender as the moderator. Two sets of multiple regression analyses were carried out. In the first set of multiple regression analyses, planful problem-solving coping (mediator) was regressed on HS (IV; $B = .52, p = .005$), gender (moderator; $B = -.04, p = .837$) and the HS*gender interaction (IV*moderator; $B = -.58, p = .032$). The overall HS*gender interaction term was significant which indicated that gender moderated the relationship between HS and planful problem-solving coping. Following Aiken and West (1991) procedures to examine the nature of the interaction effect, we carried out simple slopes analyses at each level of gender. As presented in Figure 2, the simple slopes for the interaction between HS and gender on planful problem-solving coping showed that female students with higher HS scores engaged in higher levels of planful problem-solving coping ($B = .52, p = .005$). In contrast, male students did not differ in their reported levels of planful problem-solving coping regardless of their HS scores ($B = -.06, p = .768$).

In the second set of multiple regression analyses, environmental mastery (DV) was regressed on planful problem-solving coping (mediator; $B = .28, p = .005$), HS (IV; $B = .57, p = .000$), gender (moderator; $B = -.13, p = .379$) and the HS*gender interaction (IV*moderator; $B = -.08, p = .720$). The overall HS*gender interaction term was not significant. This indicated that the mediating role of planful problem-solving coping in the relationship between HS and environmental mastery was not significantly different for male versus female students.

Next, we tested for moderated mediation using escape-avoidance coping as the mediator and gender as the moderator. Again, two sets of multiple regression analyses were carried out. In the first set of multiple regression analyses, escape-avoidance coping (mediator) was regressed on HS (IV; $B = -.43, p = .028$), gender (moderator; $B = -.31, p = .114$) and the HS*gender interaction (IV*moderator; $B = -.14, p = .615$). As the overall HS*gender interaction term was not significant, this indicated that gender did not moderate the relationship between HS and escape-avoidance coping. In the second set of multiple regression analyses, environmental mastery (DV) was regressed on escape-avoidance coping (mediator; $B = -.28, p = .002$), HS (IV; $B = .59, p = .000$), gender (moderator; $B = -.23, p = .127$) and the HS*gender interaction (IV*moderator; $B = -.28, p = .190$). As the overall HS*gender interaction term was not significant, this indicated that the mediating role of

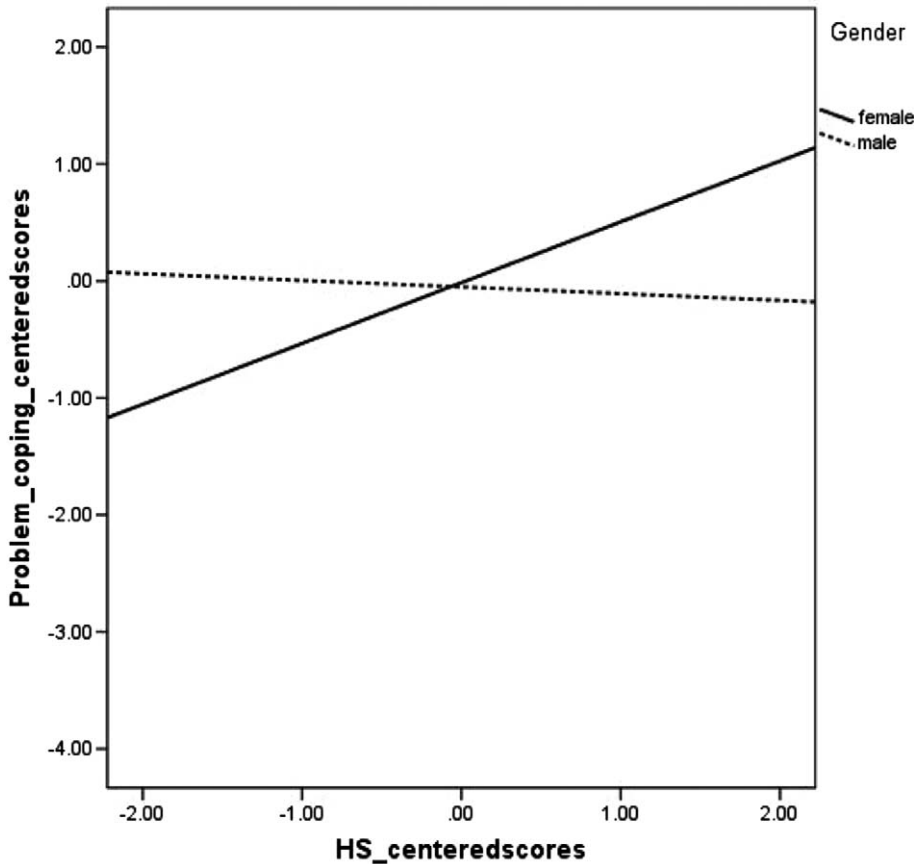


Figure 2. Moderating effect of gender in the relationship between HS and planful problem-solving coping.

escape-avoidance coping in the relationship between HS and environmental mastery was not significantly different for male versus female students.

Simple mediation analyses

As we did not find significant moderated mediations with gender as the moderator, regression analyses were carried out to test for the simple mediating effect of either planful problem-solving coping or escape-avoidance coping in the relationship between HS and environmental mastery. Following the analytical procedures proposed by Baron and Kenny (1986), the presence of mediation effect was tested : (a) a significant relationship was present when environmental mastery (dependent variable) was regressed on HS (independent variable), (b) a significant relationship was present when escape-avoidance coping (mediator) was regressed on HS, (c) a significant relationship was present when environmental mastery was regressed on escape-avoidance coping after controlling for HS and (d) the direct effect of HS on environmental mastery was smaller than its total effect after escape-avoidance coping had been added in the regression model. Additionally, Shrout and Bolger's

(2002) bootstrapping method to test for indirect effects were carried out to provide further support for the presence of mediation effects. This bootstrapping method constructs the 95% confidence interval for the indirect effect in each mediation model and the indirect effect is said to be significant if the confidence interval range does not include zero. Finally, effect size for the indirect effect of each mediation model was reported using MacKinnon's (2008) $R^2_{4.5}$ formula which indicates the amount of shared variance between the predictor, mediator and dependent variable together (Fairchild, MacKinnon, Taborga, & Taylor, 2009). All analyses to test for mediation effects were performed using the SPSS Statistics macro obtained from Preacher and Hayes (2004).

We regressed environmental mastery on HS and planful problem-solving coping. As presented in Table 2, higher scores on HS significantly predicted higher scores on environmental mastery, $\beta = .54$, $p = .000$ and higher scores on planful problem-solving coping, $\beta = .22$, $p = .055$. Planful problem-solving coping was also positively related to environmental mastery after controlling for HS, $\beta = .29$, $p = .003$. Further tests using Shrout and Bolger's (2002) bootstrapping method yielded a 95% confidence interval ranging from $-.0173$ to $.1610$. As the 95% confidence interval constructed by the bootstrapping method includes zero, planful problem-solving coping did not mediate the relationship between HS and environmental mastery. MacKinnon's (2008) effect size measure was $R^2_{4.5} = .08$ in this mediation model.

Additionally, we regressed environmental mastery on HS and escape-avoidance coping. As presented in Table 3, higher scores on HS significantly predicted higher scores on environmental mastery, $\beta = .54$, $p = .000$, as well as lower scores on escape-avoidance coping, $\beta = -.36$, $p = .001$. Escape-avoidance coping was also negatively related to environmental mastery after controlling for HS, $\beta = -.29$, $p = .004$. Although the effect of HS on environmental mastery remained significant after adding escape-avoidance coping to the model, the direct contribution of HS was reduced, hence suggesting a partial mediation effect. Further tests using Shrout and Bolger's (2002) bootstrapping method yielded a 95% confidence interval ranging from $.0100$ to $.2265$ and MacKinnon's (2008) effect size measure was $R^2_{4.5} = .13$ in this mediation model.

Table 2. Regression results for the mediating effect of planful problem-solving coping on the relationship between HS and environmental mastery ($N = 76$).

	β	p
Model without mediator		
HS \rightarrow environmental mastery	.54	.000
$R^2_{Y,X}$.29	
Model with mediator		
HS \rightarrow problem coping	.22	.055
Problem coping \rightarrow environmental mastery	.29	.003
HS \rightarrow environmental mastery	.48	.000
Indirect effect	.07	
$R^2_{M,X}$.05	
$R^2_{Y,MX}$.37	

Note: HS = Hope of Success is the independent variable (X) in this mediation model; problem coping = planful problem-solving coping is the mediator (M) in this mediation model; environmental mastery = the dependent variable (Y) in this mediation model; ' \rightarrow ' means 'affects'.

Table 3. Regression results for the mediating effect of escape-avoidance coping on the relationship between HS and environmental mastery ($N=76$).

	β	p
Model without mediator		
HS \rightarrow environmental mastery	.54	.000
$R^2_{Y,X}$.29	
Model with mediator		
HS \rightarrow escape coping	-.36	.001
Escape coping \rightarrow environmental mastery	-.29	.004
HS \rightarrow environmental mastery	.43	.000
Indirect effect	.12	
$R^2_{M,X}$.13	
$R^2_{Y,MX}$.37	

Note: HS=Hope of Success is the independent variable (X) in this mediation model; escape coping=escape-avoidance coping is the mediator (M) in this mediation model; environmental mastery=the dependent variable (Y) in this mediation model; ' \rightarrow ' means 'affects'.

Discussion

Findings in the present study add on to the existing coping and achievement motivation literature in three ways. First, our study hopes to clarify inconsistent findings on gender differences in the coping literature by studying the relationship under the influence of a personality variable, specifically achievement motive. We did not find in our study any gender differences for the mediating relationship between HS, coping and environmental mastery. The absence of gender differences in both sets of mediating relationships highlights the congruent role of the HS motive in directing goal-oriented processes across gender. HS is a facet of the basic psychogenic nAch posited by Murray (1938) and is construed as an acquired drive in directing responses towards task accomplishment and excellence (McClelland et al., 1953). Accordingly, HS affects outcomes, such as one's sense of environmental mastery defined as the efficacy to cope with task demands successfully (Ryff & Keyes, 1995), through the use of (or lack thereof) coping strategies in the same manner for both male and female students.

Second, our study has highlighted the importance of taking into account of person \times situation interaction effects in understanding gender differences in the use of coping strategies. This perspective is in contrast to previous research on gender differences in coping where coping is construed as a dispositional variable (c.f. Tamres, Janicki, & Helgeson, 2002). We suggest that the type of coping strategies selected depends on both the level of HS motivation (personal variable) and group norms or societal expectations (situational variable). In the present study, gender was found to moderate the relationship between HS and planful problem-solving coping but not between HS and escape-avoidance coping. Specifically, our findings showed that higher HS scores were associated with higher use of planful problem-solving coping in female but not male students. This finding could be interpreted along the lines of achievement-related gender stereotypes. For instance, in the academic choice model put forth by Eccles and colleagues (e.g. Eccles et al., 1983), female students are typically stereotyped to score lower on achievement motivation and are less likely to adopt problem-solving coping strategies as compared to their male classmates (Broverman et al., 1972; Meece & Courtney, 1992; Miller & Kirsch, 1987). The academic

choice model posits that the gender socialisation experiences students are exposed to guide them towards the type of gender-appropriate achievement activities and problem-solving approach to pursue (Eccles et al., 1983; Meece, Parsons, Kaczala, Goff, & Futterman, 1982). Furthermore, the academic choice model and other expectancy-value theories describe achievement strivings as a function of students' beliefs in their abilities to demonstrate competence in achievement tasks as well as the subjective worth students ascribe to the tasks (Atkinson, 1964; Meece & Courtney, 1992).

In the present study, the moderation relationship between HS and planful problem-solving coping for male students was non-significant. An explanation for the non-significant moderation relationship could be that male students have been traditionally perceived to engage in high levels of planful problem-solving (Folkman & Lazarus, 1980). This suggests that male students favour the use of planful problem-solving coping in the presence of academic stressors regardless of their levels of HS motivation. In contrast, female students, who have been subjected to the stereotype that they are inferior to male students in competence-related tasks, may respond differentially to academic stressors as a function of their expectations to successfully overcome the challenge. Specifically, female students who score high on HS could have greater confidence in their abilities on the basis of previous task successes and are therefore more likely to put in effort to overcome the difficulties and engage in planful problem-solving coping. Female students who score low on HS, in contrast, had lower expectations of overcoming the academic stressor successfully which led them to engage in planful problem-solving coping to a lesser extent.

Third, our study has outlined the processes in which motives may influence one's level of environmental mastery following failure feedback through the use of coping strategies. Although planful problem-solving coping follows from appraising a task as challenging (Folkman et al., 1986) and leads to adaptive outcomes such as better states of mental health (Park & Adler, 2003), our findings showed that HS did not significantly lead to higher usage of planful problem-solving coping and in turn higher levels of environmental mastery. In contrast, we found a significant mediation relationship where HS predicted higher levels of environmental mastery through lower use of the less adaptive escape-avoidance coping strategy. Our findings are surprising as one would expect planful problem-solving coping – which has generally been considered to be more adaptive – to mediate the relationship between HS and environmental mastery (as opposed to the less adaptive coping strategy of escape-avoidance coping).

In line with Lazarus and Folkman's (1984) conceptualisation of coping as a process, our findings provide evidence that the adaptiveness of the type of coping strategy used depends on other dispositional variables. As the self-attributed motives measured in this study reflect the norms and expectations that prevail in a group or situation (McClelland et al., 1989), the highly competitive environment in which college students strive for accomplishment may prompt the high usage of planful problem-solving coping (as shown in Table 1) regardless of their motivational profiles. This could explain why the positive correlation between HS and planful problem-solving coping did not reach significance as college students who scored high on HS may have been socialised to engage in planful problem-solving to the same extent as their peers who scored low on HS. Nonetheless, the decreased use of escape-avoidance coping strategy in our higher HS-scorers is consistent with Atkinson's (1964) argument that individuals with high nAch are more likely to approach than avoid competence-related tasks in evaluative situations.

Apart from theoretical significance, our findings have practical implications as well. Specifically, as coping strategies are conscious cognitive tools that form part of one's self-regulation process, maladaptive strategies could be replaced with useful ones through cognitive modification. A practical implication from our study is that rather than promoting the use of planful problem-solving coping in students with high HS scores, it might be productive to discourage the use of escape-avoidance coping strategies in HS-motivated students so as to increase their efficacy in overcoming academic failure feedback.

There are a few limitations that should be acknowledged. The first limitation is that our research has only studied questionnaire-measured, self-attributed achievement motive as distal predictor of environmental mastery. In order to provide a more thorough understanding of the role played by achievement motives in environmental mastery, future studies could investigate implicit achievement motives and the interaction effect between implicit and self-attributed motives on coping strategies following failure feedback (McClelland et al., 1989). This is because implicit and self-attributed motives represent two distinct forms of motivation responding to different incentives which may influence environmental mastery differently (McClelland et al., 1989).

The second limitation is that it may be useful for future research to differentiate between feedback directed at an individual's innate abilities such as intelligence versus those directed towards underlying learning mechanisms such as strategies and the amount of effort invested into the goal pursuit process. Recent research has shown that praise pertaining to the underlying learning mechanisms increased students' intrinsic motivation and perceived competence while praise pertaining to students' innate abilities was detrimental to their intrinsic motivation (Haimovitz & Corpus, 2011). Additionally, gender differences were reported such that praise aimed at the underlying learning mechanisms increased while praise aimed at students' innate abilities decreased intrinsic motivation in female students but the same pattern of results were not replicated for male students (Corpus & Lepper, 2007).

In sum, the present research did not find any gender differences in the mediating role of coping strategies on the relationship between HS and environmental mastery. Planful problem-solving was also found not to mediate the relationship between HS and environmental mastery. Instead, escape-avoidance coping was found to mediate the relationship between achievement motivation and environmental mastery. Our research has highlighted the importance of using achievement motives as a guide to understand gender differences in the type of coping strategies used, and how these coping strategies play a role in coping with failure feedback in students.

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