

Examining Relationships of Taiwanese Adolescents' Achievement Goals to Academic Engagement and Coping

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Abstract

The present study attempted to examine the relationships among Taiwanese eighth graders' achievement goals, academic engagement, and coping. Also, the beneficial effects of pursuing multiple goals on academic engagement and coping were investigated. Four hundred and two eighth-grade Taiwanese students completed a self-reported survey assessing the variables described above. Results of regression analyses sustained the vital role of mastery-approach goals in students' academic engagement. Mastery-approach goals positively predicted agentic, behavioral, emotional, and cognitive engagement. Moreover, performance-approach goals positively predicted agentic engagement. As for the predictors of academic coping, mastery-approach and mastery-avoidance goals together with behavioral and cognitive engagement emerged as positive predictors of engagement coping. Mastery-approach goals negatively predicted disengagement coping, whereas performance-avoidance goals functioned as a positive predictor of this type of coping. Finally, results from MANCOVA showed that both mastery-approach and performance-approach goals independently exerted influences on students' academic engagement and coping. Implications for educational practices are discussed.

Keywords: achievement goals, academic engagement, academic coping, multiple goal perspective

1. Introduction

Academic issues have been found to be a primary concern of adolescents (Lee et al., 2010). Findings of a longitudinal study (Wang, Chow, Hofkens, & Salmela-Aro, 2015) indicated that Finnish adolescents become overwhelmed and anxious over school as they move from 9th to 11th grade. Also, an increase in teacher control and discipline has been found in middle and high school classrooms in the U. S. These practices result in escalated social comparisons, concern about evaluation, and competitiveness among students (Eccles et al., 1993). In Asian societies, the pressures to perform well in schoolwork are even more intense due to cultural values (Huan, Yeo, Ang, & Chong, 2006; Lee et al., 2010). For example, the Taiwanese education system requires all the ninth-grade students to take the joint entrance examination for senior high schools (Grade 10-12). The pursuit of examination success has turned the classroom into a setting mainly focused on the preparation for examination and caused tremendous stress for the Taiwanese adolescents. Academic stress has been found to constitute a significant and pervasive risk factor for maladjustment in the school context (Mantzicopoulos, 1990). When students experience such stress, a crucial factor that may influence student success and satisfaction in school is academic coping (Krypel& Henderson-King, 2010; Skinner & Wellborn, 1997).

Previous studies on academic coping have been limited to primarily Caucasian samples and have not explored adolescents' coping with academic demands in more diverse cultural contexts (Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001).

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Given that schools can be very stressful for Taiwanese adolescents, research on the determinants of academic coping in the Taiwanese classroom context should provide valuable information about how to devise interventions that can facilitate students to effectively cope with academic stress. To identify key predictors of academic coping, in the present study, the relationships of Taiwanese adolescents' achievement goals and academic engagement to their coping with academic difficulties were investigated.

1.1 Academic Coping

Academic coping refers to cognitive and behavioral efforts that students make to react to academic challenges, setbacks, and difficulties that are appraised as taxing or exceeding their resources. The outcomes of such efforts can be either positive or negative (Kryprl & Henderson-King, 2010; Lazarus & Folkman, 1984). There has been little consensus about the dimensions or categories that best discriminate among different academic coping strategies. Two widely adopted perspectives are problem- versus emotion-focused coping and engagement versus disengagement coping (Compas et al., 2001; Skinner & Wellborn, 1997). Lazarus and Folkman's model of stress and coping (1984) posits that individuals' coping efforts can be directed at stressor itself (i.e., problem-focused coping) or directed at minimizing the emotional distress arising from stressors (i.e., emotion-focused coping). Problem-focused coping enables the person to identify possible solution to a problem and take actions to change the circumstances from which stress originates. Emotion-focused coping leads one to respond to stress by using such strategies as self-soothing (e.g., relaxation), expressing negative emotions (e.g., yelling or crying), seeking emotional support from others, and attempting to escape stressful situations (Carver & Connor-Smith, 2010; Compas et al. 2001).

The distinction between engagement and disengagement coping also has received substantial attention through research with different populations including children, adolescents, and adults (Compas et al., 2001). Engagement coping is characterized by responses that are oriented toward the source of stress (e.g., problem-focused coping) or toward the person's emotions or thoughts (e.g., emotion regulation or cognitive restructuring). Disengagement coping refers to strategies that are oriented away from the stressors such as withdrawal or denial. Engagement coping is organized, flexible, and benign. Disengagement coping, in contrast, is generally ineffective in alleviating stress in the long run, for it does nothing about the stressor's existence and its eventual impact (Carver & Connor-Smith, 2010). The distinction between problem- and emotion-focused coping has been criticized because some emotion-focused responses are very different from each other. There are several disparate types of coping within the same dimension. Considering the criticism, the present study adopted the engagement versus disengagement distinction to examine Taiwanese adolescents' academic coping.

Previous findings (Brdar, Rijavec, Loncaric, 2006; Skinner & Wellborn, 1997) revealed that students using engagement coping to tackle academic problems appear to maintain vigorous interactions with academic material. They reflect on class material and try to relate it to personal experiences. Additionally, they tend to have good time management skills when it comes to homework completion and exam preparation, to take personal responsibility for learning by showing more effort, persistence, concentration, interest, as well as enthusiasm, and to actively seek novelty and challenge. Put differently, engagement coping is thought to lead to the development of a repertoire of actual competences characterized as self-regulated learning. Conversely, disengagement coping is presumed to restrain learning and to hinder adjustment (MacCann, Fogarty, Zeidner, & Roberts, 2011). Escaping distress resulting from academic demands has its long term consequences. Instead of solving the academic problem, students adopting disengagement coping are inclined to refrain from taking part in class activities and to shy away from novelty (Skinner & Wellborn, 1997). The contrastingly different outcomes associated with engagement versus disengagement coping show the need to explore the predictors of academic coping. To this end, the predicting effects of academic engagement and achievement goals on Taiwanese adolescents' academic coping were examined in the current study.

1.2 Academic Engagement

There has been an explosion of interest in academic engagement in the past two decades because engagement has been found to be both a malleable state that can be shaped in the classroom setting and a robust predictor of students' learning outcomes such as academic progress and achievement (Appleton, Christenson, & Furlong, 2008; Furlong, & Christenson, 2008; Reeve, 2012; Reeve & Tseng, 2011; Skinner & Pitzer, 2012). Engagement has been viewed as the outward manifestation of motivation. Motivation refers to the psychological processes that underlie energy, purpose, and durability of human action. Engagement refers to energized, directed, and sustained action of students' actual interactions with academic tasks (Skinner & Pitzer, 2012).

Academic engagement is a multidimensional construct including not only behavioral but also emotional and cognitive components. The behavioral dimension of engagement is characterized as effort, on-task attention, persistence, intensity, and perseverance in the face of difficulties. The emotional aspect of engagement contains elements like enthusiasm, enjoyment, fun, satisfaction, absence of anxiety, and boredom. The cognitive component encompasses the use of strategic and sophisticated learning strategies as well as active self-regulation (Reeve & Tseng, 2011; Skinner & Pitzer, 2012).

Reeve and his colleagues (Reeve, 2012; Reeve & Tseng, 2011) maintained that while the existing concept of behavioral, emotional, and cognitive engagement nicely captures the extent to which students react to teacher-provided learning activities, this three-component model of academic engagement represents only an incomplete understanding. Such a conceptualization of student engagement falls short of capturing the extent to which students contribute agentically into the on-going flow of the instruction they receive, namely, agentic engagement. Agentic engagement is described as a process in which students intentionally and proactively try to personalize and enrich both what is to be learned and the conditions and circumstances under which it is to be learned. These researchers (Reeve, 2012; Reeve & Tseng, 2011) proposed that in addition to the three components mentioned above, academic engagement also includes initiating a process in which the students generate options that expand their freedom of actions and increase the chance of experiencing both strong motivation and meaningful learning. For example, students in class express their preferences and opinions and let the teacher know what they are interested in. To better understand how student engagement is related to their academic coping, the four-component model of engagement proposed by Reeve and his associates (Reeve, 2012; Reeve & Tseng, 2011) was employed in the present study.

Students' academic engagement may create a motivational context that, to a great extent, shapes how they deal with difficulties, challenges, and obstacles encountered in school. "Everyday resilience" refers to resources that empower students to bounce back from setbacks and failures. Further, such resources allow them to constructively reengage with challenging academic tasks in the face of obstacles (Martin & Marsh, 2008, 2009). A primary process of everyday resilience in school is academic coping. Skinner and Pitzer (2012) posited that academic engagement, coping, and reengagement following failures and setbacks may work together to determine students' academic development. Little research, nevertheless, examines the interrelations of these underlying processes. One of the purposes of the current research, hence, was to investigate relationships of the four aspects of academic engagement to adolescents' use of coping strategies in the Taiwanese classroom environment. Another factor of interest considered to be linked to students' academic engagement and coping is achievement goals.

1.3 Achievement Goals

As a dominant framework that provides a lens through which to examine individuals' motivation and achievement-related behaviors, achievement goal theory informs both educational research and classroom practice (Anderman & Patrick, 2012; Maehr & Zusho, 2009). Achievement goal refers to a cognitive representation of a competence-based possibility that a person seeks to attain (Elliot, 1999). The study of achievement goals began in the late 1970s. Over the past several decades, the theory has blossomed into a robust 2x2 theoretical framework (Elliot & McGregor, 2001). Achievement goal theorists differentiate achievement goals on two dimensions: according to how competence is defined and according to how competence is valenced. Conventionally, competence may be defined according to whether one has fully mastered the task at hand or performed better than others (i.e., the mastery-performance distinction). In terms of how competence is valenced, an achievement goal may focus the individual on attaining a positive, desirable possibility (an approach goal) or avoiding a negative, undesirable possibility (an avoidance goal). Combining the definition and valence dimensions result in a 2x2 crossing of the performance-mastery and approach-avoidance distinctions that may account for the broad spectrum of competence-based strivings (Elliot & McGregor, 2001). The 2x2 model has been supported in both North American (Conroy, Elliot, & Hofer, 2003) and Asian samples (Bong, 2009).

In this model, mastery-approach goals inspire individuals to increase their competence or achieve task mastery. Mastery-avoidance goals focus students on avoiding misunderstanding, a lack of task mastery, and losing skills or abilities. Performance-approach goals lead individuals to demonstrate that they are more competent than others or to prove their self-worth. Finally, performance-avoidance goals motivate students to avoid appearing incompetent or less able than others. Achievement goals are presumed to function as channels for one's underlying motivation. Each goal type, thus, has been found to be related to a distinct predictive profile. For example, mastery goals have been associated with a range of positive processes and outcomes, including absorption in study material,

persistence while studying, deep processing of information, and long-term retention of information (Anderman & Patrick, 2012; Elliot & McGregor, 2001). The pursuit of performance-approach goals has been linked to high academic achievement (Church, Elliot, & Gable, 2001; Daniels et al., 2009). Performance-avoidance goals have been consistently and negatively related to achievement. Also, this type of goal has been associated with procrastination, low absorption during task engagement, and poor retention of information (Elliot & Church, 1997; Elliot & McGregor, 2001).

1.4 Achievement Goals and Academic Engagement

Given that each type of achievement goal is associated with a particular set of learning patterns, the specific achievement goal orientation that a student holds is expected to determine the quality of their engagement in schoolwork (Ames, 1992a, 1992b). Results of the studies exploring the relations of each type of engagement to goal orientation indicated that achievement goals that students adopt are related to a wide range of achievement behaviors in the classroom. Mastery goals are found to be associated with positive academic behaviors such as effort expenditure (Miller, Greene, Montalvo, Ravindran, & Nichols, 1996), engaging in relevant activities outside of school (Anderman & Johnston, 1998), and seeking help when needed (Ryan & Pintrich, 1997). By contrast, a focus on performance goal orientation is related to help avoidance (Ryan & Pintrich, 1997) and being disruptive during lessons (Ryan & Patrick, 2001).

With regard to emotional engagement, previous findings suggested that mastery goals are positively related to positive affect about school (Roeser, Midgley, & Urdan, 1996) as well as feelings of hopefulness (Daniels et al., 2009) and negatively related to math anxiety (Skaalvik, 1997). Performance-approach goals are positively associated with feelings of hopefulness (Daniels et al., 2009) and are weakly and negatively related to math anxiety (Skaalvik, 1997). The adoption of performance-avoidance goals is positively related to both math and verbal anxiety (Skaalvik, 1997). As for cognitive engagement, it has been consistently found that the types of achievement goals that students espouse are related to the kinds of learning strategies that they employ when engaged with academic tasks (Anderman & Patrick, 2012). For instance, results of a study with a large sample of South Korean adolescents (Bong, 2009) revealed that both mastery-approach and mastery-avoidance goals are positively associated with the use of cognitive strategies (e.g., rehearsal, elaboration, and organization strategies) and more adaptive self-regulation (e.g., monitoring their comprehension), although the associations with mastery-avoidance goals are weaker. In terms of the effects of performance goals on cognitive engagement, the evidence is more mixed. Nolen (1988), in an early study, found that performance goals are either unrelated or negatively related to students' use of deep-processing strategies and either unrelated or positively related to the use of surface-level strategies. Approach and avoidance orientations were not yet differentiated when Nolen's study was conducted. Bong (2009) nonetheless found that performance-approach goals are positively related to greater use of cognitive as well as self-regulatory strategies, whereas performance-avoidance goals are not.

1.5 Achievement Goals and Academic Coping

Although motivational variables have for long time been recognized as important determinants of how one copes with stressful situations, relationships between achievement goals and coping in educational context have just received some attention in last few years (Brdar, Rijavec, & Loncaric, 2006; Grant & Dweck, 2003; Rijavec & Brdar, 2002). In Lazarus & Folkman's model of stress and coping, achievement goals are regarded as a personal factor that may be closely linked to the individual's coping with difficulties. One is unlikely to experience stress without a goal at stake. According to their model, primary appraisal is related to fit between the situation and the person's pursued goal. Because people tend to strive hard to attain their goals, goals can have powerful influences on actions they take. In the phase of second appraisal, the focus is on what can be done in the stressful situation, including evaluation of coping options. Empirical evidence suggests that mastery goals are positively related to help seeking (Tanaka, Murakami, Okuno, & Yamauchi, 2002) and problem-focused coping in case of failure, which in turn results in higher achievement (Grant & Dweck, 2003; Rijavec & Brdar, 2002). It has been found that in mastery goal framework, children interpret failures as opportunities to receive information about how to change strategies in order to succeed (Brdar et al., 2006).

The effects of performance goals on students' coping, however, are less clear. Grant and Dweck (2003) explored goal effects in stressful or demanding situations to determine how children with different goal orientations cope under these conditions. They found that performance goals are negatively related to positive reinterpretation of the stressful situation and positively related to behavioral disengagement and denial. Tanaka et al. (2002), in contrast, found that performance-approach goals are positively related to help seeking when students encountered academic difficulties. Students adopting performance goals may be motivated to achieve success and to avoid failure simultaneously. In order to perform better than others, they would use problem-focused coping when faced with failure to improve their school achievement. On the other hand, constant comparison-making arising from a performance goal orientation can elicit anxiety that may lead to emotion-focused coping. To investigate the relationship between each type of achievement goal and academic coping with greater precision, the 2 x 2 achievement goal model was used in the present study. Moreover, students' academic engagement was controlled for when the effects of goal orientation on coping tendencies were examined.

1.6 Multiple Goal Perspective

Given that mastery- and performance-approach goals are associated with different achievement behavior patterns, optimal achievement processes may require both types of goals. Empirical findings indicate that pursuing one type of goal does not necessarily exclude pursuit of the other (Bouffard-Bouchard, Boisvert, Vezeau, & Larouche, 1995; Middle & Midgley, 1997; Shih, 2005). Using median splits to create groups of college students, Bouffard-Bouchard et al. (1995) found that students in the high-mastery/high-performance goal group show the highest levels of motivation, best strategy use, and higher grades. Turner, Meyer, Midgley, and Patrick (2003) investigated the effects of classroom goal structures on sixth graders' reported affect (e.g., negative affect following failure), academic coping, as well as self-regulation and found that a high-mastery/high-performance goal structure fosters students' self-regulation. Little is known, nonetheless, about how multiple goal pursuit is at work in the cultural context other than Western societies.

Barron and Harackiewicz (2000, 2001) suggested that the pursuit of multiple goals may help to facilitate achievement behaviors by way of an additive goal pattern. In other words, both mastery- and performance-approach goals independently exert positive effects on a particular outcome. The present study attempted to examine whether Taiwanese adolescent students would benefit from adopting both mastery- and performance-approach goals simultaneously as a result of an additive pattern of achievement goal pursuit. Specifically, effects of different levels of a particular type of approach-oriented goal (i.e., mastery- or performance-approach goal) on students' academic engagement and coping were compared while controlling for the other type of approach-oriented goal. In doing so, it was hoped that the unconfounded effects of both mastery- and performance-approach goals would be detected.

1.7 The Present Study

To sum up, there were three purposes of this study. First, the relationships between achievement goals (i.e., mastery-approach, mastery-avoidance, performance-approach, and performance-avoidance goals) and academic engagement (i.e., agentic, behavioral, emotional, and cognitive engagement) were investigated in the hope that the extent to which students' personal goal orientations functioned as the antecedents of different types of academic engagement could be determined. The second purpose of this study was to examine the relationships of achievement goals and academic engagement to students' coping (i.e., engagement and disengagement coping) with academic demands in order to identify the types of achievement goals and engagement that were most predictive of adaptive and maladaptive coping. Finally, the differences in academic engagement and coping between students with high versus low levels of mastery-approach goals were examined while controlling for performance-approach goals. Also, the differences in academic engagement and coping between students with high versus low levels of performance-approach goals were examined while controlling for mastery-approach goals. Such examination was expected to determine the more precise effects of mastery- and performance-approach goals on students' academic engagement and coping. Further, the effects of an additive pattern of pursuing both mastery- and performance-approach goals were presumed to be captured.

2. Method

2.1 Participants

The participants included 402 eighth-grade Taiwanese students from twenty classes in four junior high

schools. Participating schools were located in the northern part of Taiwan. All of school principals granted initial consent for data to be collected in their schools. The 211 boys (53%) and 191 girls ranged in age from 14 years to 15 years, 9 months ($M = 14$ years, 8 months, $SD = 4$ months). The school districts were primarily middle class in terms of socioeconomic status. All of the participants were Taiwanese. Students' participation was voluntary. Guidelines for the proper treatment of human subjects were followed (APA, 2010). All participants had parental consent to take part in the study. Confidential treatment of the data was guaranteed.

2.2 Procedure

The data were collected at the beginning of the eighth grade. Students were invited to fill out a survey (described in detail below) during regular class time. It took participants about 20 minutes to complete the questionnaire. There were two research assistants in each class for the data collection. They assured students of the confidentiality of their self-reports and encouraged them to respond to all items as accurately as possible.

2.3 Measures

Participants were instructed to respond to all items using a five-point Likert scales, ranging from 1 (strongly disagree) to 5 (strongly agree). A Chinese language version of this self-report survey was used. All measures utilized in the present study were translated into Chinese and then back-translated into English. To ensure adequate translation, guidelines of the International Test Commission (Hambleton, 1994) were followed. Specifically, the translation process took account of linguistic and cultural qualities among Taiwanese adolescents. Participants' familiarity with item format, item content, and test procedures was ensured by checking with two Taiwanese junior high students during the translation process. Also, statistical techniques were selected to establish the equivalence of the different language versions of the measure. Information on each scale used in the present study is detailed below.

2.3.1 Achievement goals. The questionnaire assessing adolescents' achievement goal orientations was developed based on the work of Elliot and McGregor (2001). This questionnaire is composed of four scales for each type of achievement goals. Four scores representing mastery-approach (e.g., "I want to learn as much as possible from this class" and "My aim is to completely master the material presented in this class"; 6 items; $a = .86$), mastery-avoidance (e.g., "It is important for me to avoid losing what I have learned from this class" and "My goal is to avoid learning less than it is possible to learn"; 5 items; $a = .88$), performance-approach (e.g., "It is important for me to do well compared to others in this class" and "My goal is to perform better than the other students"; 6 items; $a = .84$), and performance-avoidance goals (e.g., "I just want to avoid doing poorly in this class compared with others" and "I am striving to avoid performing worse than others"; 6 items; $a = .76$) for each student were created accordingly.

2.3.2 Academic engagement. Students' academic engagement was assessed by the Questionnaire of Engagement (Reeve & Tseng, 2011). This questionnaire consists of four subscales measuring four aspects of student engagement in the classroom context: agentic engagement (e.g., "I let my teacher know what I am interested in" and "During class, I express my preferences and opinions"; 5 items; $a = .82$); behavioral engagement (e.g., "I pay attention in class" and "I work hard when we start something new in class"; 5 items; $a = .91$); emotional engagement (e.g., "I enjoy learning new things in class" and "When I am in class, I feel curious about what we are learning"; 4 items; $a = .84$), and cognitive engagement (e.g., "When doing schoolwork, I try to relate what I am learning to what I already know" and

Variable	1	2	3	4	5	6	7	8	9	10
1. Mastery-approach goals	—									
2. Mastery-avoidance goals	.59 ***	—								
3. Performance-approach goals	.55 ***	.57* **	—							
4. Performance-avoidance goals	.49 ***	.72* **	.71* **	—						
5. Agentic engagement	.35 ***	.21* **	.30* **	.22***	—					
6. Behavioral engagement	.69 ***	.50* **	.40* **	.45***	.37***	—				
7. Emotional engagement	.66 ***	.40***	.31* **	.32***	.48***	.75***	—			
8. Cognitive engagement	.71 ***	.45***	.43* **	.41***	.53***	.74***	.72***	—		
9. Engagement coping	.71 ***	.57***	.47* **	.47* **	.37* **	.71* **	.60* *	.72***	—	
10. Disengagement coping	— .01	.12**	.14* *	.22* **	.12* *	-.01	.02	-.01	-.01	—
<i>M</i>	3.6 6	3.44	3.33	3.33	3.04	3.68	3.56	3.48	3.45	2.52
<i>SD</i>	.79	.92	.86	.82	.86	.80	.81	.74	.76	.86

“I make up my own examples to help me understand the important concepts I study”; 8 items; $\alpha = .87$). Higher scores represent a higher level of student engagement in the academic context.

2.3.3 Academic coping strategies. Students’ use of academic coping strategies was assessed by the scale adapted from the Coping Orientations to Problems Experienced (COPE) inventory developed by Carver, Scheier, and Weintraub (1989). This inventory was used to measure the ways in which the general population respond to stress across different situations. Given that the current study was intended to investigate students’ coping responses in academic settings, the word “problem” in the original items was changed to “academic problem” when students’ tendencies to cope with academic stress were assessed. The adapted academic coping inventory consists of two scales. Engagement coping is comprised of three subscales (i.e., active coping: “I take additional action to try to get rid of the academic problem”; 4 items; planning: “I think about how I might best handle the academic problem”; 4 items; suppression of competing activities: “I put aside other activities in order to concentrate on schoolwork”; 2 items; $\alpha = .91$). Disengagement coping is comprised of four items (e.g., “I reduce the amount of effort I am putting into solving the academic problem” and “I just give up trying to reach my goal”; $\alpha = .76$).

3. Results

3.1 Regression Analyses

Descriptive information and correlations for study variables are shown in Table 1. Results from regression analyses are presented first for outcomes regarding academic engagement and then for academic coping. For the regressions predicting students’ academic engagement, achievement goals (i.e., mastery-approach, mastery-avoidance, performance-approach, and performance-avoidance goals) were included as predictors. In the hierarchical regression analyses predicting students’ academic coping, the four types of achievement goals were entered in block 1. In block 2, four aspects of academic engagement (i.e., agentic, behavioral, emotional, and cognitive engagement) were entered in the regression models. Students’ achievement goals were given higher priority of entry because these predictors were presumed to be causally prior to academic engagement (Tabachnick & Fidell, 2007).

Table 1 Descriptive Statistics and Correlations for Study Variables (N =402)

3.4 Differences between Students with Different Levels of Mastery- and Performance-Approach Goals

One of the purposes of the present study was to examine and compare the effects of different levels of approach-oriented goals (i.e., mastery- and performance-approach goals). To determine the effects of high versus low levels of mastery-approach goals on Taiwanese adolescent students' academic engagement and coping, a multivariate analysis of covariance (MANCOVA) was performed while including performance-approach goals as covariate. By taking into account performance-approach goals, it was hoped that the effects of mastery-approach goals would be detected more precisely. Adolescents who scored above the mean on mastery-approach goals were grouped as students with high levels of mastery-approach goal orientation. By contrast, those who scored below the mean on mastery-approach goals were identified as students with low levels of mastery-approach goal orientation. According to the criteria, there were 214 more mastery-approach oriented and 188 less mastery-approach oriented students. The means and standard deviations of the dependent variables according to these students' group membership are displayed in Table 4.

Two assumptions for the MANCOVA had been examined before the analysis was conducted. First, Box's M test was performed to check for the homogeneity of covariance matrices. The result of this test was not significant, suggesting the confirmation of this assumption. Additionally, the test for homogeneity of regression also yielded insignificant results. Hence, using a common regression coefficient to adjust for the covariate in both groups was appropriate. The MANCOVA revealed significant effects for mastery-approach goals on students' academic engagement and coping, Hotelling's $T = .58$, $F(6, 394) = 37.96$, $p < .001$, $\eta^2 = .37$.

Results of the univariate analyses indicated significant effects on agentic engagement, $F(1, 399) = 16.55$, $p < .001$, $\eta^2 = .04$, behavioral engagement, $F(1, 399) = 162.79$, $p < .001$, $\eta^2 = .29$, emotional engagement, $F(1, 399) = 130.20$, $p < .001$, $\eta^2 = .25$, cognitive engagement, $F(1, 399) = 147.92$, $p < .001$, $\eta^2 = .27$, and engagement coping, $F(1, 399) = 151.97$, $p < .001$, $\eta^2 = .28$. Students with high levels of mastery-approach goal orientation scored significantly higher than did students with low levels of mastery-approach goal orientation on agentic engagement (adjusted $M = 3.21$ versus adjusted $M = 2.84$, respectively), behavioral engagement (adjusted $M = 4.11$ versus adjusted $M = 3.19$, respectively), emotional engagement (adjusted $M = 3.97$ versus adjusted $M = 3.09$, respectively), cognitive engagement (adjusted $M = 3.85$ versus adjusted $M = 3.05$, respectively), and engagement coping (adjusted $M = 3.84$ versus adjusted $M = 3.01$, respectively). Evidently, after controlling for the effects of performance-approach goals, Taiwanese adolescents' academic engagement and coping varied as a function of their orientations to mastery-approach goals. Also, to investigate the effects of high versus low levels of performance-approach goals on Taiwanese adolescents' academic engagement and coping, a MANCOVA was performed while including mastery-approach goals as covariate. Students who scored above the mean on performance-approach goals were grouped as students with high levels of performance-approach goal orientation. Conversely, those who scored below the mean on performance-approach goals were identified as students with low levels of performance-approach goal orientation. According to the criteria, there were 182 more performance-approach oriented and 220 less performance-approach oriented students. The means and standard deviations of the dependent variables according to these students' group membership are also displayed in Table 4. Two assumptions for the MANCOVA, namely, Box's M test as well as the test for homogeneity of regression had been examined before the analysis was conducted. Both tests yielded insignificant results, suggesting that using a common regression coefficient to adjust for the covariate in both groups was appropriate. The MANCOVA revealed significant effects for performance-approach goals on students' academic engagement and coping, Hotelling's $T = .08$, $F(6, 394) = 5.36$, $p < .001$, $\eta^2 = .08$. Results of the univariate analyses indicated significant effects on agentic engagement, $F(1, 399) = 9.74$, $p < .01$, $\eta^2 = .02$, cognitive engagement, $F(1, 399) = 13.57$, $p < .001$, $\eta^2 = .03$, and engagement coping, $F(1, 399) = 12.90$, $p < .001$, $\eta^2 = .03$. Students with high levels of performance-approach goal orientation had significantly higher scores than did students with low levels of performance-approach goal orientation on agentic engagement (adjusted $M = 3.20$ versus adjusted $M = 2.91$, respectively), cognitive engagement (adjusted $M = 3.61$ versus adjusted $M = 3.37$, respectively), and engagement coping (adjusted $M = 3.59$ versus adjusted $M = 3.35$, respectively).

Table 4

<i>Differences Between Students with Different Levels of Mastery- and Performance-Approach Goals</i>										
	Mastery-approach goals					Performance-approach goals				
	High		Low			High		Low		
	<i>(n</i> = 214)		<i>(n</i> = 188)			<i>(n</i> = 182)		<i>(n</i> = 220)		
Variable	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>F</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>F</i>
Agentic engagement	3.27 (3.21) _a	.91	2.76 (2.84) _b	.70	16.55***	3.29 (3.20) _a	.87	2.82 (2.91) _b	.79	9.74**
Behavioral engagement	4.13 (4.11) _a	.64	3.16 (3.19) _b	.63	162.79***	3.98 (3.74) _a	.72	3.42 (3.62) _a	.78	2.46
Emotional engagement	3.97 (3.97) _a	.71	3.08 (3.09) _b	.63	130.20***	3.80 (3.57) _a	.79	3.35 (3.54) _a	.77	.16
Cognitive engagement	3.91 (3.85) _a	.62	2.99 (3.05) _b	.55	147.92***	3.82 (3.61) _a	.67	3.20 (3.37) _b	.69	13.57***
Engagement coping	3.90 (3.84) _a	.63	2.95 (3.01) _b	.57	151.97***	3.80 (3.59) _a	.70	3.16 (3.35) _b	.69	12.90***
Disengagement coping	2.52 _a (2.47) _a	.99	2.51 _b (2.56) _a	.68	.82	2.61 (2.63) _a	.99	2.44 (2.42) _a	.72	4.71

Note. Means within the parentheses were adjusted for the covariate. Different subscripts denote statistically significant differences ($p < .05$) in means according to Tukey's criteria.

** $p < .01$. *** $p < .001$

4. Discussion and Conclusion

Findings of the present research advance the understanding of the determining factors of adolescents' academic engagement and coping within the Taiwanese context. This line of research has primarily been confined to Caucasian samples. Given that academic stress is common among Asian students, there is a need to examine students' academic coping in more diverse cultural contexts (Compas et al., 2001). The present findings hence broaden the knowledge in this respect. Results of the present study indicate that mastery-approach goals positively predict all the four components of academic engagement. Performance-approach goals positively predict agentic engagement. These results sustain the vital role of mastery-approach goals in students' academic engagement that has been well documented in the literature. Further, results of hierarchical regressions suggest that mastery-approach and mastery-avoidance goals together with behavioral and cognitive engagement emerge as positive predictors of engagement coping. Mastery-approach goals negatively predict disengagement coping, whereas performance-avoidance goals positively predict this type of coping. Finally, results from MANCOVA show that both mastery- and performance-approach goals independently exert influences on students' academic engagement and coping. Such findings offer insights into the likely beneficial effects of pursuing multiple goals on Taiwanese adolescents' learning. Subsequently, several important findings are discussed in more detail.

4.1 Predictors of Academic Engagement

Results of the present study are consistent with the notion that engagement is the outward manifestation of motivation. As motivational variables in the present study, achievement goals in effect predict students' academic engagement. Mastery- and performance-approach goals positively predict agentic engagement. As described earlier, agentic engagement refers to students' efforts to initiate a process in which they increase the chance of experiencing both strong motivation and meaningful learning. It is therefore not surprising that both types of approach-oriented goals, whether focusing on self-improvement or outperforming others are found to be associated with this dimension of academic engagement.

Findings of the current study indicate that different aspects of engagement are predicted by different types of achievement goals. With regard to behavioral engagement, it is found that mastery-approach and performance-avoidance, two contrastingly different types of goals positively predict this aspect of engagement.

It is the widely held notion that mastery goals are linked to a host of positive academic behaviors (Anderman & Johnson, 1998; Miller et al., 1996), but performance-avoidance goals are hardly found to function as positive predictors of behavioral engagement. Behavioral engagement is characterized as an expression of students' on-task attention, lesson involvement, and effort (Reeve & Tseng, 2011). The present findings unexpectedly suggest that not only the aim for increasing one's own competence (i.e., mastery-approach goals), but the fear of appearing incompetent (i.e., performance-avoidance goals) may lead to greater student involvement in task demands. As for emotional and cognitive engagement, mastery-approach goals emerge as the only significant predictor of these two dimensions of academic engagement. The other type of approach-oriented goal (i.e., performance-approach goals) appears to be unrelated to Taiwanese adolescents' positive emotions such as enthusiasm, enjoyment, fun, and satisfaction. Neither are performance-approach goals related to the use of sophisticated cognitive strategies when students engage in schoolwork.

All in all, mastery-approach goals play a pivotal role in students' academic engagement. This type of goal positively predicts the four aspects of engagement in the current research. Moreover, mastery-approach goals account for large amounts of variance in emotional (44%) and cognitive engagement (50%). These statistics clearly show the profoundly positive effects of this type of goal on how Taiwanese students interact with academic tasks.

4.2 Predictors of Academic Coping

The primary goal of the present study is to examine whether students' achievement goals and academic engagement serve as determinants of their coping with academic stress. Results of hierarchical regression analyses indicate that both mastery-approach and mastery-avoidance goals significantly predict engagement coping. Mastery goals, whether focusing on achieving task mastery or avoiding a lack of task mastery, seem to bring about students' engagement in schoolwork when encountering difficulties. Mastery goals alone explain over half the variance (54%) in engagement coping. The predicting effects of mastery-approach goals are stronger than those of mastery-avoidance goals. In addition to mastery goals, behavioral and cognitive engagement are also found to be positive predictors of engagement coping. Mastery goals together with these two aspects of engagement account for two-thirds of the variance in students' effective coping with academic stress. When it comes to fostering engagement coping, students' task involvement including effort expenditure, attention, and persistence (i.e., behavioral engagement) as well as their use of sophisticated learning strategies (i.e., cognitive engagement) are significant determinants. Agentic and emotional engagement, however, seem to be unrelated to engagement coping. These findings suggest that not all aspects of academic engagement can be considered antecedents of Taiwanese adolescents' active coping with academic difficulties.

With regard to disengagement coping, mastery-approach goals negatively predict this type of coping. In contrast, performance-avoidance goals are found to be positively associated with disengagement coping. It is likely that mastery-approach goals may ameliorate one's inclination to use coping strategies that are oriented away from the stressors. Accordingly, this type of goal may act as antidote of disengagement coping. On the contrary, the fear of failure embedded in performance-avoidance goals may motivate students to use disengagement coping to deal with academic stress.

Results of the current research show that when achievement goals are controlled for, all the four aspects of academic engagement fail to significantly predict disengagement coping. Unlike mastery-approach goals that may mitigate students' tendency to employ disengagement coping, adolescents' academic engagement has nothing to do with decreasing students' use of disengagement coping in the face of academic difficulties. Further, it is noteworthy that agentic engagement, the newly included component of academic engagement (Reeve, 2012) predicts neither engagement nor disengagement coping when achievement goals are controlled for. The very dimension of engagement that students intentionally try to enrich the content of their learning and the environment of learning does not influence how they cope with academic stress.

4.3 Effects of Multiple-Goal Pursuit

In addition to regression analyses, MANCOVA is performed to explore the benefits of pursuing both mastery- and performance-approach goals. Results of MANCOVA reveal that while controlling for performance-approach goals, students with high levels of mastery-approach goal orientation report significantly higher levels of agentic, behavioral, emotional, and cognitive engagement as well as engagement coping than did those with low levels

of mastery-approach goal orientation. When mastery-approach goals are controlled for, performance-approach goals are found to be able to facilitate students' agentic engagement, cognitive engagement, and engagement coping. Evidently, both types of approach oriented goals independently exert their own effects on academic engagement and engagement coping. These findings corroborate Barron and Harackiewicz's (2000, 2001) notion that the pursuit of multiple goals (mastery- and performance-approach goals in this case) is conducive to the development of academic engagement and coping by means of an additive goal pattern.

4.4 Implications for Education

In light of the valuable effects of mastery-approach goals on optimizing adolescent students' academic engagement and coping, teachers are advised to cultivate students' mastery-approach goal orientation. To foster the adoption of mastery-approach goals, it is important to introduce mastery-focused practices including emphasizing personal improvement, using self-referenced standards, valuing effort expenditures, providing personally meaningful and challenging tasks, encouraging learning from making mistakes, and recognizing the value of making progress rather than outperforming others (Ames, 1992a; Kaplan, Middleton, Urda, & Midgley, 2002; Wolters, 2004). Moreover, the present findings show that performance-avoidance goals predict students' use of disengagement coping. Ames (1992a) suggested that teacher practices that highlight ability comparisons among students may result in students' concerns about negative judgment and, in turn, lead to the adoption of performance-avoidance goals. To prevent students from employing disengagement coping to tackle academic problems, social comparisons among students and a strong emphasis on the competitive evaluation, therefore, should be avoided in the classroom settings.

4.5 Limitations and Future Research

Although results of the present study provide insights into educational practices, there are several limitations that need to be addressed in the future research. First, the four-component model of engagement proposed by Reeve (2012) is used in the present study in order to more thoroughly explore the relationships between academic engagement and coping. Agentic engagement, the very component newly added to the model, is nevertheless unrelated to both engagement and disengagement coping. To precisely identify effects of this particular aspect of engagement on students' learning processes and outcomes, future research should include diverse outcome variables (e.g., a variety of achievement behaviors) such that how agentic engagement is at work in achievement-related processes may be clarified. Second, the present study only examines the influence of personal factors (i.e., achievement goals) on adolescents' academic engagement and coping. Future research can also examine the influences of such environmental factors as classroom goal structures and compare the magnitudes of effects of personal achievement goals and classroom goal structures on students' engagement and coping. The understanding of the role of environmental factors has the potential for effective interventions that may foster students' academic engagement and coping.

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