

Perception of classroom environment, achievement goals, and strategy use among Hong Kong students

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Abstract: This study examined the relations among Hong Kong students' perceived classroom environment, achievement goals, and strategy use. A total of 1522 Grade 5 students from six primary schools and Grade 7 students from six secondary schools in Hong Kong voluntarily responded to a questionnaire that measured these three sets of variables. Consistent with previous studies on goal orientation theory, findings of the study indicated that students' perceived classroom environment was significantly related to their personal achievement goals and strategy use. While mastery goals were found to be the strongest predictor of strategy use, performance-approach goals and perceived instrumentality also had positive relations with mastery goals and strategy use. Findings of the study suggested that mastery and performance goal orientation were not two contrasting goal orientations as conceptualized in the normative goal orientation theory and students with high motivation on both types of goal were more advantageous than students pursued either single goal. Moreover, the value of adding perceived instrumentality in studying students' motivation should also be emphasized. Implications of these findings for understanding Hong Kong students' motivation and planning effective teaching instruction to enhance their motivation are discussed.

Keywords: achievement goal, strategy use, classroom environment, Hong Kong students' motivation

Research on achievement goal theory is currently one of the most active areas of research on student motivation (Elliot & Thrash, 2001; Pintrich, Conley, & Kempler, 2003; Harachiewicz & Linnenbrink, 2005). Achievement goals are generally defined as perceptions about the purposes of achievement behaviors. They represent the meaning that individuals assign to achievement situations and provide a cognitive structure for arranging how individuals define success and failure, their affective reactions, and their subsequent behaviors (Dweck, 1986; Urdan, 1997). Since achievement goals have important influences on how students perceive their academic outcomes and determines their attitudes in academic engagement, understanding students' achievement goals provides useful insights for educators to facilitate students' learning.

Among various goal orientation theories, two contrasting goal orientations have been identified and have received substantial research interest (Ames, 1984; Dweck & Leggett, 1988; Nicholls, 1984). Students with mastery goal orientation (or labeled as learning goals or task-involved goals) focus on developing competence, learning, and understanding a task. They tend to master a task according to self-referenced standards of importance (Pintrich *et al.*, 2003). Therefore, whatever their confidence in ability is, they still have incentives to learn. Research findings have consistently shown that students' learning goal orientation was positively related to their intrinsic interest in learning, adaptive pattern of attribution, persistence on tasks, and deep cognitive engagement (Ames, 1992; Greene & Miller, 1996).

There is a consensus among goal theorists that mastery goal orientation is an adaptive motivation orientation that facilitates learning.

In contrast, students with performance goal orientation (or labeled as relative ability goal or ego-involved goals) focus on demonstrating competence, being superior to others, and the use of social comparison standards (Pintrich *et al.*, 2003). Learning itself is viewed only as a way to achieve a desired goal. Therefore, in the normative goal orientation theory, performance goal orientation is posited as a maladaptive motivation orientation. However, research findings on the relation between performance goal, academic behaviors and achievement have been inconsistent. Whereas some researchers have suggested that students with performance goals are more likely to attribute failure to ability, prefer less challenging tasks, use more surface processing learning strategies, and are less persistent when faced with difficulties (Ames, 1992; Dweck & Leggett, 1988), there has been some evidence that performance goals have positive relations with adaptive outcomes, such as task value, academic self-concept, active engagement, and graded performance (Harachiewicz *et al.*, 2002; Harachiewicz, Barron, & Elliot, 1998; Pintrich & Garcia, 1991).

Instead of viewing performance goal orientation as a uniform construct, Elliot (Elliot, 1997; 1999; Elliot & Church, 1997) has proposed that the approach and avoidance components of performance goals should be separated. Different types of performance goals may have very different implications for motivation, cognition, and achievement. Performance-avoidance goals represent students' high fear of failure and low competence expectancies. Research findings consistently show that work avoidance goals were negatively related to students' intrinsic motivation, learning attitudes, deep cognitive engagement, and achievement (Elliot & Church, 1997; Meece, Blumenfield, & Hoyle, 1988; Pintrich *et al.*, 2003; Urdan, 1997). In contrast, with regard to performance-approach goals, students can be positively motivated to outperform others and demonstrate their competence and superiority. In this sense, students who pursue performance-approach goals may have similar positive academic outcomes as students who pursue learning goals (Barron & Harachiewicz, 2003; Elliot & Church, 1997; Harachiewicz *et al.*, 1998). Given the possible positive potential of performance-approach goals, researchers have moved beyond the dichotomous mastery/performance framework to a multiple goal perspective, in which mastery goals and performance goals can work together to facilitate motivation and performance (Church, Elliot, & Gable, 2001; Harachiewicz & Linnenbrink, 2005; Harachiewicz *et al.*, 1998; Pintrich, 2000).

Regarding the nature of performance goal orientation, researchers have suggested an important direction to expand the achievement goal research to different ethnic and cultural groups (Harachiewicz & Linnenbrink, 2005; Urdan, 1997). Since different cultures value different achievements and the ways of attaining those achievements, it is reasonable to expect that the same achievement goals may be more or less adaptive for students of different ethnic and cultural backgrounds. Traditional Chinese culture is influenced by Confucian thinking, emphasizing the important role of effort in pursuing outperforming achievement (Ho, 1994; Xiang, Lee, & Solmon, 1997; Yang, 1997). So it is quite likely that Chinese students tend to adopt both mastery goals and performance goals simultaneously. Moreover, the classroom environment in Hong Kong schools is well-known for its competitiveness and

examination stress (Biggs, 1991). In previous Western studies, researchers have found that due to the matching hypothesis, students with performance-approach goals are more adaptive in a competitive learning environment than in a mastery-oriented learning environment (Barron & Harachiewicz, 2003; Harachiewicz *et al.*, 1998). The competitive learning environment in Hong Kong classrooms, in which outperforming others is the major goal of many Hong Kong students, is an appropriate educational context for testing the effects of performance-approach goals.

Both mastery goals and performance goals concern the immediate purposes of students' achievement behaviors. Some researchers have argued that adding a future time perspective in studying students' achievement goals can lead to greater understanding of students' achievement behaviors and potentially more influential intervention (Lens, 2001; Miller & Brickman, 2004). In our study, students' perceived instrumentality was chosen to examine how future goals affected their cognitive engagement. Perceived instrumentality is an individual's understanding of the future instrumental value of a present behavior (Husman & Hens, 1999). Perceived instrumentality as a distal valued outcome can provide clear directions for planning a path of proximal subgoals leading to future goal attainment and give additional incentive value of proximal task performance. Since students' perceived instrumentality is usually self-determined and is connected endogenously to an identified future goal, it can have positive effects on students' motivation though it is extrinsic in nature (Husman & Hens, 1999). Previous studies have supported the findings that students' perceived instrumentality is positively related to their mastery goals, intrinsic motivation, self-regulation, and performance (Husman & Hens, 1999; Greene *et al.*, 2004; Miller & Brickman, 2004; Miller *et al.*, 1996). Perceived instrumentality is particularly important for Chinese students. Learning itself has seldom been viewed as an ultimate goal from ancient China to modern Chinese society. Most Chinese people emphasize the importance of learning mainly because of its high instrumental value for getting good careers (Gow *et al.*, 1996; Ho, 1994). It is desirable, therefore, to include perceived instrumentality in studying Chinese students' achievement motivation.

Since achievement goals can have important impacts on subsequent motivational, cognitive, and affective outcomes, understanding how students' goal orientations are formed should provide useful directions to improve their motivation and achievement. Previous studies have demonstrated the significant role of classroom contextual factors, especially teachers' instructional practices, in the shaping of students' goal orientations (Pintrich *et al.*, 2003; Urdan, 1997). In general, a perceived mastery goal structure in the classroom has been found to be related to students' personal mastery goals and adaptive behaviors whereas a perceived performance goal classroom structure is related to students' personal performance goals and maladaptive behaviors (Ames & Archer, 1988; Anderman & Midgley, 1997; Roeser *et al.*, 1996; Urdan, 1997; Wolters, 2004). Based on a systematic analysis of how classroom structures affect students' goal adoption, Ames (1992) has used a conceptual system labeled "TARGET" (originally developed by Epstein, 1988) to organize the significant classroom characteristics presumed to orient students toward the adoption of achievement goals. Under the TARGET acronym, six contextual factors, task, autonomy, recognition, grouping, evaluation, and time, are highlighted in establishing a mastery goal structure in the classroom. Studies derived from this TARGET framework have strongly supported the hypothesized

links between these classroom characteristics and students' mastery goal adoption (Ames & Archer, 1988; Anderman & Anderman, 1999; Barron & Harachiewicz, 2003; Church *et al.*, 2001; Greene *et al.*, 2004); Pintrich, Roeser, & DeGroot, 1994).

Based on goal orientation theory and previous findings in Western studies, the present study was designed to investigate the relationships between Hong Kong students' perceived classroom environment, achievement goals, and strategy use. In our study, students' mastery goals, performance-approach goals, and perceived instrumentality were hypothesized as mediated factors affected by students' perceived classroom environment and, in turn, affected their strategy use. Specifically, we sought answers to these questions:

- (1) While the positive relation between mastery goals and students' achievement behaviors has received consistent support, would performance-approach goals also have a positive relationship with strategy use among Chinese students in Hong Kong?
- (2) From a multiple goal perspective, would students who pursued both mastery and performance-approach goals have a more positive perception of classroom environment and employ more learning strategies when compared with students who pursued single type of goal?
- (3) Was perceived instrumentality a significant element of Hong Kong students' motivation? What were the relationships between students' perceived instrumentality and their mastery goals, performance-approach goals, and strategy use?
- (4) Based on the TARGET framework, would students' perceived classroom environment have significant relationships with their goal orientations, and strategy use?

Method

Participants

A total of 1522 Grade 5 and Grade 8 Hong Kong Chinese students (805 boys and 717 girls) participated voluntarily in our study. Their ages were between 10 and 17 years, with a mean of 12.23 and an SD of 1.73. They came from six primary schools (N = 597) and six secondary schools (N = 925). The sample consisted of similar numbers of students with high, average, and low levels of academic achievement. Specifically, 444 students came from four Band 1 schools (schools with high achieving students), 622 students came from four Band 2 schools (schools with moderate achieving students), and 456 students came from four Band 3 schools (schools with low achieving students). Participants were carefully chosen to ensure the sample was representative.

Instruments

Participants completed a Classroom Learning Questionnaire in their daily classes. This questionnaire was mainly based on two questionnaires, namely the Survey of Classroom Goals Structures and Motivation and Strategy Use Survey, developed by Greene and her colleagues (Greene & Miller, 1996; Greene *et al.*, 2004; Miller *et al.*, 1996) in their series of studies on the goal orientation theory.

The original questionnaires were written in English and validated in studies of high school and college students. In our study, the items were translated into Chinese and adapted

for primary and secondary students in Hong Kong. The 45-item questionnaire consists of three parts, measuring separately students' perceived classroom environment, achievement goal orientation, and strategy use. All items in the questionnaire are on a 4-point Likert scale (1 = very different from me; 2 = a little different from me; 3 = a little like me; 4 = a lot like me). Simple items and descriptive statistics for each scale in the questionnaire are shown in Table 1.

The measures of classroom environment were derived from the Survey of Classroom Goals Structures. Three important classroom characteristics from the TARGET model, including "motivating tasks", "autonomy support", and "mastery evaluation", were chosen to explore students' perceptions of their classroom environment. Altogether there are 18 items in this part of questionnaire, with each scale consisting of 6 items.

The measures of students' achievement goal orientation were derived from the Motivation and Strategy Use Survey. There are three scales measuring three different types of reasons for students to study hard in their class. Specifically, the "mastery goal" scale measures students' intrinsic reasons for learning, such as developing competence, learning and understanding the task. The "performance-approach goal" scale measure students' incentive to demonstrate competence, get high performance, and be superior to others. The "perceived instrumentality" scale measures students' perceived instrumental value of learning on achieving their future goals. There are 15 items in this part of questionnaire, with each scale consisting of 5 items.

The measures of students' strategy use were derived from the Motivation and Strategy Use Survey. This part of the questionnaire only has one "strategy use" scale. Twelve items in this scale were used to assess students' use of different strategies in studying.

Table 1: *Sample item and descriptive statistics for variables measured in the study*

Sample item	No. of item	Mean	SD	Chronbach's alpha
<u>Perceived Classroom Environment</u>				
Mastery task: Teachers' activities and assignments are interesting.	6	2.83	.50	.74
Autonomy support: Students can choose projects/topics they want to work on.	6	2.74	.47	.66
Mastery evaluation: Teachers pay attention to students' improvement when grading.	6	2.90	.47	.58
Composite score	18	2.82	.42	.85
<u>Achievement Goal Orientation</u>				
Mastery goal: I am willing to study hard because I want to learn new ideas and skills.	5	3.21	.58	.84
Performance-approach goal: I am willing to study hard because I want others to think I am smart.	5	2.83	.66	.82
Perceived instrumentality: I am willing to study hard because my achievement plays a	5	3.30	.60	.86

role in reaching my future goal.

Strategy Use	12	2.83	.54	.87
Strategy use: Before a quiz or examination, I plan out how I will study.				

Procedure

All students were administered the Classroom Learning Questionnaire during regular class periods by their teachers, who read a standard instruction on the administration procedures, answered their questions, and reassured them that all the data collected were confidential and would be used for research purposes only. It took about 10 minutes for students to complete the questionnaire. All questionnaires were collected by the teachers immediately after completion and were returned to the investigators within a week.

Results

Preliminary analysis for establishing reliability and validity evidence

Since the instruments adopted in this study were originally developed for Western students, the reliability and validity of the scales were checked before running subsequent analyses. The internal consistency estimates of reliability for the scales are shown in Table 1 and zero-order correlations of the scales are shown in Table 2. The three classroom environment scales only showed moderate internal consistency (.58 - .74). Findings of the zero-order correlations indicated high correlations (.61 - .70) among the three scales. Regarding the scales measuring students' achievement goal orientation and strategy use, the values of Cronbach's coefficient alpha were sufficiently high (.82 - .87) for evidence of internal consistency. Among the three goal orientations, students had highest scores on perceived instrumentality, followed by mastery goal and performance-approach goal. Findings of the zero-order correlation indicated moderate to high correlations (.37 - .72) among the three goal orientation scales. Mastery goal and perceived instrumentality were closely related. The moderate but positive correlation between mastery goal and performance-approach goal indicated these two types of goal orientation were not as contradictory as posited in the normative goal orientation theory.

Table 2: *Correlations among students’ perceived classroom environment, goal orientation, and strategy use*

	MT	AS	ME	MG	PG	PI
Motivating Task (MT)						
Autonomy Support (AS)	.72***					
Mastery Evaluation (ME)	.62***	.61***				
Mastery Goal (MG)	.45***	.40***	.40***			
Performance-approach Goal (PG)	.22***	.22***	.17***	.44***		
Perceived Instrumentality (PI)	.39***	.35***	.37***	.72***	.42***	
Strategy Use (SU)	.46***	.43***	.40***	.63***	.35***	.53***

Note. *** $p < .001$

Confirmatory factor analysis (CFA) using LISREL 8.30 (Joreskog & Sordom, 1998) was employed to examine the factor structure of the classroom environment scales and achievement goal orientation scales. In this study, two measurement models were specified separately for the two sets of measures. In each model, the items were specified to load on only the factor they were designed to measure. To ensure an adequate assessment of the model fit, multiple criteria and a number of indices were employed in the study (Bentler, 1990; Joreskog & Sordom, 1998; Steiger, 1990). For the measurement model of the three classroom environment scales, findings of CFA indicated a good fit to the data (see Table 3). Inspection of the lambda coefficients, modification indices, and measurement errors generally supported the proposed factor structure of the scales. However, it was noteworthy that correlations among the three latent variables were extremely high (.90 - .98), suggesting that the three latent variables might measure a same construct. Indeed, although each classroom structure was described separately in the original conceptualization of TARGET model, Ames (1992) has emphasized that these structures are overlapping and interdependent. Researchers have not reached a broad consensus on whether classroom structures should be measured as a composite score or individual indicators (Church *et al.*, 2001). Based on the findings of CFA, a composite score of classroom environment was used in the subsequent analyses.

Table 3: *The goodness of fit for the measurement models of and the structural equation model in the study*

Measurement model / Structural equation model	Goodness-of-fit index				
	χ^2	df	NNFI	CFI	RMSEA
Classroom environment	471.25	132	.94	.95	.04
Goal Orientation	740.19	87	.93	.94	.07
Structural Equation Model	2036.17	395	.92	.93	.05

Note. NNFI = Non-normed fit index; CFI = Normed comparative fit index; RMSEA = Root mean square error of approximation

For the measurement model of the three goal orientation scales, findings of CFA also indicated a good fit to the data (see Table 3). Inspection of the lambda coefficients, modification indices, and measurement errors generally supported the proposed factor structure of the scales. Correlation between mastery goal and performance-approach goal was

moderate and positive (.50). This finding again supported the finding that mastery goal and performance-approach goal were not two contrasting goals. Correlation between mastery goals and perceived instrumentality (.84) was higher than correlation between performance-approach goal and perceived instrumentality (.47). This finding suggested that although mastery goal and perceived instrumentality were two conceptually different goals, in which mastery goal was intrinsic whereas perceived instrumentality was extrinsic in nature, they were closely related goals in the eyes of Hong Kong students.

An examination of zero-order correlation provided initial validity evidence for the three sets of measures. Consistent with goal orientation theory and previous findings, a mastery-oriented classroom environment was positively related to students' personal mastery goal. Students' mastery goal had the strongest positive correlation with their strategy use. Students' perceived classroom environment, performance-approach goal, and perceived instrumentality also showed moderate and positive correlation with their strategy use. In sum, the hypothesized relationships among students' perceived classroom environment, goal orientation, and strategy use were initially supported.

Relationships between perceived classroom environment, goal orientation, and strategy use

Structural Equation Modeling (SEM) using the LISREL 8.30 program was employed to examine the hypothesized relationships between students' perceived classroom environment, goal orientation, and strategy use. Based on the findings of CFA, the scores of "mastery task", "autonomy support", and "mastery evaluation" scales were used as item parcels to form the latent variable of classroom environment. For other latent variables in the model, item scores were used as observed indicators. The directions of the relations among the latent variables are shown in Figure 1. The model hypothesized that students' perceived classroom environment affected their goal orientations and their goal orientations, in turn, affected their strategy use. Besides the indirect effects, classroom environment was also hypothesized to have direct effects on students' strategy use.

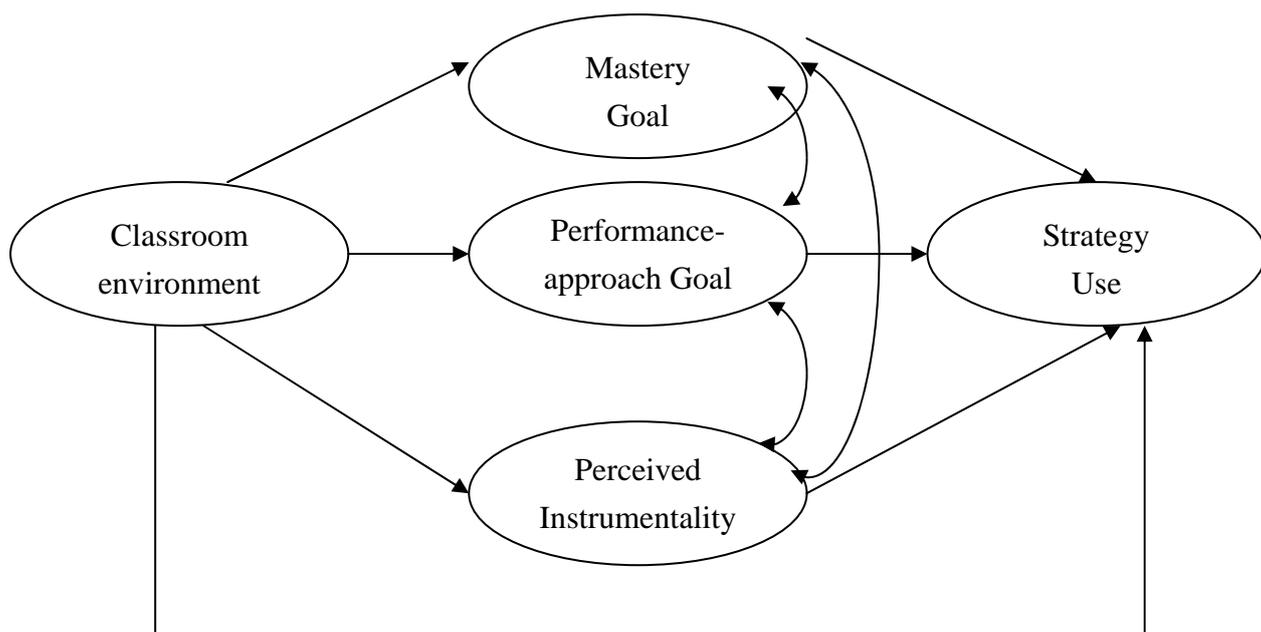


Figure 1: *The hypothesized structural equation model in the study*

Findings of SEM indicated a good fit for the hypothesized model (see Table 3). However, the proposed path between performance-approach goal and strategy use and the path between perceived instrumentality and strategy use did not reach the significant level ($p < .05$). Although performance-approach goal and perceived instrumentality did show significant relationships with strategy use in zero-order correlations, these relations became insignificant when the effects of classroom environment and all goal orientations on strategy use were assessed simultaneously in SEM. The model was then respecified by setting those two insignificant paths fixed. As shown in Figure 2, findings of SEM indicated that students' perceived classroom environment had significant and positive effects on their various types of goal orientations. A mastery-oriented classroom environment was more closely related to students' mastery goal and perceived instrumentality than to their performance-approach goal. Students' mastery goal was found to be the strongest predictor of their strategy use. Besides the direct effects (.26), findings of SEM also supported the indirect effects (.42) of classroom environment on students' strategy use mediated through their mastery goal.

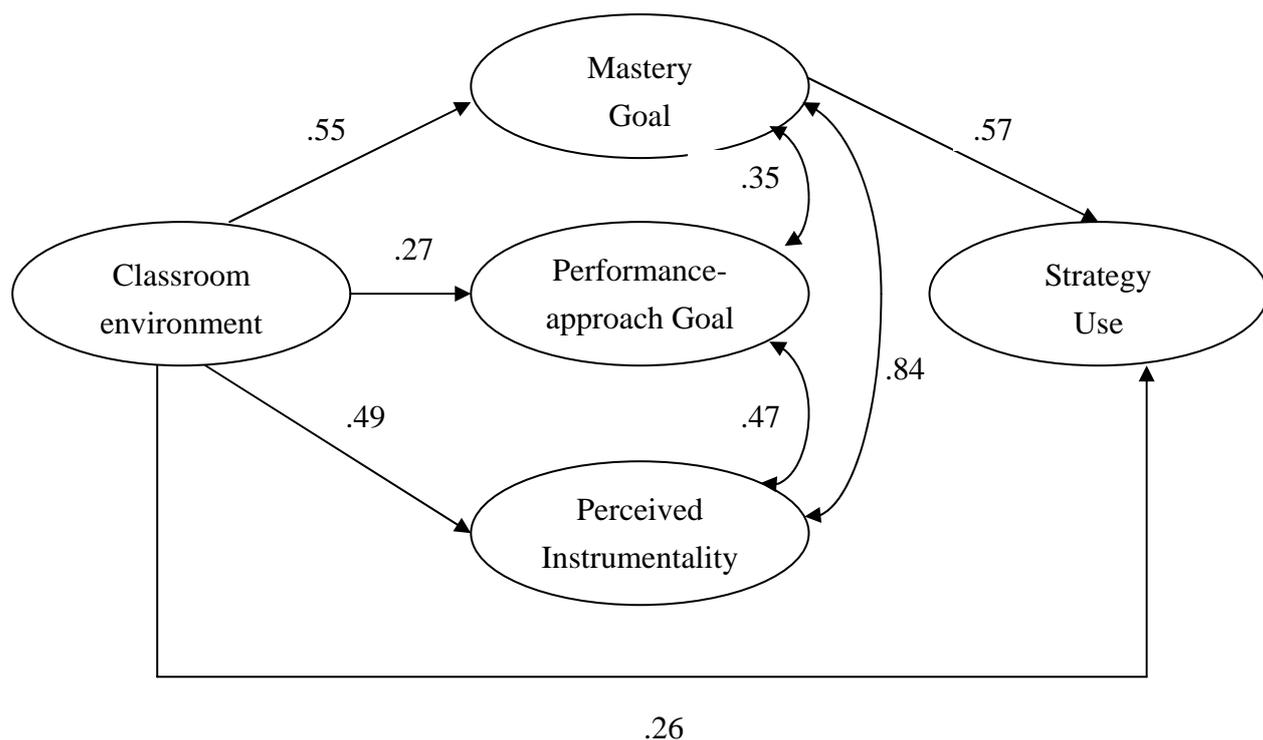


Figure 2: The structural equation model showing important relationship among the latent variables in the study

Single goal versus multiple goals

Findings of zero-order correlation and SEM clearly indicated that the performance-approach goal was positively related to mastery goal and strategy use. To explore further whether students who pursued a high mastery and high performance-approach goal had more positive perception of their classroom environment and employed more learning strategies than students who pursued single type of goals, students were classified into four groups with median split (high mastery and high performance-approach goal group, high mastery and low performance-approach goal group, low mastery and high performance-approach goal group, low mastery and low performance-approach goal group). Two one-way ANOVAs were separately performed to examine the differences between the four student groups of their perception of classroom environment and their strategy use.

Means and standard deviations of each student group on their perceived classroom environment and strategy use as well as the findings of one-way ANOVAs are shown in Table 4. Significant group differences were found on both measures. Findings of post hoc tests indicated that the high mastery and high performance-approach goal group scored highest on both measures, followed by the high mastery and low performance-approach goal group, the low mastery and high performance-approach goal group, and the low mastery and low performance-approach goal group, respectively. Students who pursued high motivation on both mastery and performance-approach goal perceived their classroom environment as more mastery-oriented and employed more learning strategies than did students who pursued single type of goals. These findings supported the multiple goal perspective that the mastery and performance-approach goals were not contradictory and could work together to facilitate

students' motivation.

Table 4: Differences among students with different combinations of goal orientations on their perceived classroom environment and strategy use

Measured Variable	Group	No. of Student	Mean	SD	F (3, 1518)	Post Hoc Tests	
Perceived Classroom Environment	1	462	3.01	.42	83.71***	1>2,3,4	
	2	307	2.92	.36			2>3,4
	3	364	2.72	.36			3>4
	4	389	2.63	.39			
	Total	1522	2.82	.42			
Strategy Use	1	462	3.15	.48	178.87***	1>2,3,4	
	2	307	2.98	.44			2>3,4
	3	364	2.67	.43			3>4
	4	389	2.46	.48			
	Total	1522	2.83	.54			

Note. Group 1 = high mastery and high performance goal; Group 2 = high mastery and low performance goal; Group 3 = low mastery and high performance goal; Group 4 = low mastery and low performance goal;
*** $p < .001$

Discussion

Our study examined the relations among Hong Kong students' perceived classroom environment, achievement goals, and strategy use. In sum, our findings have provided insights for answering our four research questions.

(1) Consistent with previous studies on goal orientation theory, findings of the study indicated students' mastery goals showed the strongest relation with their strategy use. When the approach component of performance goals was adopted, it was found that Hong Kong students' performance goals were positively related to their mastery goals and strategy use.

(2) The study supported the multiple goal perspective that students who pursued high mastery goals and performance-approach goals had more positive perceptions of their classroom environment and employed more learning strategies than did students who pursued either single goal.

(3) Besides mastery goal and performance goal, perceived instrumentality was another significant element of Hong Kong students' motivation. Perceived instrumentality was found to have close and positive relation with students' mastery goal and their strategy use.

(4) Consistent with previous findings on the TARGET model, students' perceived classroom environment was significantly related to their goal adoption and strategy use. A mastery-oriented classroom environment was more closely related to students' mastery goal orientation and perceived instrumentality than to their performance goal orientation. Classroom environment also indirectly affected students' strategy use through their mastery goal.

Findings of our study generally support that the achievement goal orientation theory, which has been developed in Western society, is well generalized in a Chinese context. Specifically, our findings support the view that the approach components of performance goal orientation had positive effects on students' strategy use (Elliot, 1997; 1999; Elliot & Church, 1997). In the normative achievement goal theory, mastery and performance goal have been conceptualized as two contrasting goal orientations. In the past, the majority of research studies have concentrated on mastery versus performance goal comparisons and the findings have been simplified as "mastery goals are good and performance goals are bad" (Ames, 1992; Dweck & Leggett, 1988; Nicholls, 1984). However, the mixed results regarding the effects of performance goals have generated debates among goal orientation theorists on whether the normative achievement goal theory should be revised. While some researchers have suggested that the approach component of performance goals are also beneficial for students' learning and have proposed to revise the goal theory by adopting a multiple goal perspective (Barron & Harachiewicz, 2001; Harachiewicz & Linnenbrink, 2005; Harachiewicz *et al.*, 2002; Pintrich, 2003), other researchers have argued that performance-approach goals are only adaptive for some achievement-related outcomes in some circumstances and the deleterious consequences of performance goals should not be ignored (Kaplan & Middleton, 2002; Midgley, Kaplan, & Middleton, 2001). In recent years, Harachiewicz and her colleagues have found certain evidences to support the benefits of performance-approach goals for college students, especially in their cognitive engagement and academic achievement (Barron & Harachiewicz, 2003; Harachiewicz *et al.*, 1998). They have argued that the benefits of performance-approach goals are more salient for college students because they are better matched to the social comparisons and performance pressures operating at higher levels. Findings of our study provided additional support for the multiple goal perspective by expanding the scope of research to primary and junior secondary students. As mentioned before, the emphasis on achievement in traditional Chinese culture and the competitive learning environment in Hong Kong classrooms may make performance-approach goals more adaptive for Hong Kong students even in the early grades. While findings of our study echoed numerous studies in finding that mastery goal orientation was the most advantageous goal orientation, our study also suggested that performance-approach goals could be combined with mastery goals to promote optimal motivation. Having a high intrinsic interest in learning and an incentive to strive for high achievement provided multiple motivational sources for Hong Kong students to maintain positive learning attitudes in a highly competitive learning environment.

Findings of our study also pointed to the importance of including perceived instrumentality in studying Hong Kong students' motivation. Students scored highest in perceived instrumentality among the three types of goal orientation. Ho (1994) has used the term "utilitarian pragmatism" to describe Chinese people's view on education. In ancient China, people used to view the imperial examination system as one of the main vehicles for entering the bureaucracy. From the Confucian tradition, education in the Chinese context could be viewed from both internal (intrinsic) and external (extrinsic) perspectives as education is both important for personal development and social mobility (Lee, 1996). Nowadays, many Hong Kong students still regard learning as a means of obtaining good educational or career prospects. Therefore, it was not surprising to find that perceived

instrumentality was the most important achievement goal for Hong Kong students. Findings also indicated students' perceived instrumentality was positively related to their strategy use. This finding was consistent with previous studies that concluded that instrumentality provided incentive and direction for students' self-regulated learning (Miller & Brickman, 2004; Miller *et al.*, 1996). The strong relation between mastery goal and perceived instrumentality was an interesting finding in our study. From a theoretical perspective, mastery goal and perceived instrumentality should be two conceptually different goal orientations, in which mastery goal is intrinsic and perceived instrumentality is extrinsic in nature. The strong relationship between these two goal orientations in our study could also be explained by Deci and Ryan's self-determination theory (Deci & Ryan, 1985; Ryan & Deci, 2000). According to the self-determination theory, extrinsic motivation can be distinguished into different levels, from the most surface level, "external regulation", to the most internal level, "integrated regulation". Whereas external regulation is totally controlled by external reinforcement, integrated regulation is mainly due to internalization and integration of external value. When students fully identify and internalize the instrumental value of learning, this kind of extrinsic motivation is similar to mastery goal and can also create positive effects on their learning. Due to the pragmatism of Chinese culture, Hong Kong students are socialized to identify with the future value of learning. Therefore, it is understandable why Hong Kong students regard perceived instrumentality as similar to intrinsic mastery goals.

While students' achievement goal orientations had important impacts on their achievement-related behaviors, our findings also supported classroom environment as an important antecedent of students' goal adoption. Consistent with previous studies, a mastery-oriented classroom environment was found to be most closely related to students' mastery goals (Ames & Archer, 1988; Anderman & Anderman, 1999; Barron & Harachiewicz, 2003; Church *et al.*, 2001; Greene *et al.*, 2004); Pintrich, Roeser, & DeGroot, 1994). In addition, classroom environment also positively affected students' strategy use directly and indirectly through their mastery goals. In our study, a mastery-oriented classroom environment was characterized by providing students with motivating tasks, autonomy support, and mastery evaluation. Based on the TARGET model (Ames, 1992), tasks that involve variety, diversity, and meaningful reasons can enhance students' intrinsic interest in learning. Giving students choices and support for planning and applying appropriate strategies can develop students' competence and self-regulation. Evaluation that focuses on mastering the tasks instead of grading can avoid social comparison and direct students' attention to deep understanding of the tasks. All these factors encourage students to adopt a mastery goal orientation and employ deep-processing strategies.

In conclusion, our findings provided important insights for educators in understanding Hong Kong students' motivation and for planning effective instruction to enhance students' learning motivation. The strong relationship between students' mastery goals and strategy use supported the hypothesis that goal orientation theory, although developed in the West, can be generalized to Chinese students in Hong Kong. The concrete guidelines suggested by the TARGET model are useful for teachers seeking to establish a mastery-oriented classroom environment that encourages students' adoption of mastery goals. Besides mastery goals, the positive effects of performance-approach goal and perceived instrumentality should also be

noted. Though mastery goal orientation is the optimal motivation for students' learning, it is unrealistic to expect that all the instructional tasks in school can match students' interests. Moreover, the highly competitive examination system in Hong Kong also makes a purely mastery goal impossible. Performance-approach goals provide a good match to the educational environment in Hong Kong. Therefore, while emphasizing the intrinsic meaning of learning, teachers can also make use of the positive side of performance-approach goals, such as setting up concrete performance goals with their students based on their ability levels and guiding them to plan appropriate strategies to achieve the goals. The importance of perceived instrumentality provides another direction for helping students with poor motivation. For areas where students lack interest, their motivation can be enhanced through internalizing the future utility of school-related knowledge and skills. When students perceive learning tasks as worthy of making a personal investment, they are willing to sustain effort in areas of low interest.

While the findings of our study have important implications for the study of student motivation in Hong Kong, several limitations of this study and suggestions for future study should be noted. First, the study only investigated the relationships between students' goal orientation and their strategy use. Students' goal orientation may have effects on their various achievement-related outcomes. It is especially important for the study of performance-approach goals. Support for the benefits of performance-approach goals has come mainly from studies focusing on students' achievement and cognitive engagement (Barron & Harachiewicz, 2003; Harachiewicz *et al.*, 1998; Urdan, 1997). Midgley and her colleagues (2001) have warned that the cost of performance-approach goals, such as using self-handicapping strategies, avoidance of novelty and challenge, cheating, and being reluctant to co-operate with peers, should not be overlooked. Our findings support the benefit of performance-approach goals on their positive relationships with students' strategy use. Whether Hong Kong students who pursue performance-approach goals are really adaptive in their learning should be explored further in future studies including more outcome measures. Secondly, while our findings suggest that mastery goals combined with performance-approach goals was more advantageous than single types of goals, it was not clear how these two types of goal orientation worked together to facilitate students' learning. Barron & Harachiewicz (2001) have proposed four potential patterns, additive, specialized, interactive, and selective goal effect, in which performance-approach goals can combine with mastery goals to promote optimal motivation. Since the multiple goal perspective is a new research direction in the field, the concrete relationship between mastery and performance-approach goal deserves further research attention. Thirdly, though the relationship between classroom environment and students' goal adoption has been well documented, some methodological issues have been raised concerning the measurement of classroom environment. Like most of the survey studies, our study employed a students' self-reported questionnaire to measure classroom environment. Though researchers have argued that it is how an individual interprets his/her classroom environment that is predictive of his/her own motivation, cognition, and behaviors (Ames, 1992; Greene *et al.*, 2004; Maehr & Midgley, 1991), some researchers have begun to emphasize the value of adding teacher perception data or observational data for triangulation and providing additional information to understand the interactive relationships between classroom environment and students'

motivation (Church *et al.*, 2001; Pintrich *et al.*, 2003). In addition, the limitation of survey methods in examining causal relations should also be noted. Urdan (1997) has pointed out that the relationship between students' perceived classroom environment and their personal goal can be reciprocal because students' personal goal orientation may also affect their perception of classroom goal structure. Therefore, studies using longitudinal or experimental design are needed to delineate accurately the causal relationships between these two variables. Lastly, although the sample in this study was carefully chosen to increase its representiveness, all students were from Grade 5 and Grade 8. The findings could hardly be claimed to be generalizable to all Chinese students in Hong Kong. The need for cross-replication in future studies with a larger sample or students in other grades should be emphasized.

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