

LAI06321

A study of intrinsic motivation, achievement goals and study strategies of Hong Kong Chinese secondary students

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Abstract

Research has pointed out that motivational orientations influence the study strategies students adopt and subsequently influence academic achievement. While achievement goals emphasize the ways in which students think about themselves in learning, intrinsic motivation reflects students' engagement in learning for its own sake. Both have impact on learning strategy and achievement. This paper reports the study of the relationship among intrinsic motivation, achievement goals, study strategies and achievement. The participants were 786 male and 595 female students from Hong Kong. Intrinsic motivation, viz. challenge, curiosity and independent mastery, and achievement goals, viz. mastery goal, performance approach and avoidance goals, were examined for their correlation with learning strategies and achievement. The results showed that the three subscales of intrinsic motivation were all positively and significantly related with deep strategy but not with surface strategy. Performance approach goal and performance avoidance goal were significantly and positively related to both deep and surface strategy while mastery goal was significantly related with deep strategy only. Academic achievement was positively and significantly related with deep but not surface strategy. Results of multivariate analysis showed significant differences in gender and level of study for the three variables under study. The results were discussed in relation to the Chinese cultural context and implications were drawn for enhancing motivation to learn.

Introduction

Motivation has long been considered by psychologists and educators as an important factor that affects student learning and achievement. It is a common contention that adaptive motivational orientations facilitate learning while maladaptive ones impede it. Recent research in motivation has focused on the nature of motivational constructs and the ways these constructs affect learning and achievement. According to the social-cognitive model of motivation, motivation is a dynamic, multifaceted phenomenon that explains how and why students are engaged in their learning activities. In line with this thinking, research in motivation has identified a number of motivational constructs that have impacts on students' learning (Pintrich & Schunk, 2002). Research findings have maintained that intrinsic motivation and achievement goals are powerful enablers for academic learning and achievement (Linnenbrink & Pintrich, 2002). These two motivational constructs also represent two of the major theories in the current studies of motivation (Eccles, Wigfield, & Schiefele, 1998; Graham & Weiner, 1996; Pintrich & Schunk, 2002). The present study aims to examine the motivational profiles of Hong Kong secondary students with respect to intrinsic motivation and achievement goals. The study also compares these motivational constructs between boys and girls and between junior and senior secondary students. The relationships with learning strategies and academic achievement were also examined.

Intrinsic Motivation

In the early years of study in motivation, White (1959, 1960) described intrinsic motivation as a kind of motive to master. People seek challenges to overcome and learn new skills to master simply to have the pleasure of mastery and accomplishment. Hunt (1961, 1965) viewed intrinsic motivation as a motivational value of a sense of control. Human finds the exercise of control over their environment to be inherently motivating. Harter (1979, 1981) conceptualized intrinsic motivation as curiosity which leads an individual to seek out and master challenging tasks. Harter (1981) identified three components of intrinsic motivation which are challenge, curiosity and independent mastery. It was maintained that students who were intrinsically motivated were more likely to choose new and difficult tasks, like to learn new things and exercise great independence on learning rather than relying on the teachers. Other researchers also maintained that students' curiosity and personal interest in the learning activity is the defining feature for intrinsic motivation (Hidi, 1990; Hidi & Harackiewicz, 2000; Krapp et al., 1992). Contemporary researchers have defined intrinsic motivation as motivation to engage in an activity for its own sake (Lepper, 1981; Pintrich & Schunk, 2002;

Ryan, 1992). Activities are carried out without apparent external reinforcement. In the learning context, it may mean that a student learns because of curiosity rather than external rewards. Intrinsic motivation is often reflected in students' taking initiative in engaging in learning activities rather than being pushed along by the teachers.

Much research findings have pointed out the importance of intrinsic motivation in academic setting. It is important as it is associated with increased attention, persistence and study skills (Hidi & Harackiewicz, 2000). It is positively correlated with achievement as well as with the use of deeper cognitive strategies (Krapp et al, 1992; Schiefele, 1991).

With regard to gender differences in intrinsic motivation, there has been conflicting findings. While Boggiano (1991) reported that elementary school girls are more likely to be extrinsically motivated and influenced by adult feedback, Meece and Holt (1993) reported that girls shows greater intrinsic motivation. Others however reported no gender difference (Ryan & Pintrich, 1997). According to the studies conducted by Hagborg (1995), boys and girls in high school had similar intrinsic motivation. He also found that the mastery motivation was correlated with achievement for both the boys and girls. Rusillo and Arias (2004) also reported that they did not find any gender difference in intrinsic motivation.

Regarding developmental differences, it was reported that elementary students scored higher in motivation and performance in English and maths as compared to middle school children (Anderman & Midgely, 1996). In the studies of Hong Kong students, it was found that junior secondary students showed more academic initiation than students in senior secondary classes. It was found that secondary students perceived learning as less interesting as they progressed to higher forms (Mok et al, 2005). The present study attempted to verify the findings on developmental differences of secondary students with respect to intrinsic motivation.

Achievement Goals

The goal theory emphasizes the reasons learners perceive for achievement (Ames, 1992, Midgley, 1993; Naegr & Midgley, 1991). Two goal orientations are generally discussed, i.e. mastery/learning goal and performance goal. Mastery goal oriented learners tend to improve ability and understanding, improve their level of competence or achieve a sense of mastery based on self-referenced standards whereas performance goal oriented learners tend to focus on their ability and self-worth, determine their ability by outperforming others in competitions, surpass others in achievements or grades, and receive public recognition for their superior performance (Ames, 1992).

A large number of empirical studies have demonstrated that mastery goal oriented learners tend to learn and understand the materials and try to improve their performance relative to their own past performance. This helps foster a number of adaptive cognitive and achievement outcomes (Ames, 1992). In contrast, under the performance goal, the students try to be the best, get higher grades than others, and do well compared to others. This results in more negative affect or anxiety, increased distraction, and diminished cognitive capacity, task engagement and performance (Linnenbrink & Pintrich, 2002). Recent research studies have reported inconsistent results regarding whether performance goal was a maladaptive orientation toward learning. As reported in the study by Chan, Lai, Moore & Leung (2006), performance goals were not necessarily maladaptive in learning as the goals could still lead to good performance or achievement. In fact, recent research studies in achievement goals have modified the conception of the dichotomous goal orientation whereby performance goal was split into performance approach and performance avoidance goals. (Harackiewicz, Barron, & Elliot, 1998; Harackiewicz, Baron, & Pintrich, 2002). Individuals holding performance approach goal tend to demonstrate their ability excellence over others while the students adopting the performance avoidance goal tends to conceal their weakness (Ames, 1992; Archer, 1994). Performance approach goal is manifested in the learner seeking to achieve excellence in performance while performance avoidance is seeking to avoid looking stupid (Ng, 2000). Avoidance goal also involves a desire to put forth as little effort as possible and get away with it (Markku, 1997).

With respect to gender difference, it was reported that boys in the sixth grade are more likely to pursue performance-approach goals than girls (Middleton & Midgley 1997). Markku (1997) also maintained that boys were more inclined to performance goals than girls. The boys are also reported to have higher levels of performance orientation than girls in English and Maths (Roger et al, 2001).

As far as developmental differences are concerned, there has been little research studies in this area even though it was reported that goal orientations of college students are more differentiated than primary school students (Ross, et al, 2002).

Learning Strategies

The influence of motivational constructs on study strategies has been well-documented in literature. Motivation influences the approach students take to learn and the strategies they use in learning (Biggs, 1987, 1992). According to Biggs' 3P model of learning, surface strategy, in which students resort typically to rote-memorization of detail and facts, is associated with the extrinsic motive while deep strategy, in which the students seek deeper level of understanding, is associated with an intrinsic motive (Biggs, 1993).

Likewise, achievement goal orientation is related with students' learning strategies. Research findings from Greene and Miller (1996); Hong and Salili (2000); Kong and Hau (1995) have reported significant and positive correlations between the deep-processing strategies with the learning goal, as well as between surface-level processing and the performance goal.

The relationship among achievement goal, learning strategies and academic achievement has been widely

explored in previous studies (e.g. Chan et al 2005; Elliot, McGregor, & Gable, 1999; Leung & Chan, 1999; Pintrich, Roeser & DeGroot, 1994; Pintrich, & Schunk, 2000)). But study that examined the relationships among intrinsic motivation, achievement goal, learning strategy and academic achievement have been lacking. The present study attempted to fill this gap in the literature.

Aim of the Study

The purpose of the study was to examine Hong Kong secondary students' learning profiles with respect to their intrinsic motivation, achievement goal orientations and learning strategies. The study aimed to explore the interrelationships among intrinsic motivation, achievement goal, learning strategies and academic achievement and comparisons of the variables would be made between boys and girls and between junior and senior secondary students.

Research Questions

1. What are the learning profiles of Hong Kong secondary students with respect to intrinsic motivation, achievement goals and learning strategies?
2. What are the relationships among intrinsic motivation, achievement goals, learning strategies and academic achievement of Hong Kong secondary students?
3. Are there any significant differences in intrinsic motivation, achievement goals and learning strategies among boys and girls?
4. Are there any significant differences between junior and senior secondary students with respect to the intrinsic motivation, achievement goals and learning strategies?

Method

A questionnaire survey was conducted to assess a sample of Hong Kong secondary students' intrinsic motivation, achievement goals and learning strategies. Students responded to a self-report instrument which included subscales for intrinsic motivation, achievement goals and learning strategy. Data on students' academic achievement were also obtained through the self-report questionnaire.

Sample

The participants of the study comprised 1381 students from three secondary schools in Hong Kong. There were 786 boys and 595 girls. Each of the three schools belonged to either Band 1, 2, or 3. In Hong Kong, schools are categorized into different bands based on the academic standard of each individual schools.

Measuring instruments

The measuring instruments of the variables comprise the following:

1. **Intrinsic motivation:** A modified version of Harter's (1981) intrinsic motivation scale was used. The scale measures intrinsic motivation at a global level and it consisted of three subscales, viz. challenge, curiosity and independent mastery. Each subscale consisted of 5 items, each of which was rated on a 6-point Likert scale, ranging from 1 (strong disagree) to 6 (strongly agree). The psychometric properties reported by Harter (1981) showed that this one-factor model has a high internal consistent alpha (.90) and valid construct validity.
2. **Achievement goals:**
The scale used to measure achievement goals was adapted from the Achievement Goal Questionnaire (AGQ) developed by Elliot and Church (1997). The AGQ consists of three subscales: mastery goals, performance-approach goals and performance-avoidance goals, each with items rated on a 6-point Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree). The reported reliability alphas for the measures of mastery, performance-approach and performance-avoidance goals were .89, .91 and .77 respectively based on a study of a sample of 204 university undergraduates.
3. **Learning strategies**
For learning strategies, Biggs' Revised Two-factor Study Process Questionnaires (Biggs, Kember & Leung, 2001) were used. It was claimed that the Revised SPQ was a better instrument for assessing deep and surface approaches with fewer items. The questionnaires assessed both the surface and deep approaches to learning, with each comprising the motive and strategy subscales. A 5-point rating scale with 1 (strong disagree) to 5 (strongly agree) was being used. To serve the purpose of the present study, only the results of surface strategy and deep strategy subscales were analyzed.

All the items of the measuring instrument were translated into Chinese.

Academic Achievement

Students were asked to report their academic achievement in the last examination prior to the questionnaire survey. Academic achievement was represented by 5 categories which were low, mid-low, middle, mid-high and high. Students were asked to indicate as to which category their academic achievement would fall into. The 5 categories were then converted into numerical values with 5=high, 4=mid-high, 3=middle, 2=mid-low and 1=low.

Data Analysis

The data collected were analyzed with statistical procedures. Reliability and validity tests were conducted to check the psychometric properties the scales of intrinsic motivation, achievement goals and learning strategies. Multivariate analyses were carried out to make comparisons between boys and girls and between junior and senior groups and correlational analysis was conducted to examine the relationships between the variables.

Results

Reliability

Statistical results showed that the reliability coefficient alphas for the subscales of intrinsic motivation, achievement goals, learning strategies ranged from .66 to .87. Except for the low reliability coefficient alpha value of performance avoidance ($r=.66$), the overall alpha values were considered satisfactory and adequate for research purposes (Nunnally, 1978).

Validity

Confirmatory factor analyses were conducted separately to examine the construct validity of the scales for intrinsic motivation, achievement goals and learning strategies.

For intrinsic motivation, all item factor loadings on the three subscales were above .50 which were of satisfactory values. There was an exception of one item in the independent mastery subscale (with factor loading of .49) which was then excluded from later statistical analysis. The overall fit for this three-factor model for the intrinsic motivation was satisfactory with the RMSEA = .083. The GFI =.95. AGFI=.90 and the NNFI=.93.

For the confirmatory factor analysis of the three-factor model of achievement goals, viz. mastery goal, performance-approach goal and performance-avoidance goal, the model attained an adequate fit to the data with the RMSEA=.082, the GFI=.97, the AGFI=.92 and the NNFI=.95.

There were originally five items for each of the two factors for learning strategies, viz. deep strategy and surface strategy respectively. In the confirmatory factor analysis of the learning strategy, decision was made that only items with factor loadings above .45 would be retained for further analysis. It was found that the four items as grouped under deep strategy were distinctively different from those classified as surface strategy in terms of their factor loading. The overall fit for this two factor model was good with the RMSEA =.015. The GFI=.99. The AGFI=.97 and the NNFI=.99.

Descriptive Statistics

Table 1 shows the means and standard deviations of intrinsic motivation, achievement goals, learning strategies and academic achievement for the overall sample, the gender groups and level groups. The results showed that the students scored highest in independent mastery ($m=4.16$), followed by challenge ($m=3.68$) and curiosity ($m=3.63$) within the intrinsic motivation domain. In achievement motivation, the students scored highest in mastery goal ($m=4.32$) than the two performance goals (approach and avoidance goals) ($m=3.84$ and 3.74 respectively). Overall, the students also scored higher means in deep strategy ($m=3.63$) than the surface strategy ($m=3.54$), showing that the students in this sample were inclined to adopt the deep learning strategy than the surface strategy.

Subscale	Male	Female	Junior	Senior	Total
	M (s.d)	M (s.d)	M (s.d)	M (s.d)	m. (s.d)
Challenge	3.84 (.95)	3.46 (.99)	3.67 (1.04)	3.68 (1.01)	3.68 (1.02)
Curiosity	3.71 (.95)	3.52 (.95)	3.64 (0.95)	3.62 (1.01)	3.63 (.93)
Independent Mastery	4.28 (.88)	4.27 (.79)	4.14 (.85)	4.14 (0.86)	4.16 (.85)
Intrinsic Motivation	3.94 (.83)	3.66 (.79)	3.81 (.83)	3.83 (.81)	3.82 (.82)
Mastery Goal	4.36 (.90)	4.27 (.82)	4.31 (.90)	4.34 (.83)	4.32 (.87)
Performance Approach	3.89 (1.06)	3.77 (1.05)	3.83 (1.06)	3.69 (1.05)	3.84 (1.06)
Performance Avoidance	3.71 (.89)	3.79 (.89)	3.79 (.91)	3.69 (.86)	3.74 (.89)
Deep Strategy	3.69 (.86)	3.54 (.80)	3.68 (.88)	3.56 (.79)	3.63 (.84)

Surface Strategy	3.53 (.86)	3.56 (.81)	3.64 (.84)	3.43 (.83)	3.54 (.84)
Academic Achievement	3.03 (1.12)	3.03 (1.02)	3.18 (1.10)	2.85 (1.03)	3.03 (1.08)

Table 1. Means and standard deviations for intrinsic motivation, achievement goals, learning strategies and academic achievement.

Correlations

Table 2 shows the correlation matrix of intrinsic motivation, achievement goals, learning strategies and academic achievement for the whole sample. The scores from the three subscales of intrinsic motivation were aggregated to form one score to represent overall intrinsic motivation. The results showed that there were significant correlation alphas among intrinsic motivation, achievement goals, learning strategies and academic achievement. It can be noted that intrinsic motivation was positively and significantly correlated with mastery goal and performance goal (approach and avoidance goals) and was positively and significantly correlated with deep strategy ($r=.58$) whereas the correlation with surface strategy was negative and insignificant ($-.03$). Intrinsic motivation was also positively and significantly correlated with academic achievement ($r=.24$). On the other hand, mastery goal was positively and significantly correlated with intrinsic motivation, performance goal (approach and avoidance goals), deep strategy and academic achievement. While performance approach goal was significantly and positively correlated with academic achievement ($r=.21$), performance avoidance goal showed no significant relationship with it. Lastly performance goal (approach and avoidance goals) both showed positive and significant relationship with surface strategy ($r=.22$ and $r=.28$ respectively).

Scale	1	2	3	4	5	6	7
1. Intrinsic motivation	1	.62*	.35*	.15*	.58*	-.03	.24*
2. Mastery goal		1	.47*	.33*	.55*	-.04	.26*
3. performance approach			1	.52*	.39*	.25*	.21*
4. Performance Avoidance				1	.26*	.31*	.02
5. Deep approach					1	.18*	.23*
6. Surface approach						1	.03
7. Academic achievement							1

Table 2. Correlation matrix of intrinsic motivation, achievement goals, learning strategies and academic achievement for the whole sample

Analysis of Variance

Table 3 shows the summary F-statistics from gender and level of study ANOVA for intrinsic motivation, achievement goals and learning strategies. The results showed that there was significant gender differences in the three subscales of intrinsic motivation whereas significant gender difference was found only in performance approach goal under the trichotomous achievement goal orientations. There was no significant difference between junior and senior students with respect to intrinsic motivation, mastery goal and performance approach goal. Junior students, however, scored higher in performance avoidance goal than senior students and the difference was significant. Overall, there was no interaction effect of gender and levels of study.

Motivation subscale	Gender	Level of Study	Gender x Levels of Study
	F-value	F-value	F-value
Challenge	50.45*	0.00	0.93
Curiosity	14.55*	0.26	0.02
Independent Mastery	37.56*	1.78	0.69
Mastery Goal	6.26*	0.12	0.00
Performance Approach	4.21*	0.08	0.00
Performance Avoidance	2.61	5.06	.35

Deep Strategy	14.34*	8.66*	.48
Surface Strategy	.39	18.36*	.56

* at 0.05 significant level

Table 3. Summary F-statistics from Gender x Level of Study for intrinsic motivation, achievement goals and learning strategies.

Discussion

Student Motivation and Learning Profiles

The results in this study showed that for all the students in this sample, the most important source of intrinsic motivation was independent mastery, followed by challenge and curiosity (see Table 1). This finding indicates that the students demonstrate preferences to solve problem independently rather than relying on the teachers. They were willing to seek challenges and to learn new things to satisfy their curiosity. On the other hand, the mean values showed that overall the students demonstrated a higher orientation toward the mastery goal than the two performance goals suggesting that pursuing knowledge and seeking understanding are the major achievement goals held by the students. This was followed by performance approach and performance avoidance. Overall, the students also scored higher means in deep strategy than surface strategy showing that the students in this sample were inclined to adopt deep learning strategy than surface strategy. It appeared that the students in this sample overall have exhibited positive motive and have adopted adaptive achievement goal orientations and effective learning strategies.

Relationships Among Variables

Results of the correlational analysis showed that the intrinsic motivation were positively and significantly correlated with the achievement goal and the deep learning strategy. Mastery goal was positively and significant correlated with intrinsic motivation, deep learning strategy but insignificantly correlated with surface strategy. The finding was consistent with previous research findings which reported that mastery goal was associated with preference for challenge work (Ames & Archer, 1988; Elliott & Dweck, 1988), intrinsic motivation for learning (Bulter, 1987; Meece, Blumenfeld, & Hoyle, 1988; Stipek & Kowalski, 1989) and the use of effective learning strategies.

On the other hand, performance approach goal was positively and significantly correlated with intrinsic motivation and academic achievement ($r=.35$ and $r=.21$ respectively). The results revealed that the students in the study have adopted multiple goals which are beneficial to their learning outcomes. This finding seemed to be contradictory with the expectation that performance goal was unlikely to relate positively to intrinsic motivation and achievement goal as performance goal was normally viewed as maladaptive. However, some studies under the tricotomous view of achievement goal theory by Ames & Archer, (1988); Archer, (1994); Duda and Nicholls, (1992); Harackiewicz, Barron, Carter, Lehto, & Elliott, (1997) have reported that performance goals were related to intrinsic motivation even though the correlation was lower than that with mastery goals. Theorists such as Elliott (1996) contended that mastery goals are facilitative of intrinsic motivation while performance approach goal under the approach-avoidance performance achievement goal framework also led to intrinsic motivation (Elliott, 1996). Under the trichotomous theory of achievement goal orientation, performance approach goal which emphasizes pursuit of competence may not necessarily be maladaptive as it was previously claimed. Performance approach goals have also been reported to be related to a number of adaptive learning variables such as higher aspiration, absorption during task engagement and performance attainment (Elloit & Church, 1997; Elliot & Harackiewicz, 1996; Elliot, McGregor, & Gable, 1999). Some research findings in this area (e.g. Harackiewicz et al, 1998; Urdan, 1997) have shown evidence that strong conclusions about the negative effects of performance goals may be premature. Studies have shown that pursuing one type of goal does not necessarily exclude pursuit of the other (Ames & Archer, 1988; Bouffard-Bouchard, Boisvert, Vezeau, & Larouche, 1995; Harackiewicz et al, 1997; Middleton & Midgley, 1997). In fact, as mastery and performance-approach goals are linked to different achievement outcomes, optimum motivation may require both types of goals (Shih, 2005). Shih (2005) also contended that because performance goals orient people toward competence, such goals might promote adaptive achievement behaviours and lead to positive outcomes. Bouffard et al (1995) found that students in the high mastery and high performance group had the highest motivation, the best strategy use and the best in academic achievement. Pintrich (2000) also reported the enhanced effects of adopting both mastery and performance-approach goals on junior high school students' achievement related behaviorus.

The results also showed that both performance approach and avoidance goals are related to the adoption of surface strategy. Given that performance avoidance is an example of expending minimum effort and avoiding work, it is presumed to be strongly associated with surface learning strategy. Nevertheless, because performance approach goals also focused on outperform others, these goals may also be positively associated with surface strategy.

Nevertheless, research studies have suggested that policies and practices in classrooms and schools influence students' goal orientations (Ames & Archer 1988, Maehr & Midgley, 10991). School teachers may create classroom

situations where students display incompetence and feel embarrassed whereby leading to the adoption of the performance avoidance goal. On the other hand, Meece and Jones reported that the structure of learning activities (small group vs. whole class) are related to students' achievement goal orientations. Students displayed more avoidance tendency in whole-class than in small-group lessons as the structure of learning activities is more informal and flexible resulting in less threat. Additional research is needed to explore how classroom practices might affect students' goal orientations.

The results of the correlational analysis indicated that academic achievement was positively and significantly associated with intrinsic motivation, mastery goal, performance goal and the deep strategy. Overall, the findings were consistent with previous studies in this area.

Gender Differences

As for gender differences, there were significant differences between the boys and girls in intrinsic motivation as the boys scored higher than the girls in all three subscales of intrinsic motivation. While the most prominent source of intrinsic motivation for both boys and girls was independent mastery, the second important source of intrinsic motivation for the boys was challenge and the third was curiosity. In contrast, the second important source of intrinsic motivation for the girl students was curiosity and the third was challenge. In this sample the male students as compared to the female students appeared to be more willing to confront challenge, to seek to learn new things to satisfy curiosity and to solve problem independently. Based on this result, one may argue that the level of intrinsic motivation attained by the male students was higher than that attained by the female students and that boys were more intrinsically motivated in learning than girls. Nevertheless, according to Patrick et al (1999), Anderman and Midgley (1997), gender difference in motivational orientation was discipline-based depending on the subjects the students learn, such as boys are more intrinsically motivated in learning maths while girls are more motivated to learn languages. Meece & Jones (1996) quoted previous research findings that in learning maths, boys are more likely than girls to assume control for their learning and to evaluate different problem solutions while girls tend to show greater avoidance of problem solving situation, take fewer risks, and request more assistance than do boys. It was contended that girls lacked the confidence to sustain high levels of problem solving or independent learning in science. Whether the gender differences in intrinsic motivation were discipline-based will require further investigation.

Significant gender differences were also found in the mastery goal and performance approach goals but not in performance avoidance goal. In this study, the male students were seen to endorse the mastery goal and performance approach goal more than the girl students did. This finding was parallel with the finding in intrinsic motivation. Although this finding was inconsistent with that in Western literature that boys tended to be more performance goal oriented than girls, it was consistent with findings in studies of Hong Kong Chinese samples (Chan, Lai, Leung & Moore, 2005). Previous research have suggested that gender differences are due to gender-role stereotypes and socialization experiences (Eccles-Parson, et al, 1982, Halpern, 1992). Differential sex-role socialization patterns affect the students' school-related attitudes and values. In this study, girls were shown to adopt the performance goals more than boys. This may be due to the complex cultural and social context that have influence on achievement goal orientations. It can be argued that within the Chinese cultural context where traditional sex stereotyping is strong, the boys still enjoy better educational and career opportunities. The motive to learn and outperform the boys have to be stronger for a female if she wishes to get educated and to advance in her studies. The female students may need a stronger desire to show competence than their male counterparts as they need to perform well in order to render parental and family support to pursue in education and career.

Developmental Differences

From a developmental perspective, there was no difference in intrinsic motivation between junior and senior secondary school students. This finding is inconsistent with previous research findings which claimed that students' interest in learning diminished as they progressed to higher forms. Parallel with this, again no difference was found between junior and senior levels of students in their achievement goal orientations, except that junior students showed stronger performance avoidance orientation than the senior students. It can be interpreted that junior students tended to avoid committing in learning tasks so as to avoid facing failure more so than senior students. It may appear that junior students were more inclined than senior students in avoiding incompetence rather than demonstrating competence. Specifically, it can be speculated that there was a tendency among the junior students to construe the achievement setting as a threat and might therefore try to conceal incompetence. When gender, level of study and achievement are considered together, the emerging picture for the junior group of students was more complex than it was previously claimed to be. As for the performance avoidance goal adopted by the junior students, it is suggested that instructional practices should be designed to help protect self-worth such as avoiding making social comparison or competition.

Conclusions

This study investigated the relationship of intrinsic motivation, achievement goals, learning strategy and academic achievement. It examined the gender and developmental differences of the variables among Hong Kong secondary students. It was found that overall intrinsic motivation was related to achievement goals, learning strategy and academic achievement, as being consistent to previous research findings. There was significant gender differences regarding intrinsic motivation and developmental differences in respect to performance avoidance goal. The findings have helped us understand better Hong Kong Chinese students' learning profiles with regard to intrinsic motivation, and

achievement goals and learning strategies. However, the findings should be considered in the light of the limitation of the present study in respect to sampling method and the self-report measures. Nevertheless, based on the present study, the next step forward would be to conduct the path analysis using structural equation modeling techniques to further explore the interrelationships of the variables.

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