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Academic Self-Concept: A Cross-Sectional Study of Grade and Gender Differences in a Singapore Secondary School

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Many studies support the existence of a significant decline in students' academic self-concept from early to mid-adolescence. In comparison, the findings on gender effect are less conclusive. This study aimed to determine whether there is any grade or gender effect on adolescents' academic self-concept in the Singapore context. Specifically, the cross-sectional study was conducted with Secondary 1, 2 and 3 students (N = 656) in a government co-educational school. The results established a significant main effect according to grade, with Secondary 3 students having significantly lower academic self-concept (scale and subscales) than Secondary 1 and 2 students. In addition, there was a significant main effect for gender, with female students having significantly higher perceived academic effort (academic self-concept subscale) than their male counterparts.

Key Words: Academic self-concept, Singapore, Secondary school students, Grade and gender effects

Adolescence is usually thought of as a developmental transition during which an individual passes from childhood to maturity (Coleman & Hendry, 1990). In addition to physiological maturation, the period is usually accompanied by an intertwined network of pressures, such as cognitive changes, shifting societal expectations, conflicting role demands, increasingly complex relations with parents, peers and opposite sex, and often choices of school courses and changes in school environments (Alsaker & Olweus, 1993; Block & Robins, 1993; Bolognini, Plancherel, Bettschart, & Halfon, 1996; Coleman & Hendry, 1990; Dacey & Kenny, 1997). It is also characterised as a time of questioning of self and subsequent reformulation of perceptions and evaluations of self (Block & Robins, 1993). In view of the changes that take place, several theorists have postulated that adolescent years are a time of confusion and ambiguity (Burns, 1979), a period of 'storm and stress' (Hall, 1904), and a phase of 'identity crisis' (Erikson, 1959). Even among those who are unwilling to accept a 'turmoil' formulation, there is a consensus that adolescence is a difficult stage of adjustment (Rutter, Graham, Chadwick, & Yule, 1976). To test the 'crisis' hypothesis, many studies have utilised changes in self-concept as an indicator of disturbance in development. Nonetheless, not much work has been done in the Singapore context. As such, to have a better understanding of adolescents in Singapore, this study will attempt to establish whether there is any grade or gender effect on their academic self-concept during early to mid-adolescence.

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Operational Definition of Academic Self-Concept

Self-concept is generally defined as an individual's perception of self and the perceptions are said to be formed through experiences with the environment, interactions with

significant others, and attributions of his or her own behaviour (Marsh & Shavelson, 1985; Shavelson, Hubner, & Stanton, 1976). To translate the general definition into something operational, Shavelson and Bolus (1982) defined self-concept as perceptions of ability in different areas. Along the same lines, Battle (1981), Piers and Harris (1964), as well as Marsh and his colleagues (Marsh, 1988, 1992; Marsh, Craven, & Debus, 1999; Marsh & O'Neill, 1984; Marsh, Parker, & Barnes, 1985; Marsh, Relich, & Smith, 1983) all agreed that competence perception is a key aspect of school or academic self-concept.

It is noteworthy that apart from the emphasis on competence, several researchers also looked at students' enjoyment and willingness to work hard in their academic subjects when assessing students' academic self-concept. For instance, Marsh et al. (1999) made a distinction between self-concepts of competence and affects. The academic competence scale has expected items that assess whether students feel that school subjects are easy for them and whether they are good at most school subjects. Whilst the academic affect scale has items that assess whether students like or hate to go to school, like to study different subjects, and feel that going to classes at school is fun. In addition, Marsh et al.'s (Marsh, 1988, 1992; Marsh & O'Neill, 1984) school subjects self-concept scale (Self Description Questionnaire) has an item that assesses whether students enjoy doing work for their school subjects, whilst Battle's (1981) academic self-esteem subscale has items that evaluate whether students usually quit when school work is too hard or that they often feel like quitting school. It is tenable that Singaporean students' definition of academic self may leverage quite a bit on the 'commitment' aspect of academic self-concept. This is due to the fact that the culture is largely influenced by Confucianism, with its conception of learning as a process of 'studying extensively, inquiring carefully, pondering thoroughly, sifting clearly, and practicing earnestly' (as cited in Lee, 1996). Presumably, the societal emphasis on effort and will-power in the pursuit of learning is likely to influence students' self-definitions, cognitions and values.

In the light of the earlier work and the cultural context in Singapore, it seems appropriate to conceptualise academic self-concept as having two components. Thus, academic self-concept as used in this study is operationally defined as students' perceived academic competence and their commitment to, and involvement and interest in schoolwork, as indicated by their responses to the items in the academic confidence and academic effort subscales.

Review of Related Literature

Studies that have focused on general or global self-concept (e.g., Alsaker & Olweus, 1993; Block & Robins, 1993; Chubb, Fertman, & Ross, 1997; Keltikangas, 1990; Wylie, 1979; Zimmerman, Copeland, Shope, & Dielman, 1997) do not conclusively indicate whether there is any age or grade effect on adolescents' overall self-concept or self-esteem. The inconsistencies in findings are possibly related to the use of global and non-distinct self-measures in the reviewed studies (Crain & Bracken, 1994). Presumably, adolescents could have different perceptions about aspects of their self at different stages of their development, so age or grade effect on specific domains could have countervailed to give contradictory findings in a unidimensional self-variable (as evidenced in Keltikangas, 1990).

In contrast to the findings on general self-concept, many studies concur that there is a significant U-shaped age or grade effect on general school or academic self-concept. For example, Watkins and Dong (1997) established that children 10 years of age had more positive self-perceptions on the scales for reading and school in general compared to older children 13 years of age. Likewise, Chang, McBride-Chang, Stewart and Au (2003) reported that Grade 2 children had higher academic self-concept than Grade 8 adolescents. Whilst, Lau (1990), Marsh (1989), and Marsh, Parker and Barnes (1985) all found that school self-concept was higher in Grade 7, declined to the lowest around Grade 9 (average age 15) and then increased around Grades 10 and 11.

Marsh et al.'s (1985) and Marsh's (1989) Australian studies documented an absence of gender effect and grade by gender interaction on general school self-concept of early-to-middle adolescents (Grades 7 to 11/12). Interestingly, Lau's (1990) results of Hong Kong adolescents did not mirror those of Marsh and his colleagues. In essence, his first study established a significant gender effect, in favour of boys, on adolescents' academic self-concept (Grades 7, 9, 11 and 13). In addition, there was a significant grade by sex interaction effect. Specifically, although both genders witnessed a decrease in academic self-concept from Grade 7 to Grade 9, the decrease was greater for the girls. From Grade 9 onwards, although the academic self-concepts of both genders increased, the increase was greater for the boys. Lau's (1990) second study again reported a significant gender effect, in favour of boys, on adolescents' (Grades 7 to 9) academic self-concept. The decline of the boys' academic self-concept was found to be less pronounced than that of the girls but no statistical test was employed to ascertain whether the

difference was significant. Lau and Leung's (1992) study of Hong Kong adolescents (Grades 7 to 9) likewise substantiated a significant gender effect, in favour of boys, on adolescents' academic self-concept.

Taken together, there seems to be a consensus that there may be a curvilinear age or grade effect from pre-adolescence to late-adolescence on school or academic self-concept, but there is less agreement on whether there is any gender effect. Considering that self-concept 'is the image or picture the person has of himself, which has developed through childhood and adolescence under the formative influences of home, school and social environment, …' (Thomas, 1980, p. 24), it is not surprising that the findings are different in different countries. This is especially true for gender effect since 'gender refers not only to biological sex but also to the psychological, social, and cultural features and characteristics that have become strongly associated with the biological categories of female and male' (Gilbert, 1992, p. 385). As such, it is difficult to generalise the findings across countries with different cultures and different socialisation processes.

Although a number of studies have been conducted in Hong Kong, very little has been done in South-East Asian countries such as Singapore, Malaysia or Indonesia. One of the few exceptions is Liu's (1994) cross-sectional study. However, it is difficult to make any meaningful conclusion from the study with regard to grade effect on students' academic self-concept because of its narrow sampling of only Secondary 1 and 4 students. In an attempt to fill the empirical gap, the purpose of this exploratory study, therefore, was to determine whether there is any grade or gender difference in early-to-middle adolescents' academic self-concept in the Singapore context.

Method

Participants

The whole cohorts of Secondary 1 (N = 217), Secondary 2 (N = 179) and Secondary 3 (N = 260) students from a single government co-educational school in Singapore took part in the cross-sectional study (N = 656). There were 318 (48.5%) male and 338 (51.5%) female students. 325 students were from the Express stream (most academically inclined), 217 students were from the Normal Academic stream, and 114 students were from the Normal Technical stream (least academically inclined).

Instrument

The academic self-concept scale (ASC scale) was developed with reference to Battle's (1981) academic self-esteem subscale, Marsh, Relich and Smith's (1983) school subjects self-concept scale, Piers and Harris' (1964) general and academic status scale and Quek's (1988) academic self-concept scale. It comprised of two subscales – academic confidence (9 items) and academic effort (10 items). The academic confidence (AC) subscale assessed students' feelings and perceptions about their academic competence. Example items included 'I am good in most of my school subjects' and 'Most of my classmates are smarter than I am' (negatively worded). The academic effort (AE) subscale assessed students' commitment to, and involvement and interest in schoolwork. Example items included 'I am interested in my school work' and 'I study hard for my tests'. Answers for the items were given on a 4-point scale ranging from 1 (strongly disagree) to 4 (strongly agree). By averaging the responses, mean scores were calculated for the ASC scale and the two subscales for each student.

The ASC scale's validity and reliability were established by Liu and Wang (in press). Specifically, a validation study (N = 576) found that the scale has concurrent validity with Battle's (1981) academic self-esteem subscale (r = .73), Marsh, Relich and Smith's (1983) school subjects self-concept scale (r = .71), and Piers and Harris' (1964) general and academic status scale (r = .63). In addition, CFA conducted on the ASC scale to examine its factorial validity using EQS for Windows 5.7 (Bentler & Wu, 1998) supported the hierarchical model comprising of two first-order factors (academic confidence and academic effort) and one higher-order factor (academic self-concept) ($\chi 2 = 287.45$, df = 146, NNFI = .903, CFI = .917, GFI = .941, RMSR = .023, RMSEA = .044; 90% CI of RMSEA = .036, .051). Whilst, Cronbach's alpha coefficients showed that the ASC scale and its two first-order factors, that is, academic confidence and academic effort, had satisfactory internal consistencies ($\propto$s = .82, .71 and .76 respectively).

Procedure

The ASC questionnaire was administered in the middle of the year to intact classes by teachers briefed by the researchers. The students were told that the purpose of the study was to find out how they feel most of the time about schoolwork and their academic ability. They were given the assurance that their answers would remain confidential. They

were instructed to work on their own and were told that there were no right or wrong answers. On average, the students spent about 10 to 15 minutes to complete the questionnaire.

Results

The mean scores and standard deviations of the academic self-concept scale and subscales by grade level for males, females and overall sample are shown in Table 1. Generally, the students had reasonably high academic self-concept, as indicated on the 4-point scale.

A three-way (3 x 2 x 3) Multivariate Analysis of Variance (MANOVA) was conducted to examine potential grade, gender and stream differences (independent variables) using the ASC scores (scale and subscales) as dependent variables. Table 2 shows the results of the multivariate tests. The results showed that the main effects of grade and gender were significant (Wilk's Λ = .972, F (6, 1272) = 3.06, p < .01, $\eta 2$ = .01 for grade, and Wilk's Λ = .976, F (3, 636) = 5.24, p < .01, $\eta 2$ = .02 for gender) but the main effect for stream was

Table 1. *Academic Self-Concept Mean Scores and Standard Deviations*

	Secondary 1		Secondary 2		Secondary 3		Overall	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
ASC scale								
Male students	2.84	0.34	2.85	0.34	2.80	0.31	2.80_a	0.33
Female students	2.88	0.36	2.90	0.29	2.81	0.35	2.81_a	0.35
Overall	2.86_a	0.35	2.88_a	0.32	2.81_b	0.33	2.81	0.34
AC subscale								
Male students	2.69	0.39	2.69	0.41	2.57	0.36	2.63_a	0.38
Female students	2.67	0.40	2.68	0.34	2.46	0.38	2.60_a	0.39
Overall	2.68_a	0.39	2.68_a	0.37	2.52_b	0.38	2.62	0.39
AE subscale								
Male students	2.98	0.39	2.99	0.36	2.89	0.37	2.94_a	0.38
Female students	3.07	0.41	3.09	0.34	2.86	0.38	3.01_b	0.40
Overall	3.03_a	0.41	3.05_a	0.35	2.88_b	0.38	2.97	0.39

Note. Means in the same row and column that do not share the same sub-scripts differ at p < .05 in the Tukey honestly significant difference comparison.

Table 2. *Multivariate Analysis of Variance Tests*

Effect	Wilk's Λ	Hypothesis df	Error df	F	$\eta 2$	p
Grade	.972	6	1272	3.06**	.01	.00
Gender	.976	3	636	5.24**	.02	.00
Stream	.987	6	1272	1.38	.01	.22
Grade X Gender	.990	6	1272	1.01	.01	.41
Grade X Stream	.973	12	1683	1.45	.01	.14
Gender X Stream	.986	6	1272	1.52	.01	.17
Grade X Gender X Stream	.976	12	1683	1.30	.01	.21

Note. **p < .01.

not significant (see Table 2). None of the two-way or three-way interaction effects were significant.

The results of the follow-up tests revealed that grade effect was significant for all the three ASC scores (F (2, 638) = 8.15, for ASC, F (2, 638) = 6.77, for academic confidence, and F (2, 638) = 6.11, for academic effort, all ps < .01). Post-hoc tests showed that students from Secondary 3 had significantly lower ASC, academic confidence and academic effort scores compared to students from Secondary 1 and 2 (all ps < .001). No difference was found between the Secondary 1 and 2 students (see Table 1).

In terms of gender comparisons, the results revealed that male and female students had comparable overall ASC scores. In addition, the male students had higher, albeit not significant, academic confidence than the female students. In contrast, the female students had significantly higher academic effort compared to their male counterpart (F (1, 638) = 5.79, p < .05).

Discussion

Grade Differences in Students' Academic Self-Concept

Results of the study showed that the Secondary 1, 2 and 3 students had reasonably high academic self-concept. Nonetheless, there was a significant grade effect. Specifically, the Secondary 3 students had significantly lower academic self-concept scores (scale and subscales) than the Secondary 1 and 2 students.

The present findings of the overall academic self-concept scale are similar to those of Marsh et al. (1985), Marsh (1989) and Lau (1990) for students in Grades 7 to 9 (similar to Secondary 1 to 3). As noted earlier, the studies found that school self-concept declined from Grade 7 to the lowest around Grade 9 (average age 15) before increasing around Grades 10 and 11.

Since the decline in students' academic self-concept occurs during adolescence, the negative grade effect may be rationalised in part from the 'crisis' perspective, that is, the decline is related to changes that take place during adolescence. Amongst them, one particular difficult change for young adolescents must be changes in school environment. Secondary schools are generally larger than primary schools so they present students with a larger social comparison network, and the added challenge of establishing themselves and finding their own niches. Presumably, some students will establish themselves with time, and the situation will get better. Nonetheless, students can be overlooked in large schools and many may not have the chance to participate and excel in class or school activities (Dacey & Kenny, 1997). Thus, even with time, students may never achieve the same level of social recognition experienced in their primary schools. Considering that self-concept is essentially a social product of reflected appraisals (Cooley, 1912; Mead, 1934), this lack of recognition may have an effect on adolescents' sense of well-being and their academic self-concept.

Burns (1982) noted that the 'school is a context in which evaluation and competition is pervasive, continuous and systematic' (p. 202). Since there is an increase use of social comparison amongst students, and an increase emphasis on evaluation, competition and performance with grade levels (Harter, Whitesell, & Kowalski, 1992), the situation in upper secondary is clearly worse than in lower secondary. In the case of Singapore, Secondary 3 may be one of the most stressful years because students will be channelled into different courses (Science, Arts or Technical) at the end of the year based on their academic results. Considering that secondary students, especially Secondary 3 students, have to face frequent reminders of their potentials and limitations, successes and failures, and have to cope with intense pressure of extensive evaluations, it is not surprising that their academic self-concept should decline with grade. Indeed, the negative effects of competition and evaluation may be acutely felt by Singaporean students because of the huge societal emphasis on education and the prevailing cultural pressure to succeed in the chase for paper qualifications.

Gender Differences in Students' Academic Self-Concept

It will be recalled that both genders had comparable overall academic self-concept. Nonetheless, the female students had significantly higher perceived academic effort than the male students, whilst the male students had higher, albeit not significant, perceived academic confidence than their female counterparts.

The present results on the overall academic self-concept is congruent with that obtained by Marsh et al.'s (1985) and Marsh's (1989) Australian studies. They are, however, in contrast to that obtained by Lau's (1990) and Lau and Leung's (1992) study of Hong Kong adolescents.

Besides the current study, Liu (1994) conducted another exploratory study on students' academic self-concept in the Singapore context with a narrow sample of Secondary 1 and 4 students (N = 432, from 3 government co-educational schools). Interestingly, the earlier findings on gender

comparisons were similar to that of the present study. In essence, the study also documented comparable academic self-concept for both genders, and that the female students had significantly higher perceived academic effort than the male students. In this case, however, the male students had significantly higher perceived academic confidence than their female counterparts.

To a certain extent, it is tenable that the inconsistencies in findings between the studies conducted in Singapore, that is, the present study and Liu (1994), and those conducted in Hong Kong, that is, Lau (1990) and Lau and Leung (1992), may be explicable by cultural differences. Despite Hong Kong's acceptance of Western technologies and its cosmopolitan appearance, it is at heart a traditional Chinese society. There is a relatively strong belief about the roles of males and females in the society, in which males are the main breadwinners of the families, and females play the supportive roles of wives and mothers. In line with such societal expectations, parents may have conveyed differential educational aspirations and expectations to their children when they were making decisions about their school or course choices. They may also have given more academic guidance and support to their sons than daughters. In such a situation, it is comprehensible if there is gender difference in students' academic self-concept.

The situation in Singapore is rather different from that of Hong Kong. Due to the successful implementation of the family planning programme by the government, the average family size in Singapore is quite small, with one child or two children being the norm. The small family size ensures that most parents pay equal emphasis to their children's education, regardless of their sex. Moreover, Singapore has no other resources except its people, so the government's education policy is to 'maximise development of talents and abilities, and maximise harnessing of talents and abilities' (Ministry of Education, 1998, 5 September). As such, girls are not discriminated against; instead they are actively encouraged to excel in their studies and to build their careers, even in male dominated domains. Consistent with the societal and parental expectations, schools also tend to treat both genders equally. Considering that both genders experience equal support and guidance from home and school, it is conceivable that there is no gender effect on their overall academic self-concept.

Apart from Liu (1994), none of the other reviewed studies looked at subscales such as academic confidence and academic effort. Nonetheless, the present finding and that of Liu's (1994) on girls having higher perceived academic effort are not totally unexpected. Rosenberg and Simmons (1975) noted that adolescence girls are more concerned about being well-liked, more affected by others' opinion of them, and more eager to avoid behaviour that elicits negative reaction. Likewise, Lau and Leung (1992) commented that compared to boys, girls are higher in their need for affection and affiliation. In their eagerness to conform to socially desirable behaviour and in their zeal in pleasing their significant others, it is not surprising that girls are more willing to put in effort with their schoolwork.

Lau and Leung (1992) noted that boys place more importance on the intrinsic motivation of feeling intelligent when they look at academic competence. In contrast, Clarke-Steward, Friedman and Koch (1985), as well as Lau (1989) observed that girls focus on academic ability and performance, which are instrumental in gaining adult approval and praises. Although not conclusive, the earlier findings taken together with the current and Liu's (1994) results suggest that there may be important differences between genders in the way they define their academic self. In essence, even if they have comparable overall academic self-concept, it is possible that they stake their 'competence' on different things. From the results of the present study and Liu (1994), it seems that girls' relatively high overall academic self-concept is contingent upon their commitment and belief in hard work, whilst boys' comparable overall academic self-concept is largely the result of their high confidence in their intelligence or ability.

In the light of the current discussion, researchers may want to re-examine the way they operationalise the academic self-concept construct to ensure that it is not gender biased. Burns (1982) contended that some instruments may contain items more appropriate for endorsement by one gender than the other. Evidently, the use of such instruments in any study would make interpretations of gender differences difficult. On a more global level, there is perhaps a need also to explore in depth the content, composition and organisational structure of academic self-concept across genders and cultures. Considering that culture has an impact on males' and females' ways of dealing with their perceptual world and has an influence on their cognitions, values and emotional responses (Taft, 1977), there is always the concern that a measure developed in one culture may not assess the same conceptual meaning or the totality of the meaning for both genders in another culture. This is especially true for constructs such as self-concept, which is likely to have universal as well as culture-specific meanings.

To conclude, although the findings of the present study are interesting, it has to be emphasised that it is only an exploratory study, with its own limitations. For instance, the

grade effect that was reported was based on cross-sectional data from Secondary 1, 2 and 3 students. To have a more conclusive answer on age or grade effect, there is clearly a need to substantiate the findings with longitudinal data, preferably over a wider age range. In addition, the sample was drawn from a government co-educational school so the findings cannot be extrapolated to schools with distinctly different cultures, such as independent schools or single-sex schools. As such, it would be worthwhile to replicate the study in different types of schools. Finally, the academic self-concept construct with its two first-order factors need to be tested with different samples and age groups to make sure that the factorial structure holds.

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