DOCUMENT RESUME

ED 302 565 TM 012 566

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TITLE	Adolescent Self-Concept, Ability Grouping, and Social Comparison: Reexamining Academic Track Differences.
PUB DATE	Aug 88
NOTE	35p.; Paper presented at the Annual Meeting of the American Psychological Association (Atlanta, GA, August 12-16, 1988).
PUB TYPE	Reports - Research/Technical (143) -- Speeches/Conference Papers (150)
EDRS PRICE	MF01/PC02 Plus Postage.
DESCRIPTORS	*Ability Grouping; Academic Aptitude; *Adolescents; Comparative Analysis; English; *Factor Structure; Foreign Countries; Grade 11; Grade 12; High Achievement; High Schools; *High School Students; Low Achievement; Psychometrics; Secondary School Mathematics; *Self Concept; *Track System (Education)
IDENTIFIERS	Canadians; Covariance Structural Analysis; Latent Structure Analysis; LISREL Computer Program; *Social Comparison

ABSTRACT

Covariance structural analyses (LISREL) were used to examine latent mean differences in general self-concept (SC), academic SC, English SC, and mathematics SC between low-track and high-track high school students. The study report is preceded by a theoretical model of adolescent self-concept and discussions of academic track as a social referent and as a basis for social comparison. Study subjects included 248 low-track and 582 high-track students in grades 11 and 12 enrolled in two suburban high schools in suburban Ottawa (Canada). Assumptions of invariant SC measurements and structure were tested prior to the analysis of latent mean structures. Twelve self-report SC instruments were used in the study. Findings reveal significant differences in academic, English, and mathematics SCs only. Inconsistencies in measurement and structure of SC across track were also found. Findings illustrate the possible interplay of compensatory factors in the formation of SC, and indicate that low-ability students place more importance on their social and/or physical competencies, rather than on their academic competencies. A 49-item list of references and three data tables are included. (TJH)

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Adolescent Self-concept, Ability Grouping, and Social Comparison: Reexamining Academic Track Differences

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Paper presented at the American Psychological Association Annual Meeting, Atlanta, 1988

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Abstract

Covariance structure analyses (LISREL) were used to examine latent mean differences in general self-concept (SC), academic SC, English SC, and mathematics SC between low-track (n = 248) and high-track n = 582) high school students. Assumptions of invariant SC measurements and structure were tested prior to the analyses of latent mean structures. Findings revealed significant differences in academic, English and mathematics SCs only. Inconsistencies in the measurement and structure of SC across track were also found.

Adolescent Self-concept, Ability Grouping, and Social Comparison: Reexamining Academic Track Differences in High School

That social comparison plays a vital role in self-concept (SC) development is now widely recognized (see Suls & Miller, 1977). In particular, in achievement-related social environments like schools, such comparisons bear importantly on perceptions of academic ability (academic SC) (see e.g., Coleman, 1983; Rogers, Smith, & Coleman, 1978; Strang, Smith, & Rogers, 1978). Clearly, schools that practise ability grouping (i.e., the placement of low and high ability students in separate classrooms) provide a fertile environment for the operation of social comparison processes. This is particularly so at the high school level where such practices have been shown to segregate students into distinct within-school societies, each with its own social structure and accompanying norms (Rosenbaum, 1976,1980); characteristics unique to each of these societal groups being readily recognized by students and teachers alike (see e.g. Addy, Henderson, & Knox, 1980; Finley, 1984; Rosenbaum, 1976). The saliency of these ability groups, then, makes them highly effective social referents for high school adolescents in their perceptions of self (see Richer, 1976).

Ability grouping at the high school level is commonly referred to as academic tracking. Unfortunately, given widely discrepant guidelines regarding the number of track groups in a school, and selection criteria underlying track membership, a precise definition of academic tracking is difficult, if not impossible. However, regardless of terminology, or operational procedures, the principal underlying the practice remains the same -- students are grouped according to their academic capabilities.

The advantages and disadvantages of abilty grouping have been debated for well over a century (see Kulik & Kulik, 1982). In recent years, however, attention has swung from the 1950's focus on positive aspects of ability grouping for high-track students, to the 1980's focus on its negative effects on low-track students, especially with respect to their SCs (Kulik & Kulik, 1982). While these concerns have precipitated numerous investigations of track differences in SC, findings have been inconsistent and indeterminate. Given the potency of self-evaluations on one's sense of well-being in general, and on the career goals of adolescents in particular, it was considered important to: (a) identify possible reasons for the indeterminacy of previous research, and (b) resolve these inadequacies and then reexamine track differences in SC for high school adolescents. In broad terms, these were the tasks of the present study.

Limitations of Previous Research

The indeterminate findings from previous studies of track differences in adolescent SC can be linked to several factors. First, researchers have focused on academic SC only, despite substantial evidence that general, academic, and subject matter SCs are clearly distinguishable (see e.g., Byrne, 1986; Byrne & Shavelson, 1986, in press; Harter, 1982; Marsh & Shavelson, 1985), and can be differentially affected by particular intervention programs (Marsh, Richards, & Barnes, in press). Second, findings from most studies have not been related to a specific theoretical model of SC. As such, findings based on undefined SC constructs cannot be meaningfully interpreted, nor adequately replicated. Third, analyses have relied largely on traditional statistical procedures, and used only one measuring instrument; implicit in this technique is the assumption of perfect reliability and validity. Indeed, given the known psychometric weaknesses of most SC measures, this assumption must be considered extremely unrealistic (see e.g., Byrne, 1984; West, Fish, & Stevens, 1980; Wylie, 1974).

Finally, group comparisons have been based on observed, rather than on latent variable means. Such analyses are limited for at least three reasons: (a) observed means include measurement error which can precipitate severe attenuation, particularly with small samples; latent means, on the other hand, are error-free, thus representing the true value of the construct under study, (b) traditional statistical procedures for testing mean differences assume the factorial invariance of observed variables; such equality, however, is never really known. In constrast, the estimation of latent means takes into account a priori information regarding various degrees of invariance for the observed measures (e.g., pattern of factor loadings, factor variances/covariances, error dependencies), and (c) with traditional tests for observed mean differences, the adequacy of the measurement model (i.e., validity and reliability of the measures) cannot be evaluated; procedures used in testing for latent mean differences, however, allow for this a priori assessment.

Theoretical Model of Adolescent Self-concept

The hierarchical model of SC originally proposed by Shavelson, Hubner, and Stanton (1976) and recently validated by Shavelson and Bolus (1982), and by Byrne and Shavelson (1986) provided the theoretical framework for the present study. As such, SC structure is hypothesized as being both multidimensional and hierarchical, with perceptions of behavior at the base, moving to inferences about self in subject specific areas (e.g. English, mathematics), then to inferences about self in academic and nonacademic areas, and finally, to inferences about self in general. Furthermore, SC is postulated as becoming increasingly multifaceted with age, and as being differentiable from other psychological constructs such as academic achievement.

Findings support the multidimensionality of SC, as evidenced by research on students in grades 2 through college (see Marsh & Shavelson, 1985 for extensive references). General SC, academic SC, and the subject specific SCs related to English and mathematics, although correlated, have been shown to be separate facets of SC (Byrne, 1986; Byrne & Shavelson, 1986; Marsh & Shavelson, 1985; Shavelson & Bolus, 1982).

The hierarchical structure of SC has been tested (grade 7 through college) and supported (Byrne, 1986; Byrne & Shavelson, 1986; Fleming & Courtney; Shavelson & Bolus, 1982). As such, correlations among SC facets produce a pattern whereby the correlations between subject specific SCs and academic SC are highest, between academic SC and general SC the next highest, and finally, between subject specific SCs and general SC, the lowest.

As might be expected, academic achievement for high school students correlates highest with academic SCs and least with nonacademic SCs. Specifically, the more closely related the academic area (e.g., mathematics), and the particular facet of academic SC under study (e.g., mathematics SC), the higher the correlation. For example, grades in English and mathematics have been shown to correlate highest with SCs in these areas (mean $\underline{r}$ = .51), next highest with academic SC (mean $\underline{r}$ = .41), and least with general SC (mean $\underline{r}$ = .03) (Byrne & Shavelson, 1986; Marsh & O'Neill, 1984). These correlations are important for understanding relations between academic ability and SC.

In sum, it is evident that to study track differences in adolescent SC, one must explore multiple facets of the construct. Relations between academic achievement and SC are dependent upon the particular facet in question.

Academic Track as a Social Referent

To have an impact on the formation of students' SCs, track membership must exhibit a high degree of saliency (Richer, 1976). That is to say, for low-track students to compare themselves with their high-track peers, characteristics of the comparison group must be both obvious and significant to them in their comparison processes. Indeed, socialization within the high school has always been effective in making students cognizant of the hierarchical ordering of diverse peer groups within its community, and of the stereotypic labelling associated with each. Forces that bear on this socialization process tend to be implicit, rather than explicit, in perpetuating the notion of differential group characteristics. With respect to the stereotypic labelling accorded academic tracks, three factors are considered to bear importantly on this process --- student-teacher attitudes, student friendship patterns, and participation in extracurricular activities. Implicitly, each of these factors serves to reinforce the notion that low-track students represent one kind of people, whereas high-track students represent yet another; the perceived characteristics of each being well known to both groups. Let us now review these three important factors.

Stereotypic behavior associated with members in each track has been shown to be readily recognized by students and teachers alike. High-track students have been described by their low-track peers as "snobs", "brains", "brown-nosers", "conformists", and "more intelligent" (McKay, 1984; Rosenbaum, 1976); and by teachers, as "enthusiastic", "motivated", "bright", and "fun to teach" (Finley, 1984). In sharp contrast, low-track students have been reported to be "lazy", "goof-offs", "not caring about school", "slow learners", and "dumb" by high-track students (McKay, 1984; Rosenbaum, 1976); and as "lazy", "unresponsive", "unmotivated", "always getting into trouble" and "frustrating to teach" by teachers (Addy et al., 1980; Finley, 1984). These labels derive in large part from student and teacher judgements of academic performance using grades as a standard of reference. Indeed, the saliency of school grades as a valuable and effective source of feedback for academic performance has been noted (Bachman & O'Malley, 1986; Maruyama, Rubin, & Kingsbury, 1981). In this regard, research findings have been consistent in reporting lower levels of achievement for low-track students than for their high-track peers (Addy et al., 1980; Alexander & McDill, 1976; Alexander, Cook, & McDill, 1978; McKay, 1984; Porter, Porter, & Blishen, 1982).

Student friendship patterns are also closely linked to academic track. Unlike elementary school children whose friendships tend to be based on neighborhood proximity, high school students choose their friends from within their own track (Alexander & McDill, 1976; Cohen, 1977; Rosenbaum, 1976). Strong peer pressure reportedly energizes this selection process and helps to sustain its continued functioning (Cohen, 1977; Rosenbaum, 1976).

Participation in extracurricular activities appears to be indirectly linked to student friendship patterns. Whereas most high-track students participate in these activities, most low-track students do not (Addy et al., 1980; Rosenbaum, 1976). Furthermore, club membership, and the holding of executive positions in student council, and other school associations and clubs appear limited to high-track students (Rosenbaum, 1976). Clearly then, the status of one's friends, as well as the extent to which one participates in extracurricular activities at school appear dependent on track membership. Both of these factors in part, not only reinforce the saliency of the track groups within the school, but lead to a differential pattern of socialization within each academic stream.

It seems apparent from the literature reviewed that the differential characteristics of low and high tracks in high school are indeed visible. In fact, Rosenbaum (1976, p. 169) posits that "track position provides a single, highly visible, unambiguous label that instantaneously communicates stigma".

Academic Track as a Basis for Social Comparison

Social comparison theory (Festinger, 1954) suggests that, in the absence of objective standards, people use significant others in their environment as the bases for forming self-assessments. For adolescents, in light of the fact that most of their time is spent within the school environment, teachers and fellow students would appear to be important significant others to them in the formation of their self-conceptions. In academically tracked schools, given the saliency of track membership noted earlier, it seems likely that social comparison plays an important role in student self-judgements of academic ability. Indeed, Rogers et al. (1978, p. 51) posited that "the importance of academic achievement for self-concept lies not in the absolute level of achievement but in the child's perceptions of how his/her level of achievement compares with the achievement of those in his/her social comparison group".

Given the high value placed on education in our society, membership in the high track represents acceptable behavior; it is consistent with our expectations of academic excellence and equated with perceptions of success, another highly regarded societal value. Thus, high-track membership tends, generally, to be regarded as the norm. Within this context, then, it seems apparent that students in both tracks use each other as a yardstick against which to judge their own academic capabilities. Indeed, studies of academic tracks, in assuming this comparative process, have yielded findings that substantiate these claims (see Alexander & McDill, 1976; Alexander et al., 1978; Jerusalem, 1984; King, Warren, & Coles, 1980; McKay, 1984; Porter et al., 1982; Rosenbaum, 1976).

Undoubtedly, students also compare themselves with those in the same track. However, such comparisons are believed to play a more minor role in the formation of academic SCs since the reference group (specific classroom membership) varies from one year (and perhaps, one semester) to the next. In contrast, track membership remains relatively stable throughout the duration of one's high school years.

This review of the literature leads to the following conclusions: (a) previous research investigating high school track differences is characterized by important theoretical and methodological weaknesses, (b) adolescent SC is hierarchically structured, with academic achievement correlating highest with the subject matter SCs, next highest with academic SC, and least with general SC, (c) for high school students, track membership and the stereotypic characteristics associated with it provide a highly visible and salient referent for them in self-evaluations of their own academic ability, and, (d) in high schools where students are tracked according to academic ability, it seems evident that social comparison processes bear importantly on student self-evaluations of this ability.

Some researchers might argue that given a history of poor academic performance, low-ability students likely enter high school with academic SCs that are already lower than their high-ability peers; thus, academic tracking has little impact on their academic SCs. While I concur on the likelihood of these initial group differences, I contend that by separating students into two visibly different academic streams, tracking reinforces these differences, thereby helping to widen the differential in academic SC between low- and high-track students.

The purposes of the present study were threefold: (a) to test for latent mean differences multidimensional SCs between low- and high-track high school students, (b) to interpret findings within the framework of a specific theoretical model of SC, and (c) to analyze the data using a statistically sophisticated methodological approach that integrates measurement and theoretical concerns into one conceptual, analytic framework.

Substantively, it was predicted that, given the hierarchical structure of SC and the known pattern of correlations among SC facets, and between these facets and academic achievement, a comparison of low- and high-track students would yield findings of: (a) no mean differences in general SC and, (b) substantial mean differences in English and mathematics SCs; the low-track students exhibiting lower SCs, than their high-track peers. On the basis of theory and empirical research, only moderate track differences in academic SC were predicted; academic SC falls at the top of the hierarchy and, therefore, should be more resistent to academic situations than the subject matter SCs.

Methodologically, the study went beyond previous research in this area by (a) examining multidimensional SCs --- general SC, academic SC, English SC, and mathematics SC, using three independent measures of each SC facet, (b) using a covariance structure analysis of the data to formally test the assumption of equivalent SC measurement and structure, and (c) using only those measurements found to be invariant across track to test for latent mean differences.

Method

Sample and Procedure

The data for the present study were derived from a previously published study that was designed to validate the structure of adolescent SC (Byrne & Shavelson, 1986); subjects were grades 11 and 12 students from two suburban high schools in Ottawa, Canada. Following listwise deletion of missing data, the final sample size was 830 (248 low track, 582 high track).

In the province of Ontario, academic courses are structured at two levels of difficulty --- advanced level (A-level) and general level (G-level). A-level courses are designed to meet university entrance requirements and are taken by most regular students. G-level courses, on the other hand, are considered "appropriate preparation for employment or further education in colleges and other non-university educational institutions" (Ontario Ministry of Education, 1979-81, p.7). Students who are registered in two or more G-level courses are classified as low-track students; all other students are considered to be high-track. Once classified as low-track, a student generally retains this status (and hence the label) throughout his/her high school years.

Typically, low-track students exhibit low levels of intellectual ability; unfortunately, the IQ ranges for each group cannot be reported here since educational policy precludes access to this information. Additionally, low-track students tend not to participate in any of the social, recreational or organizational activities of the school; they usually withdraw from school as soon as legally possible to do so. The label of low-track, then, connotes a set of negative descriptors that are well known to both the low- and high-track students, and to teachers alike (see literature review).

To ensure the relevancy of SC responses related to English and mathematics, it was important that all students in the sample be registered in both of these subject areas; low-track students were registered in G-level English and mathematics classes, while high-track students were registered in A-level English and mathematics classes. A battery of SC instruments was administered to intact classroom groups during one 50-minute period. The testing was completed approximately two weeks following the April report cards. The students therefore had the opportunity of being fully cognizant of their academic performance prior to completing the tests for the study. This factor was considered important in the measurement of academic and subject matter SCs.

Instrumentation

The SC test battery consisted of 12 instruments; three measures for each of general SC, academic SC, English SC, and mathematics SC. All instruments were self-report rating scale formats and were designed for use with a high school population.

General SC was measured using the General-Self subscale of the Self Description Questionnaire III (SDQ III; Marsh & O'Neill, 1984), the Self Concept subscale of the Affective Perception Inventory (API; Soares & Soares, 1979), and the Self-esteem Scale (SES; Rosenberg, 1965). Measures of academic SC were the SDQ III Academic Self-concept Scale, the API Student Self subscale, and the Self-concept of Ability Scale Form A (SCA; Brookover, 1962). English SC was measured with the SDQ III Verbal Self-concept subscale, the API English Perceptions subscale, and the SCA Form B. Items on Form B are identical to those on Form A, except that they elicit responses relative to specific content (e.g. "how do you rate your ability in English compared to your close friends'?"). Finally, measures of mathematics SC included the SDQ III Mathematics subscale, the API Mathematics Perceptions subscale, and the SCA Form C (items specific to mathematics ability). (For a more extensive description of these measures, and a summary of their psychometric properties, see Byrne & Shavelson, 1986).

<u>Analysis of the Data</u>

Responses to negatively worded items were reversed so that for all instruments, the highest response code was indicative of a positive rating of SC. Additionally, the first item on the API Self Concept subscale was recoded, contingent on the sex of the respondent.[1] The SDQ III, API, and SCA were factor analyzed in an earlier study of these data. Based on these findings, the API Student Self subscale was deleted as a measure of academic SC.[2]

Based on theory and empirical research, a 4-factor SC structure consisting of general SC, academic SC, English SC, and mathematics SC was hypothesized, and the fit of this model tested against the data. Using the LISREL VI (Joreskog & Sorbom, 1985) program, analyses of the covariance structure of the data were conducted in three stages. First, the data were examined separately for each track to establish baseline models.[3] Second, since any discussion of mean differences is problematic unless it is known that the measures and the structure of the construct under study are equivalent across groups (see Alwin & Jackson, 1981; Rock, Werts, & Flaugher. 1978), these assumptions were tested before considering differences in latent track means. Finally, track differences in multidimensional SCs were tested, with equality constraints placed on only those measures found to be invariant across groups (see Byrne, Shavelson, & Muthén, 1987).

In covariance structure analysis, the extent to which a proposed model fits the observed data should be determined from multiple criteria (Joreskog, 1979; Joreskog & Sorbom, 1985). Assessment of fit in the present study was based on (a) the chi-square (χ^2) likelihood ratio, (b) the χ^2/degrees of freedom ratio, (c) Bentler and Bonett's (1980) normed index (BBI),[4] (d) T-values (parameter/standard error estimates), normalized residuals and modification indices provided by the LISREL program, and (e) knowledge of substantive and theoretical research in this area.

Results

Means and standard deviations for SC measurements (GSC, ASC, ESC, MSC) and academic achievement are presented in Table 1. Measurements of the latter represent overall grade average across subjects (GAVER), final grade in English (ENG), and final grade in mathematics (MATH).

Table 1 about here

The Baseline Models

The first step in the analyses was to determine a baseline model for each track. (For an elaboration of this procedure see Byrne et al., 1987; Joreskog & Sorbom, 1985; Marsh & Hocevar, 1985). The baseline model for the low track yielded a χ^2 = 49.10 (χ^2/df = 1.49, BBI = .97), and for the high track, a χ^2 = 105.50 (χ^2/df = 3.20, BBI = .98).[5] These results represented a reasonable fit to the data and indicated that for both tracks, the hypothesized model accounted for over 96% of the covariation. For both tracks, a substantially better fitting model resulted when (a) the SDQ Verbal SC subscale for the low track, and the API English Perceptions subscale for the high track were free to load on general SC and, (b) error/

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uniquenesses associated with certain subscales of the same measuring instrument were free to covary. These error covariances represented nonrandom measurement error that was introduced by a particular measurement method and are not uncommon to analyses of psychological constructs such as SC (Byrne & Shavelson, 1986). These results are presented in Table 2.

Insert Table 2 about here

Examination of the factor correlation matrix reveals some inconsistencies across track. Of particular note is the discrepancy in general/English SC relations, and the reverse ordering of academic/English SC and academic/mathematics SC relations across track. While these findings suggest that the structure of SC varies somewhat for low- and high-tracks, confirmation derives from testing for the invariance of SC structure across track. We look now at these results.

Tests for the Invariance of SC Measurements and Structure

Tests for the equivalency of SC measurements and structure involved the analysis of covariance matrices in order to estimate parameters simultaneously across track. In the interest of most readers, an elaboration of these procedures is not reported here. However, interested readers may write for a detailed summary of these analyses. (For extensive discussions of invariance testing procedures in general, see Alwin &

Jackson, 1981; Joreskog, 1979; Marsh & Hocevar, 1985; Rock et al., 1978; for applications similar to the present one in particular, see Byrne & Shavelson, in press; Byrne & Schneider, in press).

Tests for the equality of SC measurements revealed some inconsistencies. While all measures of general SC and academic SC were found to be invariant across track, this was not so for measures of the subject matter SCs; only the API English Perceptions and the SCA SC of Mathematics Ability subscales were equivalent in their measurements of English SC and mathematics SC, respectively. While tests for the equality of SC structure, for the most part, demonstrated equivalency across track, relations between general and English SCs, and between academic and mathematics SCs were found to be noninvariant.

Tests for Latent Mean Differences in Self-concept

The LISREL approach to testing for differences in latent mean structures is based on the augmented moment matrix and requires that one group be used as a reference point; as such, its mean parameters are fixed to 0.0. In this case, the low track served as the reference group, and mean parameters for the high track were freely estimated. Comparison of the groups then, was determined by the difference from zero. Statistical significance was based on on the T-values provided by LISREL; these values being approximately distributed as a *z*-statistic. It is again emphasized that the test for mean differences was conducted using only those measures found to be invariant across track (i.e., partial measurement invariance). (For details of this procedure in general, see Joreskog & Sorbom, 1985; Rock et al., 1978; Sorbom, 1979; for details involving partial measurement invariance, see Byrne et al., 1987).

The results in Table 3 reveal statistically significant mean track differences in academic, English and mathematics SCs, with positive values indicating higher scores for the high track. Contrary to predictions, the largest difference between tracks was in academic SC, followed by mathematics SC and English SC, respectively. Mean track differences in general SC were negligible, and not statistically significant.

Insert Table 3 about here

Discussion

The study examined latent mean differences in general SC, academic SC, English SC and mathematics SC between low- and high-track high school students. Since interpretations based on latent variable means assume invariant measurements and construct structure, baseline models were first determined for each track, and then tested for measurement and structural equivalencies across track.

Tests of latent mean differences in SC yielded significant track differences in academic, English and mathematics SCs. While these findings were consistent with predictions for

English and mathematics SCs, they were inconsistent with those for academic SC; based on the theory, only a moderate mean difference in academic SC was expected. These results suggest that students in the low track use the high track as a referential yardstick against which to judge their own academic abilities; in so doing, they perceive themselves as less capable.

As predicted, no latent mean track differences in general SC were found. For low-track students in particular, these findings suggest that despite their negative academic experiences and concomitant low SCs in specific subject areas, their overall perception of self remains on a par with their high-track peers. In support of Rosenberg's (1968) views on SC development, it is possible that low-track students, albeit cognizant of their inferior academic ability, do not place a high value on it's attainment. More likely, as evidenced in other studies (Addy et al., 1980; King et al., 1980), they consider popularity within their own friendship cliques as more worthwhile.

Aside from the substantive issue, inconsistencies in the measurement and structure of SC were also found. These findings bear importantly on research focusing on mean track differences in SC. This important psychometric issue, while beyond the scope of the present paper, remains the work of future research. Self-concept theorists are urged to address these issues in future construct validation research.

The major limitation of the present study lies with its assumed inter-track comparisons; this assumption was not directly tested. Research that focuses on more detailed social comparison processes within the academically tracked high school is needed. Such research may contribute importantly to our knowledge of tracking effects, for example, by confirming or disconfirming its presumed negative impact on low-ability students.

Findings from this study hint at the possible interplay of compensatory factors in the formation of SC. For example, it is possible that low-ability students place more importance on their social and/or physical, rather than their academic competencies. Accordingly, their SCs in these areas may be higher, or at least equivalent to those of their high-track peers. Indeed, past research has suggested this possibility (see e.g., Winne, Woodlands, & Wong, 1982). If this should be so, school counselors, psychologists, and others concerned with the well-being of low-ability students, may well consider placing more emphasis on the nonacademic, rather than on the academic components of SC. Future research bearing on these substantive and psychometric issues can yield further clarification of the facts, and perhaps provide us with a fresh insight into the controversial practice of academic tracking in high schools.

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Footnotes

1. The item was "I am masculine-------I am feminine".
2. The academic SC factor was not clearly defined, with only 10/25 items loading >.25.
3. A baseline model represents the most parsimonious, yet substantively most meaningful and statistically best fitting model to the data.
4. A $\underline{\chi}^2$/df ratio ranging from 1.00 to 3.00 (Carmines & McIver, 1978), and a normed index (BBI) >.90 (Bentler & Bonett, 1980) indicates a reasonable fit to the data.
5. With several additional modifications to the model, a statistically better fitting model was obtained for the high track ($\underline{\chi}^2$/df = 1.84, BBI = .99), than the one reported. Following a sensitivity analysis (see Byrne et al., 1987) of major parameters, however, this post hoc model was rejected in favor of the more parsimonious baseline model. Interested readers may write for these details.

Table 1

Observed Means and Standard Deviations for Self-concept and Academic Achievement Measures

	Low Track (n = 248)		High Track (n = 582)	
Self-concept Measure	M	SD	M	SD
SDQGSC	75.95	13.29	75.64	14.44
APIGSC	76.73	9.14	76.94	9.39
SESGSC	31.10	4.75	31.45	5.09
SDQASC	49.64	12.38	57.37	11.68
SCAASC	25.08	4.41	30.17	4.93
SDQESC	54.67	9.57	57.22	9.93
APIESC	57.35	10.79	61.53	11.26
SCAESC	25.22	4.98	28.68	5.77
SDQMSC	41.89	13.62	49.01	16.79
APIMSC	42.00	10.70	47.38	11.63
SCAMSC	22.97	5.88	26.23	7.97
GAVER	61.15	9.15	70.44	10.17
ENG	58.88	11.86	68.79	11.74
MATH	59.39	14.85	62.69	16.21

SDQGSC = SDQ General-Self subscale; APIGSC = API Self-Concept subscale; SESGSC = SES; SDQASC = SDQ Academic Self-concept (SC) subscale; SCAASC = SCA Form A; SDQESC = SDQ Verbal SC subscale; APIESC = API English Perceptions subscale; SCAESC = SCA Form B (SC of English ability); SDQMSC = SDQ Mathematics SC subscale; APIMSC = API Mathematics Perceptions subscale; SCAMSC = SCA Form C (SC of mathematics ability); GAVER = overall grade average; ENG = final grade in English; MATH = final grade in mathematics.

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Table 2

Baseline Model Parameter Estimates of Self-concept[ab]

	Low Track					High Track				
	SC Factors				Error	SC Factors				Error
Measures	GSC	ASC	ESC	MSC	Variance	GSC	ASC	ESC	MSC	Variance
SDQGSC	.89	0	0	0	.21	.89	0	0	0	.21
APIGSC	.69	0	0	0	.52	.74	0	0	0	.46
SESGSC	.85	0	0	0	.28	.91	0	0	0	.17
SDQASC	0	.82	0	0	.33	0	.80	0	0	.36
SCAASC	0	.68	0	0	.52	0	.79	0	0	.35
SDQESC	0	0	.70	0	.50	.16	0	.74	0	.38
A[illegible]	.30	0	.98	0	.20	0	0	.91	0	.15
[illegible]	0	0	.61	0	.63	0	0	.77	0	.44
S[illegible]	0	0	0	.87	.23	0	0	0	.95	.09
A[illegible]	0	0	0	.87	.21	0	0	0	.94	.12
SC[illegible]SC	0	0	0	.82	.33	0	0	0	.86	.23
Factor Correlations										
GSC	-					-				
ASC	.43	-				.45	-			
ESC	.47	.63	-			.21	.52	-		
MSC	.33	.51	.14	-		.26	.63	.02	-	

[a]Standardized solution

[b]All zero values represent fixed parameters

GSC = general self-concept (SC); ASC = academic (SC); ESC = English SC; MSC = mathematics SC; SDQGSC = SDQ General-Self subscale; APIGSC = API SC subscale; SESGSC = SES; SDQASC = SDQ Academic SC subscale; SCAASC = SCA Form A; SDQESC = SDQ Verbal SC subscale; APIESC = API English Perceptions subscale; SCAESC = SCA Form B (SC of English ability); SDQMSC = SDQ Mathematics SC subscale; APIMSC = API Mathematics Perceptions subscale; SCAMSC = SCA Form C (SC of mathematics ability); GAVER = overall grade average; ENG = final grade in English; MATH = final grade in mathematics.

Table 3

Latent Self-concept Means and Variances[ab]

	Low Track (n = 248)		High Track (n = 582)	
	Mean	Variance	Mean	Variance
Self-concept Factor				
General SC	.00[c]	.79(.09)	.01(.03)	.79(.06)
Academic SC	.00	.68(.10)	.36(.03)***	.65(.06)
English SC	.00	.49(.08)	.17(.02)***	.55(.05)
Mathematics SC	.00	.76(.08)	.25(.04)***	.91(.06)

***$p < .001$

[a]Maximum likelihood estimates

[b]Standard errors in parentheses

[c]Latent mean parameters were fixed to .00 for the low track