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Reciprocal Effects of Self-Concept and Academic Achievement in Sixth and Seventh Grade

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We aimed to (a) assess causal influences of three levels of self-concept on each other, (b) examine the relationship between each level of self-concept and academic achievement, and (c) compare the effect of self-concept on achievement with the effect of achievement on self-concept. In a two-year longitudinal study of 322 sixth and seventh grade students, influences over time between three levels of self-concept were weak. Zero-order correlations between self-concept and grades were positive and substantial, as in past studies. When using structural equation models, we found much weaker paths between self-concept and grades. Influences from self-concept to grades were very weak, but grades had a modest influence on subsequent discipline-specific self-concept. We conclude that past correlational studies have overstated the influence of self-concept on grades and of grades on self-concept.

INTRODUCTION

Hundreds of research studies have been done relating self-concept measures to academic achievement (for reviews see Wylie, 1979; Hansford and Hattie, 1982; Skaalvik and Hagtvet, 1990). The majority of studies have found positive correlations between self-concept and academic achievement

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(measured by grades or test scores), frequently about .20 to .25 (Hansford and Hattie, 1982). Wylie (p. 361) stated that the correlations between grade point averages and tests of overall self-regard were mostly around .30. These correlations have encouraged some educators to see self-concept enhancement as a resource for raising students' academic achievement. But the conclusion is premature, for at least two reasons.

First is the question of the direction of causation. Is it true that self-concept has causal impact on subsequent academic achievement, or is the main causation in the other direction, from high grades to enhanced self-concept? A third possibility is that the two are the result of past reciprocal causal influences over a long period of time. Possibly the correlation at any one time is mainly spurious, in that both are the product of experiences over a period of years.

Second is the issue of whether self-concept should be studied globally or on specific levels. Whereas the earliest research studied global self-concept, recent studies have usually distinguished between levels following the conceptualization of Shavelson or others (Shavelson *et al.*, 1976; Harter, 1983). In Shavelson's view, self-concept is structured hierarchically and has three identifiable levels. For children and adolescents, at the top is a fairly stable general (or global) self-concept; at the middle level are specific sectors of self-concept such as academic self-concept, social self-concept, emotional self-concept, and physical self-concept; and at the bottom level are specific subareas of self-concept such as mathematics self-concept, science self-concept, peer relations self-concept, and physical appearance self-concept. The proposition that self-concept is hierarchical in this manner is not under dispute today, but it raises the question of which level is the most important for influencing subsequent academic achievement.

This paper aims to clarify the relationship between self-concept and academic achievement by analyzing longitudinal data, providing opportunities for assessing causal effects in both directions, and by measuring self-concept at all three levels of specificity.

At the outset we need to comment on terminology. Recent authors have used both the term "self-concept" and the term "self-esteem" to refer to the same entity. Marsh and Shavelson are prominent researchers who use "self-concept," while Rosenberg and his collaborators use "self-esteem." Yet all these writers refer to the same thing, and even the measures they use are indistinguishable. The choice of terms seems arbitrary. Here we will use the term "self-concept." Future research would be aided by standardization of terms.

Relations Between Self-Concept and Academic Achievement

Many educators have assumed that self-concept affects academic achievement, and any gain in self-concept will benefit academic achievement later. For example, Upward Bound programs were sponsored to enhance global self-concept with the expectation that it in turn will improve academic achievement. But research has not found clear effects.

The main problem is the causal ordering of self-concept and achievement. In a review of research, Scheirer and Kraut (1979) found no support for the proposition that changes in global self-concept affect academic achievement, but they suggested that changes in more specific elements of self-concept probably have some effect. The question requires longitudinal research.

Several longitudinal studies have been done. Calsyn and Kenny (1977) studied 556 junior high and high school students with five data collections each a year apart, and in cross-lagged correlations they found a causal predominance of grades over self-concept of ability. Shavelson and Bolus (1982) measured self-concept and grades of seventh- and eighth-grade students at two times six months apart, and by use of cross-lagged structural models found evidence of the causal predominance of self-concept over achievement. Byrne (1986) studied ninth- through twelfth-grade students using two data collections six months apart, and was unable to establish causal predominance between self-concept and grades in either direction. Bachman and O'Malley (1977, 1986) analyzed data from the large longitudinal Youth in Transition study, which studied tenth-grade boys, then eleventh graders 18 months later. They studied a complex of variables influencing self-concept but could not assess the reverse influence of academic achievement on self-concept. Marsh (1987) reanalyzed the same data and showed the importance of academic levels for students' general self-concept and academic self-concept. Rosenberg *et al.* also reanalyzed the data (1989) and concluded that grades have a stronger impact on self-esteem than self-esteem has on grades. Maruyama *et al.* (1981) studied students at ages 9, 12, and 15, and found no evidence that academic achievement and self-esteem were causally related to each other. Pottebaum *et al.* (1986) analyzed longitudinal data from high school students, with a time interval of two years, and found no evidence of a predominance of one variable over the other. Newman (1984) found that self-concept had no causal influence on subsequent academic achievement, but in later analysis of the same data Marsh (1987) arrived at the opposite conclusion.

To summarize, the empirical research does not allow any firm conclusion about the causal ordering of self-concept and academic achievement. This is also the conclusion of others reviewing the studies (Byrne, 1986; Skaalvik and Hagtvet, 1990).

Not only the direction of causation but also the strength of the effects is under debate. We suspect that findings in past research depended greatly on the methods of analysis. If cross-sectional or cross-lagged zero-order correlations were calculated, they would tend to be fairly strong. If structural equation modeling was done with the same data (including paths from prior levels of self-concept and grades), the relationships would be very much weaker. Structural equation modeling is the preferred method, since it greatly reduces spurious relationships and depicts more realistically the influence of *change* in one variable on *change* in another. In the present article we compare both methods of analysis.

Levels of Self-Concept

In arguing for a hierarchical structure of the self-concept, Shavelson and his collaborators propose that the highest general level is the most stable, the lowest level is the least stable, and the middle level is between. Also, the lowest level is the most affected by specific life experiences, and over time the specific elements at the lowest level generalize and move up the structure, affecting higher levels. Change in self-concept thus moves from lower to higher levels. For example, self-concept in mathematics ability would be expected to change depending on grades in mathematics, and the impact of mathematics grades would be less (and slower) on the middle level of self-concept (that is, academic self-concept), and even less (and later) on general self-concept. What the expected causation is from the three levels of self-concept to achievement is not theoretically clear. Would we expect that mathematics self-concept would have a greater impact on mathematics grades than academic self-concept or general self-concept?

Shavelson's model has been widely accepted, and it has proved useful in clarifying the relationship between self-concept and academic achievement (see Brookover *et al.*, 1964; Shavelson and Bolus, 1982; Byrne, 1984, 1986; Byrne and Shavelson, 1986; Van Boxtel and Monks, 1992). Construct validity research confirms that these three levels of self-concept are identifiable and distinct (Fleming and Courtney, 1984; Byrne and Shavelson, 1986; Marsh *et al.*, 1988).

The expectation that general self-concept is more stable than academic self-concept (or other more specific subareas) has been tested in two longitudinal studies, and both had inconclusive results. Shavelson and Bolus (1982) found similar levels of stability at all three levels, and Byrne (1986) found academic self-concept (the middle level) to be the most stable of the three, though the differences were never large. The assumption that specific subareas of self-concept affect general self-concept more than vice versa has also been questioned, since the different levels may have separate determinants (Harter, 1990).

METHOD

Sample

Two public middle schools in a suburb of a midwestern metropolitan area took part in a two-year longitudinal study of students beginning in the sixth grade. None of the students changed schools during the study. They completed questionnaires four times—at the beginning and end of sixth grade and at the beginning and end of seventh.

Our choice of a junior high sample was made for practical, not theoretical reasons, but it is pertinent because the junior high years are a central concern of past theorists. These students were aged 11–13 at the outset. They represent diverse socioeconomic backgrounds, with about two-thirds coming from middle-class homes and one-third from working-class homes. Ninety-five percent of the students were White and 5% belonged to other racial groups, mostly Black. Boys comprised 45% of the sample, and girls, 55%. A total of 363 students began the study, and 89% participated in all phases, producing 322 completed cases on which all analyses were done (see Hoge *et al.*, 1990).

All students in the sixth grade participated except one, whose parents objected. Data collection in the fall was done in the first full week of school; in the spring it was done in the final weeks. Grades were recorded in mathematics, language arts, social studies, science, and physical education at the end of each of the four semesters.[4]

Self-Concept Measures

Self-concept was measured at three levels of specificity. At the general level we used the 10-item Rosenberg Self-Esteem Scale (Rosenberg, 1965, pp. 17–18). It measured overall self-concept apart from any content area, and included items such as "I take a positive attitude toward myself" and "I certainly feel useless at times." Each of the items had 4 responses rang-

[4]One of the five disciplines, physical education, is not discussed in this paper because it is different from the others. Grades in physical education are based largely on attitude, effort, and participation, so the concept "achievement" does not clearly apply, making it useless for our hypothesis testing. Our analysis is done on four academic disciplines.

ing from *strongly agree* to *strongly disagree,* scored from 4 to 1 (with appropriate reversals) so that a high score indicated high self-concept. Global self-concept was the unweighted mean of the responses. Cronbach's alpha was .77, .80, .81, and .86 in the four measurements.

To measure academic self-concept we used the 8-item Self-Concept of Schoolwork Ability-General Scale (Brookover *et al.*, 1962).[5] It inquired about the students' self-perceived academic ability in general. For example, items asked, "Think of the students in your class. Do you think you can do schoolwork better, the same, or poorer than the students in your class?" "How good of a student do you think you can be in the next few years?" Each item had 5 responses, scored from 5 to 1, so that a high score indicated high academic self-concept. The scale score was the unweighted mean of the items. Cronbach's alpha for this scale was .82, .86, .86, and .88 in the four measurements.

At the specific level we used the 8-item specific self-concept of ability scales written by Brookover *et al.* (1962, pp. 93ff.). These scales measured self-concept in each of four disciplines. For example, the student was asked, "How do you rate your ability in the following school subjects compared with those in your class at school: math; language arts; social studies; science?" "Where do you think you would rank in your high school graduating class in the following subjects: math; language arts; social studies; science?" Each part had 5 responses, scored from 5 to 1, with a high score indicating high self-concept. The scale score was the unweighted mean of the items. The Cronbach's alphas in the four measurements in each of the disciplines were (a) math: .92, .93, .93, and .94; (b) language: .91, .90, .90, and .90; (c) social studies: .90, .89, .89, and .92; and (d) science: .92, .92, .91, and .92.

All scale scores were computed if at least 2/3 of the items were answered. Missing data on the items in these scales was less than 1%. *N* for the scales ranged from 311 to 322 with a mean of 318.8.

These measures were quite strongly correlated. The average correlation between general self-concept and academic self-concept across the four data collections was .54. The discipline-specific measures correlated more strongly with academic self-concept than with general self-concept. For example, the average correlation between general self-concept and mathematics self-concept was .39, and between academic self-concept and mathematics self-concept it was .68.

[5]The Brookover scales are not published in an easily accessible place. Interested persons are invited to write to the first author for the items and formats. In Brookover *et al.* (1962, p. 18) it is reported that the reliability of the Self-Concept of Ability—General scale by Hoyt's method in a junior high study was .82 for males and .77 for females.

In the analysis we first looked at the stability and interrelatedness of the three levels of self-concept, then we looked at the links between self-concept and grades.

RESULTS

Stability of Measures Over Time

Table I depicts zero-order correlations of all the measures over time. The self-concept scores were especially stable across the summer months between sixth and seventh grade. For example, Academic Self-Concept correlated .61 from fall to spring in sixth grade, .78 from spring of sixth to fall of seventh grade, and .69 from fall to spring in seventh grade. We believe the high correlation from spring to fall is due to the short time elapsed.

Regarding grades, the opposite pattern appeared: stability was lower between sixth and seventh grade than within sixth grade and within seventh grade. No doubt the change of teachers and classes accounted for the lower correlations across the summer. Also within each academic year, grades were more stable than self-concept scores; for example, mathematics grades correlated .78 from fall to spring in sixth grade and .81 from fall to spring in seventh grade; no correlations of self-concept scores during one academic year were that high. With such high correlations of grades within

Table I. Product-Moment Correlations of Measures Over Time[a]

	Fall 6th grade × Spring 6th grade	Spring 6th grade × Fall 7th grade	Fall 7th grade × Spring 7th grade
General Self-Concept (Rosenberg)	.56	.71	.62
Academic Self-Concept (Brookover)	.61	.78	.69
Specific Discipline Self-Concept			
Mathematics	.57	.76	.75
Language arts	.50	.70	.62
Social studies	.52	.70	.63
Science	.43	.71	.54
Grades			
Mathematics	.78	.66	.81
Language arts	.80	.72	.82
Social studies	.64	.57	.84
Science	.75	.60	.82

[a]All correlations are significant at $p < .01$. N varies from 308 to 322.

each academic year, we cannot expect much influence from self-concept on grades during the year.

Interrelations Among Three Levels of Self-Concept

Figure 1 depicts the possible causal paths linking the three levels of self-concept across four measurements. The model was designed to analyze each of the five specific disciplines, and it was assessed separately for each using structural equation models (LISREL). Note that the period of time between the second and third measurement was relatively short—only the months from June to September. The model is a structural equation model only, not a measurement model; it has one measure for each concept.

The advantage of LISREL over path analysis is its ability to include correlations among residuals of each variable when making path estimates. The LISREL model we estimated for Fig. 1 included correlations of residuals for all nonexogenous variables in adjacent measurements; the residuals that could be included are shown by short arrows in the figure. We tested the model separately for each discipline, and it provided a strong goodness-of-fit for all. Chi-square was 392.61 for mathematics, 347.31 for language, 387.32 for social studies, and 399.41 for science, all with 30 degrees of freedom and $p < .000$. The GFI (goodness-of-fit index) scores were .837, .849, .830, and .828, respectively. The results are in the first four columns of Table II.

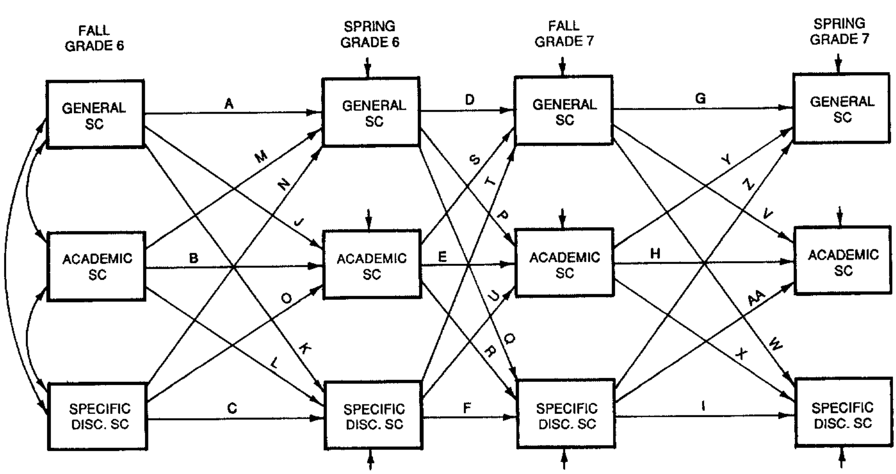

Fig. 1. LISREL model relating levels of self-concept.

Table II. LISREL Estimates on Paths Shown in Fig. 1

		Label	Model with math	Model with language	Model with social studies	Model with science	Mean of four models
Fall Grade 6 to Spring Grade 6							
Direct	General Self-Concept (SC)	*a*	.57	.57	.56	.58	.57
	Academic SC	*b*	.36	.47	.45	.47	.44
	Specific discipline SC	*c*	.54	.42	.35	.31	.41
Downward	General SC to academic SC	*j*	.18	.19	.19	.18	.19
	General SC to specific SC	*k*	.10	.20	.14	.14	.15
	Academic SC to specific SC	*l*	–.02[a]	.01[a]	.15	.14	.07
Upward	Academic SC to general SC	*m*	.00[a]	.00[a]	–.02[a]	.03[a]	.00
	Specific SC to general SC	*n*	–.01[a]	–.02[a]	.02[a]	–.09[a]	–.03
	Specific SC to academic SC	*o*	.25	.07[a]	.10[a]	.07[a]	.12
Spring Grade 6 to Fall Grade 7							
Direct	General SC	*d*	.95	.93	.93	.94	.94
	Academic SC	*e*	.99	.94	.93	.90	.94
	Specific discipline SC	*f*	.87	.73	.81	.96	.84
Downward	General SC to academic SC	*p*	.08	.08	.08	.07	.08
	General SC to specific SC	*q*	.04[a]	.00[a]	.03[a]	.06[a]	.03
	Academic SC to specific SC	*r*	.18	.22	.21	.08[a]	.17
Upward	Academic SC to general SC	*s*	.12	.08	.07[a]	.03[a]	.10
	Specific SC to general SC	*t*	–.03[a]	.04[a]	.07[a]	.13	.05
	Specific SC to academic SC	*u*	–.09	.01[a]	.01[a]	.08	.00
Fall Grade 7 to Spring Grade 7							
Direct	General SC	*g*	.72	.73	.71	.72	.72
	Academic SC	*h*	.53	.72	.71	.72	.67
	Specific discipline SC	*i*	.83	.63	.73	.50	.67

Table II. Continued

		Label	Model with math	Model with language	Model with social studies	Model with science	Mean of four models
Downward	General SC to academic SC	*v*	.10	.08[a]	.07[a]	.05[a]	.08
	General SC to specific SC	*w*	.07[a]	.03[a]	−.08[a]	.05[a]	.02
	Academic SC to specific SC	*x*	−.02[a]	.18	.21	.34	.18
Upward	Academic SC to general SC	*y*	.17	.25	.21	.21	.21
	Specific SC to general SC	*z*	.06[a]	−.07[a]	.02[a]	.00[a]	.00
	Specific SC to academic SC	*aa*	.28	.09[a]	.10[a]	.12	.15

[a]Not significant at .05.

The data in Table II contain four patterns. Most important, the cross-paths are mostly weak and mixed in strength, showing little consistent influence of any level of self-concept on other levels. Only four paths average more than .15 in strength—*y*, *j*, *x*, and *r*—and they are diverse in their location.

Second, self-concept was very stable over time. It was especially stable over the summer between sixth and seventh grade. The average for direct path *d* is .94; for *e* it is .94, and for *f* it is .84.

Third, the more general levels of self-concept are relatively more stable, in agreement with Shavelson's expectation. During sixth grade path *a* averages .57, path *b* averages .44, and path *c* averages .41. During the summer path *d* averages .94, path *e* averages .94, and path *f* averages .84. During seventh grade path *g* averages .72, path *h* averages .67, and path *i* averages .67.

Fourth, the upward and downward paths spanning *two* levels were mostly weak. The upward two-level paths (*n*, *t*, and *z*) were near zero, and two of the three downward two-level paths (*g* and *w*) were near zero. Only *k* had a modest yet consistent strength, and the reason is unclear. But, generally, the paths spanning two levels are negligible and can be ignored.

Fifth, there is no causal predominance of upward vs. downward cross-paths; all the upward paths average .07, and all the downward average .11. Both are very weak. We conclude that the influence of specific-discipline self-concept or academic self-concept on general self-concept is weak and vice versa. The more general theory that causation tends to flow upward more than downward is not supported, but to be precise we must say that we have studied only a limited range of the many specific elements of self-concept. We did not gather data on nonacademic elements of self-concept, including popularity, athletic acclaim, leadership, or family relationships. We have estimates of only specific influences of school experiences, not the total system of influences.

Links Between Self-Concept and Achievement

We compared two methods of assessing the links between self-concept and achievement. First we replicated the method most often used in past research: correlations. We posited the relationships shown in Fig. 2. All the relationships are over time, and all express influence or causality to some extent. We have no *proof* of causality in this type of nonexperimental research; all that is possible is to assess the relative strengths of the relationships and make tentative inferences about causality.

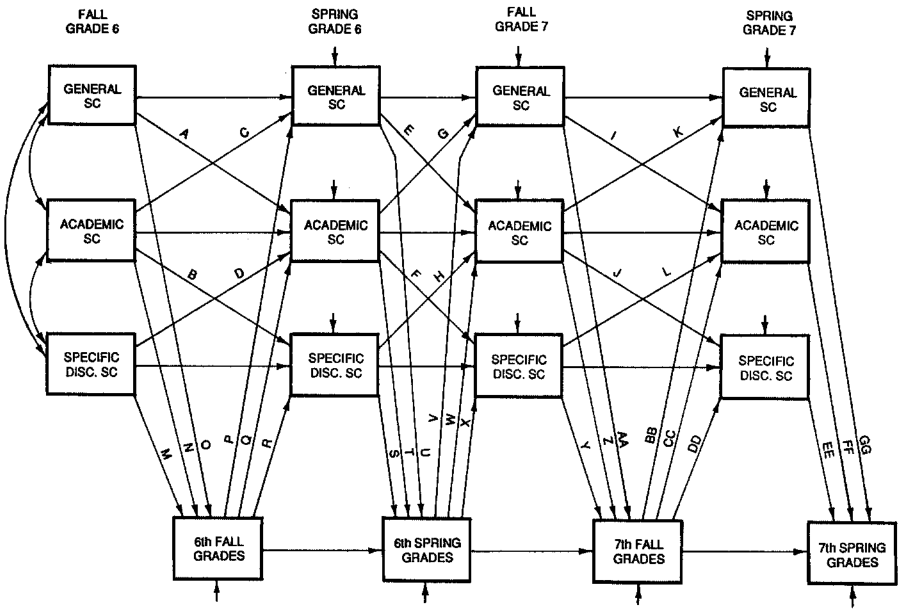

Fig. 2. LISREL model relating self-concept and grades.

We calculated zero-order correlations corresponding to each path. This was done for all four disciplines, using grades and self-concept scores specific to the discipline. Since the results were similar for the four disciplines, they are summarized in Table III. The main pattern is that grades were more closely associated with discipline-specific self-concept than with the other two levels (academic self-concept and general self-concept); they were *least* associated with general self-concept. The same pattern occurred for both directions of causation. This supported the conceptual model posited by Shavelson and agreed with past research.

Are the correlations relating self-concept to subsequent grades stronger than those relating grades to subsequent self-concept? Table III shows that the answer is no. The paths leading downward (from SC to grades) are equally strong as those leading upward (from grades to SC).

These correlations resemble those found in past correlation studies. They are similar to the average correlation found between "self-concept of ability" measures and achievement (.42) and the average between overall self-regard and achievement (.34) found by Hansford and Hattie in their large review of research.

There is a possible complication due to the timing of the data collection. As noted, several months elapsed between the fall self-concept questionnaire and fall grades, but only a few weeks elapsed between the spring self-concept questionnaire and spring grades. By the time the students took the spring questionnaires, they had a fairly good idea what their grades would be. This scheduling peculiarity suggests that the downward arrows will probably have different strengths in the fall and in the spring. If there is a genuine impact of self-concept on grades and vice versa, it should occur most strongly between the fall self-concept questionnaire and the fall grades (about $3^1/_2$ months) and between the fall grades and the spring self-concept questionnaire (about 5 months). These occurrences would appear to be the best test of influences of self-concept on achievement. Therefore we computed mean correlations equivalent to those in Table III for only these time periods. The downward paths from academic self-concept and discipline-specific self-concept (*m*, *n*, *y*, and *z*) turned out slightly weaker, but the upward paths were unchanged. The biggest change was that the mean downward paths from specific self-concept to grades (.42 in Table III, line 3) weakened to .34. That is, Table III slightly overestimates the impact of discipline-specific self-concept on grades during the course of the academic year; the stronger correlations between discipline-specific self-concept and grades at the end of each academic year (paths *s* and *ee* in Fig. 2) are inflated by the advance knowledge the students had about their year-end grades.

Table III. Means of Correlation Coefficients on Paths in Fig. 2 (Means Across Four Disciplines)

	Mean of correlations
Paths from SC to grades (downward)	
Relating general SC to grades at end of semester (mean of *o*, *u*, *aa*, and *gg*)	.24
Relating academic SC to grades at end of semester (mean of *n*, *t*, *z*, and *ff*)	.39
Relating specific SC to grades at end of semester (mean of *m*, *s*, *y*, and *ee*)	.42
Overall mean (mean of 12 paths)	.35
Paths from grades to SC (upward)	
Relating grades to general SC measured subsequently (mean of *p*, *v*, and *bb*)	.23
Relating grades to acedemic SC measured subsequently (mean of *q*, *w*, and *cc*)	.39
Relating grades to specific SC measured subsequently (mean of *r*, *x*, and *dd*)	.45
Overall mean (mean of 9 paths)	.36

Structural Equation Models Relating Self-Concept and Achievement

Our second method was to construct and assess structural equation models. The most realistic test of mutual influences between self-concept and achievement would use longitudinal data in which earlier levels of both self-concept and achievement are controlled. But even with a multivariate model, we have no proof of causation and are limited to statements about a probable influence of some variables on others.

We estimated the paths in the model shown in Fig. 2, using LISREL (Joreskog and Sorbom, 1986). The model enables us to estimate paths to and from all three levels of self-concept concurrently and "competing" with each other, while controlling for earlier levels of self-concept measures and grades. Thus spurious correlations are largely eliminated, and the strengths of paths are estimated more realistically.

We analyzed models for the four disciplines separately. Figure 2 is a structural equation model only (not a measurement model) with one measure per concept, due to the large number of variables. Cross-paths spanning *two* levels (linking general self-concept and discipline-specific self-concept) in either direction were removed due to their weakness in earlier analysis. The model provides an adequate goodness-of-fit to the data; chi-square was 459.86 for mathematics, 384.84 for language, 425.65 for social studies, and 434.91 for science, all with 63 degrees of freedom and $p < .000$. The GFI scores were .854, .870, .856, and .857 respectively.

All paths shown were estimated, but Fig. 2 has labels for only the most pertinent ones; their values are in Table IV. The final column shows mean path strengths in four models. Five patterns are visible. First, the paths showing influences of the three levels of self-concept on each other remain weak and mixed, as we saw in Table II.

Second, the paths between *general* self-concept and grades, in either direction (paths *o*, *p*, *u*, *v*, *aa*, *bb*, and *gg*), are so weak that they are seldom statistically significant. For practical purposes we can say that they do not exist at all. We ignore them in our discussions below.

Third, the influence of grades on academic and discipline-specific self-concept occurs only within each academic year, not during the summer between the years. Paths *g*, *r*, *cc*, and *dd* are moderately strong, but paths *w* and *x* are very weak. That is, the grades in the spring of sixth grade had no impact on any change in self-concept at the beginning of seventh grade. Is this because the students forgot the impact of last spring's grades when filling in the questionnaires in the fall of seventh grade? Is it because the seventh-grade teachers were new, and experiences with last year's teachers meant little?

Table IV. LISREL Estimates for Paths Shown in Fig. 2

		Label	Model with math	Model with language	Model with social studies	Model with science	Mean of four models
Fall Grade 6 to Spring Grade 6							
Paths relating levels of SC							
Downward	General SC to academic SC	*a*	.17	.18	.17	.17	.17
	Academic SC to specific SC	*b*	-.02[a]	.07[a]	.18	.12	.09
Upward	Academic SC to general SC	*c*	-.02[a]	-.04[a]	-.04[a]	-.04[a]	-.04
	Specific SC to academic SC	*d*	.22	.03[a]	.08[a]	.08[a]	.10
Paths relating SC to grades							
To grades	General SC to Fall 6 grades	*o*	.07[a]	.06[a]	.08[a]	.04[a]	.06
	Academic SC to Fall 6 grades	*n*	.15	.13[a]	.18	.32	.20
	Specific SC to Fall 6 grades	*m*	.21	.28	.17	-.03[a]	.16
From grades	Fall 6 grades to general SC	*p*	.03[a]	.11	.12	.14	.10
	Fall 6 grades to academic SC	*q*	.13	.15	.17	.22	.17
	Fall 6 grades to specific SC	*r*	.35	.22	.15	.33	.26
Spring Grade 6 to Fall Grade 7							
Path relating levels of SC							
Downward	General SC to academic SC	*e*	.08	.08	.08	.07[a]	.08
	Academic SC to specific SC	*f*	.24	.21	.20	.13	.20
Upward	Academic SC to general SC	*g*	.12	.11	.10	.11[a]	.11
	Specific SC to academic SC	*h*	-.11	.01[a]	.01[a]	.07[a]	-.01
Paths relating SC to grades							
To grades	General SC to Spring 6 grades	*u*	.00[a]	.05[a]	.03[a]	.01[a]	.02
	Academic SC to Spring 6 grades	*t*	.10	.10	.11	.03[a]	.09
	Specific SC to Spring 6 grades	*s*	.16	.02[a]	.18	.19	.14
From grades	Spring 6 grades to general SC	*v*	-.06[a]	-.06[a]	-.02[a]	-.08[a]	-.06
	Spring 6 grades to academic SC	*w*	.00[a]	-.04[a]	-.01[a]	-.07[a]	-.03
	Spring 6 grades to specific SC	*x*	-.03[a]	.02[a]	.03[a]	-.06[a]	-.01
Fall Grade 7 to Spring Grade 7							
Paths relating levels of SC							
Downward	General SC to academic SC	*i*	.11	.08[a]	.07[a]	.04[a]	.08

Table IV. Continued

		Label	Model with math	Model with language	Model with social studies	Model with science	Mean of four models
	Academic SC to specific SC	*j*	.02[a]	.16	.16	.29	.16
Upward	Academic SC to general SC	*k*	.21	.21	.22	.20	.21
	Specific SC to academic SC	*l*	.25	.08[a]	.07[a]	.13	.13
Paths relating SC to grades							
To grades	General SC to Fall 7 grades	*aa*	.01[a]	−.02[a]	−.01[a]	.13	.03
	Academic SC to Fall 7 grades	*z*	.10	.12	.08[a]	.16	.12
	Specific SC to Fall 7 grades	*y*	.05[a]	−.16	−.02[a]	−.22	−.09
From grades	Fall 7 grades to general SC	*bb*	.03[a]	−.01[a]	−.03[a]	.04[a]	.01
	Fall 7 grades to academic SC	*cc*	.09[a]	.17	.14	.21	.15
	Fall 7 grades to specific SC	*dd*	.23	.26	.22	.30	.25
From Spring 7 SC to Spring 7 Grades							
	General SC to Spring 7 grades	*gg*	−.01[a]	.00[a]	−.06[a]	−.07[a]	−.04
	Academic SC to Spring 7 grades	*ff*	−.08[a]	−.06[a]	.05[a]	−.07[a]	−.04
	Specific SC to Spring 7 grades	*ee*	.11	.13	.13	.19	.14

[a]Not significant at .05.

Fourth, paths from discipline-specific self-concept to grades are no stronger, on the average, than paths from academic self-concept to grades. But paths from grades to discipline-specific self-concept during the school years are stronger than from grades to academic self-concept; paths *r* and *dd* average .26 while paths *g* and *cc* average .16. That is, a distinction between the two levels with respect to grades occurs only in paths from grades to self-concept.

Fifth, the paths pointing upward in Fig. 2, that is, from grades to self-concept measures, are slightly stronger on average than those pointing downward—from self-concept to grades; the mean of the six upward paths (excluding paths to general self-concept) is .13, and the mean of the eight downward paths is .09. If we look only at the paths between spring and fall data collections each year (about $8^1/_2$ months), the upward paths (*g*, *r*, *cc*, and *dd*) average .21, and the downward paths (*m*, *n*, *y*, and *z*) average .10. That is, during the academic year causation is stronger from grades to self-concept than vice versa. This is our most convincing test of the general hypothesis about predominant causation in one direction or the other, and the result is that grades affect self-concept more than vice versa.

A potential bias exists in the model in Fig. 2, in that the self-concept measures on the three levels are strongly intercorrelated. For example (as noted earlier), the average correlation between academic self-concept and mathematics self-concept is .68. The intercorrelations are the strongest between the two lower levels (academic and discipline-specific), and this may produce paths in the LISREL model that are artifactually weak, since two highly intercorrelated variables are forced to share the strength of the paths. This would cause us to overestimate the contrast between correlation-based analysis and LISREL-based analysis. To check on this we recomputed the LISREL model in Fig. 2 for each discipline after deleting all general self-concept and academic self-concept scores (leaving only four specific-discipline self-concept measures and four grades). This experiment shows the maximum strength of upward and downward paths. The only slanting paths remaining were *m*, *r*, *s*, *x*, *y*, *dd*, and *ee*. The mean strengths across four models were as follows: for path *m*, .31; for path *r*, .27; for path *s*, .18; for path *x*, .00; for path *y*, –.01; for path *dd*, .29; for path *ee*, .11. As Fig. 2 shows, path *m* is artificially strong in the model, because it has no over-time controls in grades. Leaving it aside, the mean strength of the downward paths (*s*, *t*, and *ee*) is .09, and the mean strength of the upward paths (*r*, *x*, and *dd*) is .19. As before, the upward paths are relatively stronger.

The strengths of these paths are far below the zero-order correlations reported in Table III, proving that structural equation models on longitudinal studies depict much weaker interrelationships between self-concept and grades than do cross-sectional correlational studies. In our opinion the longitudinal studies are more realistic.

CONCLUSIONS

This study used a four-wave longitudinal study of sixth and seventh graders to assess the relationships among three levels of self-concept and grades. First we looked at stability of self-concept and mutual influences between the three levels of the Shavelson self-concept model. We found high stability from semester to semester, and the more general levels of self-concept are a bit more stable than discipline-specific self-concept.

Influences from one level of self-concept to the others in either direction are weak and mixed. There is little systematic influence of any one level on the others. The paths spanning *two* levels (from discipline-specific self-concept to general self-concept and vice versa) were so weak as to be negligible. Possibly the theory of different levels in the self-concept needs to put more stress on the long-term independence of the three levels, not on their interdependence.

To assess the links between self-concept and grades, we used two methods. The first was zero-order correlations, in agreement with most past research, and the results were similar to earlier research. But when we used structural equations models, the paths turned out much weaker, because the structural equations models controlled for earlier levels of self-concept and grades. The structural equations models thus call into question the credibility of the findings of earlier correlation research. The real influences are weaker than correlation studies led us to believe.

We found a modest causal predominance from achievement to self-concept within both sixth grade and seventh grade, but no influence during the summer between the two. The strongest impact (probably causal) was from fall grades to discipline-specific self-concept in the months following. In general, grades have a bit more influence on self-concept than the opposite.

One practical implication of our study is that the three-level Shavelson model of self-concept is important for any understanding of relationships between self-concept and achievement. Without distinguishing levels of self-concept we could not interpret the relationships. The level most related to achievement is the most specific (that is, discipline-specific).

Future research should assess these relationships in various settings to permit greater understanding of the importance of age, grade level, academic ability, and length of time elapsed between data collection. Also, outside factors should be introduced into the models. Given the widespread public talk about the importance of self-esteem, more research is clearly needed.

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