Self-Concepts, Self-Esteem, and Educational Experiences: The Frog Pond Revisited (Again)

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Causal models, guided by a "frame of reference" hypothesis, were used to examine whether school academic climates have any impacts on self-concepts of academic ability, global self-esteem, and long-range educational attainments. Analyses were based on a subsample of 1,487 young men from the Youth in Transition nationwide study of high school students. After the effects of individual ability and family socioeconomic status were controlled, there were only small negative effects of school mean ability on self-concepts and self-esteem. Educational attainment 5 years beyond high school was strongly influenced by background, ability, and grades, but there was little additional impact from self-concepts and self-esteem, and no overall effect attributable to school climate. These findings differ sharply from those reported by Marsh and Parker (1984), which were based on their study in five Australian schools. Theoretical and practical implications are discussed.

Self-concepts are heavily influenced by social contexts. That is a basic assumption with a long history in social psychology (the theories of Cooley, 1902, and Mead, 1934, are often cited as early examples). For young people a very important social context is the school; their work for many years is defined primarily by schools and teachers, and so is their success in that work. And because the school is such an important and pervasive context for many of the formative years, it could well be expected to have impacts on self-concepts that last long beyond the school years. Thus it is not surprising that there has been much research on the ways self-concepts are related to academic abilities and performance in school (for summaries, see Byrne, 1984; Gergen, 1971; Purkey, 1970; Wylie, 1979).

One important way in which students form self-concepts about their academic abilities (as well as a broad range of other characteristics) is by a social comparison process: in particular, by comparing themselves with their schoolmates. Davis (1966) introduced the "frog pond" metaphor ("it is better to be a big frog in a small pond than a small frog in a big pond") to suggest that students may develop relatively low aspirations if they are surrounded by very able schoolmates. See also Alwin and Otto (1977) for an analysis of high school context effects on aspirations, and for a review of other school context studies.

A rather similar notion, presented in a recent article by Marsh and Parker (1984), is the "frame of reference" hypothesis, which holds that children form their self-concepts of academic ability by comparing "their own academic ability (more or less objectively perceived) with the abilities of other students within their school or their reference group." (p. 217). Thus if students A and B are equal in academic ability, but A's schoolmates are higher in average ability than B's, then A is likely to have a lower self-concept of academic ability than B because A's standard of comparison (or frame of reference) is more demanding. Marsh and Parker (1984) reported a finding that bears on this hypothesis: a "substantially negative" effect of school mean socioeconomic status (SES) and ability on individual self-concept of academic ability after the effect of individual SES and academic ability are controlled (p. 226).

The Marsh and Parker (1984) findings were based on 305 sixth-grade students in only five schools, all located in Sydney, Australia. Thus it seemed important to test whether their findings could be replicated with larger numbers of students and schools, and also generalized to other nations and other age ranges. In particular, Marsh and Parker (1984, p. 228) suggested that analyses of data from the Youth in Transition study would provide such a test. Following their suggestion, we have carried out the necessary analyses, and we now report the findings.

Our primary purpose in this article is to examine carefully the ways in which students' self-concepts of academic ability are related to and perhaps influenced by one important aspect of "school climate": the ability levels of classmates (operationalized as school mean ability scores). We also explicate the relations between academic self-concept and the much broader dimension of global self-esteem. Lastly, we extend our analyses to consider whether school mean ability levels show any clear impact on long-term educational attainment.

Before presenting our own analyses and findings, we offer two observations. First, it is important to maintain a clear distinction between school ability and school SES. If the frame of reference hypothesis is to be applied to self-concepts of academic ability, then the focus should be on ability comparisons, not school SES or family SES. Although school SES happens to be a very close proxy for school mean ability in the Marsh and Parker (1984) sample of five schools ($r = .9$), other studies (including our own) show substantially lower correlations. Indeed, some researchers have found two different types of school context effects on such outcome variables as college plans and occupational aspirations: The ability context of the school shows negative effects, but the school socioeconomic context shows positive effects (Alwin & Otto, 1977; Meyer, 1970). Obviously, if one were interested in students' self-concepts of their socioeconomic status, then school SES and family SES would be the appropriate measures, and the

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frame of reference hypothesis would be stated in those terms. However, our focus was on self-concepts of academic ability; accordingly, we used school mean ability scores as indicators of school academic climate, and we treated family SES primarily as a variable to be controlled.

Second, the frame of reference hypothesis is predictive of a negative relation between school average ability and individual self-concepts only when individual ability is held constant. The zero-order (i.e., uncontrolled) correlation between school average ability and individual self-concepts of ability should be either zero or positive, as we demonstrate next.

First, imagine a situation in which individual students’ frames of reference with respect to their academic ability are strictly limited to their own schools; in other words, their self-concepts of academic ability are formed solely by comparison of self with schoolmates, and there is no additional outside information. In that case, no matter how much variation existed among schools in actual ability, we would expect no meaningful differences among schools in self-concepts of academic ability; in each school some should perceive themselves as high in ability, whereas others see themselves as average or below average. If self-concepts thus did not vary from school to school, then they would necessarily correlate zero with school mean actual ability (or any other overall school characteristic, for that matter).

Now let us consider a situation that we judge to be more realistic. We assume that students compare their intellectual abilities not only with their schoolmates but also with siblings, friends, and acquaintances from other schools, as well as parents and other adults. We also assume that this broadened frame of reference adds a further degree of reality to self-concepts beyond that provided by comparisons with schoolmates. Additional outside information, which might not involve direct self–other comparisons, includes feedback about abilities provided by parents, employers, standardized tests, and other sources. To the extent that any of these factors influence self-concepts, groups of students who are above average in actual ability will also tend to be above average in self-concepts of scholastic ability, in which case there will be a positive correlation between school mean ability and students’ self-concepts of ability.

In sum, we think that the frame of reference hypothesis allows only two patterns of correlation between school mean ability and individual self-concepts of ability, before there are any controls for actual individual ability: In the unlikely event that the frame of reference is strictly limited to each student’s own school, then the correlation should be essentially zero. If, on the other hand, the frame of references includes some valid information from outside the school, then the correlation should be somewhat positive.

Predictions

The frame of reference hypothesis, coupled with our own assumptions about the relative importance of the school ability context, leads us to make the following two predictions:

1. The uncontrolled correlation between school mean ability and individual self-concepts of academic ability should be positive. (This is because we assume that factors outside the school play an important part in forming these self-concepts.)

2. After we control for individual ability, the relation between school mean ability and individual self-concepts of ability should be negative. (This is because we also assume that within-school comparisons do play some special part in forming these self-concepts. Otherwise, we would predict a zero relation after we control for individual ability.)

Earlier analyses of the Youth in Transition data provide some basis for additional predictions involving global self-esteem and academic performance. That earlier work indicated that self-esteem is linked to a variety of factors having to do with educational success, including self-concepts of educational ability as well as actual long-range educational attainment. In addition, these factors (including eventual educational attainment) are more strongly correlated with early (i.e., 10th-grade) self-esteem than with later self-esteem: “It appears that those things having to do with a self-concept of educational success—things such as academic skills, past classroom performance, future aspirations, and the like—undergo some reduction in salience or ‘centrality’ for the overall self-esteem of young men as they move through the final years of high school and go on to other experiences” (Bachman & O’Malley, 1977, p. 377). (For a more extended discussion, see Bachman, O’Malley, & Johnston, 1978, pp. 99–119.) On the basis of the findings just summarized, and to be consistent with much theorizing and analysis by others (summarized by Wylie, 1979), we offer the following predictions:

3. As noted earlier, self-concept of academic ability is strongly linked to self-esteem, particularly during the early high school years. We interpret this correlation as reflecting primarily the impact of academic self-concept on global self-esteem, rather than the reverse, and our causal models reflect that interpretation. Given that conceptual ordering, we predict that most or all of the positive impacts of ability, SES, and grades on self-esteem will occur indirectly via self-concept of academic ability. Some of the positive impacts, particularly of ability, may be mediated by actual academic performance (as reflected in classroom grades). Furthermore, if there is any impact of school mean ability on self-esteem, we expect it to be a (small) negative indirect effect via self-concept of ability.

4. We predict that school mean ability will show no appreciable effect (direct or indirect) on long-term educational attainment, given that individual ability and family SES are controlled. The frame of reference hypothesis could be interpreted to suggest a negative effect; however, our view is that other factors that determine educational attainment are much stronger and more important, and thus school climate effects of the sort treated here would have trivial impacts at most.

Method

We tested the four predictions, using a portion of the data available from the Youth in Transition project, a large-scale five-wave longitudinal study of young men in the United States. For a detailed discussion of sampling, response rates, data collection procedures, and measures, see Bachman et al. (1978). The study began in 1966 with a multistage probability sample, clustered by school, of all male 10th graders in public schools in the 48 contiguous states. The study continued through 1974 (when most respondents were 5 years beyond high school and 23 years old).
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Selected for Analysis

We found it useful for present purposes to restrict the sample in several ways:

1. The three items used to measure self-concept of academic ability were included in only the first two data collections (1966, the start of 10th grade, and 1968, the end of 11th grade); thus in most of our analyses we used data from just those two time points.

2. For reasons of consistency and simplicity, we excluded from analysis those respondents who failed to participate in the second data collection.

3. Because we were interested in the possible effects of "academic climates," the analysis was further limited to those who had remained in the same high school through 10th and 11th grades (i.e., they neither transferred nor dropped out of school). (As a precaution, we examined key correlations without these exclusions in order to satisfy ourselves that they had no important impact on the relations reported here.)

4. We chose to limit the analysis to whites who attended schools in which the majority of students were white (the latter step reduced the sample of schools from 87 to 79). Including blacks would have raised at least two problems of interpretation. The first problem arises because recent analyses based on Youth in Transition and a number of other samples have demonstrated that there are widespread black-white differences in response styles, and that these influence self-esteem scores (Bachman & O'Malley, 1984). Such response style differences would have been enough to make us cautious about combining blacks and whites in the present analysis. But a far more serious problem for any analysis in which school mean ability is treated as a predictor has to do with black-white differences in test scores. Earlier research with the Youth in Transition sample revealed two key findings that bear on this issue: First, after controls for family socioeconomic level and ability test scores, blacks higher self-concepts of school ability than did whites. This was partially true of the largest subgroup of blacks, those in five southern segregated schools (Bachman, 1970, pp. 100–102). The second key finding is that this same subgroup of blacks averaged about 1.7 standard deviations below the grand mean in test scores (Bachman, 1970, p. 256). In other words, a very substantial proportion of the total between-schools variance in test scores for the Youth in Transition sample involves just these five schools. There has, of course, been a great deal of controversy about whether standardized test scores are fully valid for blacks, particularly when they are compared with whites. Without taking sides in that controversy, we simply point out what would happen if we included this set of respondents in any analysis in which individual ability and family SES were combined with school mean ability as predictors of academic self-concept. The blacks in the five southern segregated schools would be at the extreme bottom of the distribution in school mean ability, but distinctly above average in self-concepts once individual test scores and SES were included in the equation. Thus the inclusion of these cases would dramatically alter any path coefficient between school mean ability and individual self-concepts, and the alteration would be in a negative direction. If one believes that the low scores of blacks on such standardized tests are even partly spurious, then including this subgroup would cast a cloud over our findings. And even if one harbored no such doubts about the validity of black test scores, it is still questionable as to whether one would want to have the testing of any predictions hinge so heavily on this small and very unusual subgroup of blacks in five southern segregated schools during the mid-1960s.

We were willing to limit our analysis to whites, given the complications just cited, because we felt confident that the frame of reference hypothesis and our predictions based on it are general enough so that they should be readily testable with such a sample. In other words, there is no reason a priori to expect that the frame of reference dynamics should not be clearly in evidence among whites alone; indeed, if the predictions were supported, there would be considerable reason to doubt the validity of the frame of reference approach.\(^1\)

These restrictions, prompted by both conceptual and methodological considerations, left us with a sample consisting of 1,487 respondents who were located in 79 predominantly white schools. This sample remains relatively large and reasonably representative of white males in United States public high schools in the late 1960s. Moreover, there is reason to believe that the present findings are generalizable to more recent high school students, and to female as well as male students. In other large-scale surveys of U.S. seniors during the 1980s (sampled in both public and private high schools), researchers have obtained much the same overall distributions of self-concepts for male students, as well as similar self-concept scores for female students (Bachman, Johnston, & O'Malley, 1984, p. 19). These recent samples, like the Youth in Transition sample, show what Wyble (1979, pp. 663–681) has found to be a widespread "self-favorability bias": substantial proportions rate themselves above average and few rate themselves below average. This tendency is evident among both sexes, but to a somewhat greater extent among male students. (For an analysis of male–female similarities along the related dimension of global self-esteem, see O'Malley & Bachman, 1979.)

For all tests of statistical significance, we use a nominal N of 1,000; this provides a modest, and we believe quite reasonable, adjustment for the effects of using a clustered sample design.

Measures of Individual Characteristics

Socioeconomic status (SES). This refers to the respondent's home and family background. Six indicators are available, all measured at Time 1: Duncan's status of father's occupation, father's education, mother's education, a checklist of possessions in the home, number of books in the home, and the ratio of rooms per person in the home.

Academic ability. We used three indicators of ability or aptitude, all measured at Time 1: the Quick Test (Ammons & Ammons, 1962), the Gates Test of Reading Comprehension (Gates, 1956), and the General Aptitude Test Battery—Part J, Vocabulary (1962).

Academic performance (grades). Respondents were asked to report their overall average grades for the previous year. The Time 2 measure, used in our analysis, referred to performance during tenth grade.

Self-concept of academic ability. Respondents were asked to rate themselves in comparison with others their age in terms of overall school ability, reading ability, and intelligence. See Bachman (1970, p. 92) for item wordings and response distributions. The Time 2 measure was used.

Self-esteem. We measured global self-esteem by using 10 items, most of which were adapted from Rosenberg (1965); see Bachman and O'Malley (1977) or Bachman et al. (1978) for further details on this measure and its correlates. The Time 2 measure was used. Scoring was reversed on the four items that are negatively worded, so that for all items a high score indicates high self-esteem.

Educational attainment: This is an eight-category ordering of educational attainment ranging from high school dropout (1) to some graduate study beyond the bachelor's degree (8); the scale is based on Time 5 responses (Bachman et al., 1978).

Measures of school characteristics. School means were computed for each of the three tests of academic ability. Because a measure of overall

\(^1\) We are grateful to Herbert Marsh for prompting us to clarify our reasons for excluding blacks from the analysis. We also note that Marsh's own analyses of Youth in Transition data, in response to an early draft of this article, revealed just the sort of findings that we expected: When the whole sample (including the blacks in the five southern segregated schools) is used in analysis, correlations and path coefficients are substantially, sometimes drastically, altered in comparison to findings based on whites alone (or, for that matter, on blacks alone). We may differ with Marsh as to which sample provides the more credible test of the frame of reference hypothesis, but we have no trouble understanding his findings.
Table 1
Correlations and Regression Analyses Predicting Self-Concept of Academic Ability From Individual Ability, School Mean Ability (Quick Test), and Family SES

<table>
<thead>
<tr>
<th></th>
<th>Product-moment correlations</th>
<th>Standardized regression coefficients predicting self-concept of ability</th>
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<tr>
<td></td>
<td>1</td>
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<tr>
<td>1. Self-concept of academic ability</td>
<td>—</td>
<td>—</td>
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<tr>
<td>2. Individual ability*</td>
<td>.614</td>
<td>—</td>
</tr>
<tr>
<td>3. Family SES*</td>
<td>.322</td>
<td>.419</td>
</tr>
<tr>
<td>4. School mean ability (Quick Test)</td>
<td>.107</td>
<td>.310</td>
</tr>
<tr>
<td>( R^2 )</td>
<td>.385</td>
<td>.393</td>
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* Equally weighted composite of three test scores. \( ^* \) Equally weighted composite of six ingredients.

Note. SES = socioeconomic status.

school ability context was desired, the school means were based on all 2,213 Time 1 respondents. (The average number of respondents per school was 25.)

Results and Discussion

We began with a preliminary examination of a few key correlations and regression analyses; then we used LISREL (Jöreskog & Sörbom, 1984) to estimate causal models involving self-concepts of ability, self-esteem, and long-range educational attainment.

We expected that our Time 2 (end of 11th grade) measures of self-concepts would be better than the Time 1 measures as indicators of high school effects, because older students have had a longer time in which to experience the academic climates of their schools. Accordingly, in our analyses we used the Time 2 measures of self-concepts of school ability, and also global self-esteem. (We did, however, compare the Time 1 and Time 2 measures, and found that they are highly correlated with each other and also show very similar patterns of correlations with the other measures. Thus in retrospect it appears that our choice of Time 2 over Time 1 measures made little difference in the outcomes.)

Preliminary Analyses

The frame of reference hypothesis led us to conclude that the uncontrolled correlation between school mean ability and individual self-concepts should be either zero or positive; and we considered a somewhat positive correlation the more likely outcome. The product–moment correlations between self-concept of academic ability index scores (Time 2) and school mean scores on each of the three ability tests ranged from .11 to .14 (\( p < .001 \)). Thus our first prediction is supported.

By far the more important prediction is the second one: that after we control for individual ability, the relation between school mean ability and individual self-concepts of ability should be negative. In order to provide a simple test of this proposition, we undertook a series of regression analyses in which we predicted self-concept of academic ability (Time 2). The two most important of these analyses are summarized in Table 1.

In the first analysis we used both individual ability and school mean ability as predictors of self-concepts. As predicted, the impact of school ability (indicated by mean Quick Test scores) was negative; however, it was quite small (\( \beta = -.09; p < .001 \)). In the second analysis, family SES was added as a predictor, but the basic results are much the same. Actual ability continued to have a strong positive impact (\( \beta = .61 \)); family SES had an additional slight positive effect (\( \beta = .10 \)); the effect of school ability remained negative (\( \beta = -.11 \)).

The negative effect of school mean ability is far smaller than the path coefficient reported by Marsh and Parker (1984) in their Model III (p. 225). We discuss later some reasons why the Marsh and Parker findings are not consistent with ours, but we note here that the difference is not attributable to analysis approach; both estimates (\( -.11 \) in our study and \( -.36 \) in theirs) are regression coefficients predicting self-concept from school mean ability, with individual ability and family SES included in the equation, and are based on correlations uncorrected for measurement error.

Causal Model Using LISREL

Classroom grades provide a very important source of feedback to students, not only on their performance in a particular course of study but also on their more general capacities for academic work. Thus we decided to incorporate grades in this analysis. In their final model of impacts on academic self-concept, Marsh and Parker (1984) included teacher ratings of academic ability, a dimension that they considered to resemble student classroom

\(^2\) In both of these analyses, we used the best measures available on our analysis tape; in the case of individual ability, that was an equally weighted composite of the three tests, whereas for school ability context it was mean scores on the Quick Test. If the tape had included school means for the composite based on all three tests, we would have used it; however, we did not consider it worth an additional data management step. The three sets of school mean test scores are very highly correlated, as shown in Table 3; thus the results that are based on an index of the three would not differ appreciably from that based on the Quick Test alone. Furthermore, we did examine separate regression analyses, using school means on each of the other two tests, and found that the results were all quite similar. We also tried adding school mean SES to the set of predictors and found no increment in explained variance, which thus confirmed our decision to focus on school mean ability measures as reflecting that aspect of school climate most relevant to self-concept of ability.
grades. Another variable that we decided to include was global self-esteem, because we judged it useful to clarify the relation between this dimension and the more specific self-concept of academic ability.

Although it would have been a simple matter to use regression and path analyses, we preferred to use the LISREL computer program (Jöreskog & Sörbom, 1984). LISREL offers a number of advantages; of particular importance for our analysis is the ability to include estimates of measurement error in the model and thus provide estimates of the true relations among "theoretical" variables. We think that this is important for two reasons, the first one methodological and the second one having to do with practical policy implications.

First, a methodological problem with research relating school mean scores to individual scores is that there is usually a good deal less error in the aggregate scores. Thus, for example, the three ability tests show higher intercorrelations at the aggregate level (.68 to .78) than at the individual level (.56 to .66). Removing measurement error puts the several different sorts of variables on a more equal footing, rather than giving an "advantage" to the school mean scores.

Second, if we are going to be considering practical implications for students or parents, or both, then we should seek the most realistic estimates of relation. We think that attempts to remove measurement error are a step in that direction.

The causal model selected for our analysis is shown in Figure 1. Several features of the model require some comment:

1. According to the model, family SES, individual academic ability, and school mean ability are exogenous variables that are intercorrelated. We did not specify a causal ordering among these

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**Figure 1.** Causal model of self-concept of academic ability (S-C ABIL) and global self-esteem (GLOBAL S-E) related to academic ability (ACAD ABIL), family socioeconomic status (FAM SES), school mean academic ability (SCH ABIL), and academic performance (ACAD PERF). (The three exogenous variables are all based on data obtained at Time 1, start of tenth grade; ACAD PERF is the Time 2 report of classroom grades during tenth grade; S-C ABIL and GLOBAL S-E are the measures obtained at Time 2; end of eleventh grade. The proportions of explained variance for the three endogenous variables are .352 for ACAD PERF, .670 for S-C ABIL, and .136 for GLOBAL S-E. All coefficients greater than or equal in absolute value to .080 are statistically significant, t > 2.0.)
variables because it was not necessary for our purposes, and because we would have had some difficulty in doing so (as we discuss later).

2. In the model, classroom grades (reported at Time 2, and representing academic performance during 10th grade) are assumed to be influenced by SES, ability, and school mean ability.

3. In the model, self-concept of academic ability (reported at Time 2, end of 11th grade) is assumed to be influenced by recent classroom grades as well as by the three exogenous variables. There is some debate as to whether academic performance influences self-concept of ability more than the reverse: Calsyn and Kenny (1977) found academic achievement causally predominant over self-concept of ability; Shavelson and Bolus (1982), on the other hand, found self-concept to be causally predominant over academic achievement; and, to complete the cycle, Byrne (1982, cited in Byrne, 1984) was unable to establish causal predominance. In the face of the conflicting findings, it seems very likely that the relation is at least somewhat reciprocal. Nevertheless, as noted earlier, we consider grades to be one of the primary mechanisms by which students are informed about their academic ability, and we therefore consider the predominant causal direction to be from grades to self-concept. Moreover, although the data are collected contemporaneously, the grades measure refers to grades earned throughout the previous year, whereas the self-concept refers to the self-concept held at the current time (end of 11th grade).

4. Because there is only one indicator for grades, we could not let the LISREL program automatically make estimates of measurement error. Instead, we fixed a correlation of .90 between the indicator and the variable, on the basis of earlier analyses of Youth in Transition data.\(^3\)

5. In the model, global self-esteem is treated as if it is influenced by self-concept of academic ability. Although these two self-concept dimensions were measured simultaneously (in this case, at Time 2), we think that there are strong conceptual grounds for treating the more specific dimension as one of many factors contributing to global self-esteem. This view is strengthened when we consider the other variables being examined: It is reasonable to assume that any impacts of individual ability and school mean ability on global self-esteem occur largely via self-concept of ability, whereas the reverse interpretation makes much less sense (both theoretically and empirically).

6. The model fits the observed correlation matrix reasonably well: \(\chi^2 (261, N = 1000) = 687.87\); the ratio of chi-square to degrees of freedom (which is a rough measure of goodness of fit) is 2.6; the adjusted goodness-of-fit index is .93; the root mean square residual is 0.042; and Hoelter’s (1983) critical \(N\) is 449. In order to achieve this degree of fit, it was necessary to allow certain of the measurement errors to correlate. In the absence of correlated errors, the residuals among the self-esteem indicators suggested that there might be two factors rather than the single posited factor; one of the factors is a latent theoretical construct that we call global self-esteem and the other is a methodologically induced factor that is due to the presence of both positively and negatively worded items (see Carmines & Zeller, 1979, pp. 62–70, for discussion of this problem with respect to Rosenberg-like self-esteem scales). We controlled this methodological factor by allowing the error variances among the positively worded items (the first six items) to covary, and similarly allowing the error variances among the negatively worded items (the last four items) to covary. The other area in which the residuals suggested a need to allow covariance occurred in the individual ability tests versus the corresponding school mean ability tests. In essence, individual ability scores correlated more highly with school mean scores than the model would suggest. Given that there is in fact a part–whole problem here, it seemed reasonable to allow the individual test score error to correlate with the corresponding school mean measure error for each of the three ability tests. Covariances among all other errors and residuals were fixed at zero.

In Figure 1 we present the regression coefficients among the theoretical constructs, from the standardized solution as estimated via the LISREL program.\(^4\) In Table 2 we provide additional information about the measurement model. The measurement model results indicate that the various hypothesized constructs are fairly well defined. Loadings are generally high, and all are positive and significantly different from zero. In Table 3 we present the complete product–moment correlation matrices used for this analysis and the subsequent one.

Although the LISREL findings are fully consistent with the regression analyses reported earlier, there is new information of several sorts. First, it is worth noting that relations are generally stronger because of the removal of measurement error. Second, we can examine how much of the effect of each exogenous variable on self-concept of ability is direct and how much is indirect—that is, operating via grades. Third, we are able to see how global self-esteem is affected by the exogenous variables plus grades, and the extent to which these effects operate via self-concept of academic ability.

We begin our examination of Figure 1 by focusing on the links between school mean ability and individual self-concept of academic ability. We see again that the impacts of school ability are negative, with actual individual ability and SES controlled. The LISREL model shows a direct effect of -.09, plus an indirect effect via grades \((-0.09 \times 0.41 = -0.04)\), for a total effect of -.13.

Of course, the much more important influence on self-concept is actual ability. It shows a strong direct effect (.49), plus a substantial indirect effect via grades (.61 \times 0.41 = .25), for a total effect of .74. In other words, with measurement error extracted,

\(^3\) This can be thought of as the equivalent of a test–retest reliability of .81, or a correlation of .90 between each measurement and the underlying "true" score. The earlier Youth in Transition analyses suggested that this correlation might actually be slightly lower than .90, but probably higher than .85; thus, to the extent that our estimated measurement error is inaccurate, we have probably erred in a conservative direction (i.e., by failing to remove all of the effects of measurement error, we may very slightly underestimate the "true" relations with grades). As a safeguard, we repeated the LISREL analysis with a correlation of .85 fixed between the indicator and the variable. The results confirmed our expectations; the only changes were that a slightly higher proportion of the effects of the exogenous variables occurred via grades, but the overall effects (direct plus indirect) were unchanged.

\(^4\) We did not consider it necessary to go through a series of "theory trimming" steps in which small and nonsignificant paths are removed from the model, especially because only a few paths would have been eliminated and all but one of these involved the final variable, self-esteem, which is not our primary focus here.
we find that academic self-concepts are very strongly linked to actual ability as measured by standardized tests.

It is a matter of some interest that most of the impact of actual ability occurs directly rather than via classroom grades. This suggests that students’ awareness of their abilities is by no means narrowly limited to what teachers tell them in their report cards. All the same, grades are also quite important in shaping self-concepts of ability, as the coefficient of .41 in Figure 1 indicates.

Family SES makes a modest direct contribution to self-concept; however, the model as presented in Figure 1 shows no indirect effect via grades, because once ability is controlled, SES makes no independent contribution to grades. In other words, the data indicate that students from higher SES families get better grades only to the extent that they are higher in actual ability. (As we discuss later, family SES is often treated as one of the causes of ability; if that interpretation were applied to our data, we would conclude that there is a further indirect contribution of family SES to self-concept via ability.)

Turning now to the final variable in Figure 1, we see that both grades and ability have substantial positive effects on global self-esteem; however, these positive effects occur only indirectly via academic self-concept, which is consistent with our third prediction. In fact, the direct effect of ability on self-esteem is actually slightly negative, but that is quite overshadowed by the strong indirect effect through self-concept (.74 × .43 = .32). These findings can be seen as an elaboration of the earlier Bachman and O’Malley (1977) analysis of self-esteem in that the impacts of grades and ability on global self-esteem are now shown to operate largely via their impacts on the more specific self-concept of academic ability. (For further analyses and interpretation of the relations among ability, achievement, and self-esteem, see Maruyama, Rubin, & Kingsbury, 1981).

As one might expect, given these findings, the total effect of school mean ability on 11th-grade self-esteem is negative (and significant), albeit quite small (−.09). Here again most of the total effect occurs indirectly via academic self-concept (−.13 × .43 = −.06), which is consistent with our third prediction.

Impacts on Educational Attainment

We carried our analyses one step further to examine whether differences in school mean ability have any long-term impact on educational attainment. Specifically, we extended the causal model shown in Figure 1 to include educational attainment measured at the fifth and final Youth in Transition data collection. (Most respondents were 5 years beyond high school, and the average age was 23; for details, see Bachman et al., 1978.)

In Figure 2 we present the extended causal model, along with the LISREL regression coefficients; information about the measurement model is included in Table 2. We stress that the purpose of this extended model is to consider further possible impacts of school ability contexts, not to provide a full accounting of all factors that might influence educational attainment. In order to include educational attainment 5 years beyond high school, it was necessary to compute a new correlation matrix (N = 1,257) that omitted those who did not participate in the Time 5 survey. (This matrix is included in Table 3.) In spite of this further sample restriction and the addition of educational attainment as the final exogenous variable, all of the coefficients shown in Figure 1 are very closely replicated in Figure 2. This model fits the observed correlation matrix about as well as the first model did: χ²(281, N = 1000) = 742.52, for a ratio of 2.6; the adjusted goodness-of-fit index is .931; the root mean square residual is .042; and Hoelter’s (1983) critical N is 445. Thus we can now focus our attention on educational attainments, with the knowledge that the LISREL results discussed earlier remain essentially unchanged.

First, we note that the pattern of prediction to educational attainment shown in Figure 2 is generally consistent with the earlier path analysis by Bachman and O’Malley (1977, p. 373). Ability, family SES, and grades all have strong impacts on long-range educational attainment, whereas the impact of global self-esteem is quite small. Second, self-concept of academic ability, although correlated with long-range educational attainment, has only a very small impact on it; the direct effect is actually negative (−.09), and there is a trivial indirect effect via global self-esteem (.44 × .07 = .03). These data strongly indicate that the more fundamental dimensions of family SES, actual ability, and grades are the primary determinants of long-range educational attain-

### Table 2

**Measurement Models: Loadings of Indicators on Constructs**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Standardized loadings</th>
<th>Figure 1</th>
<th>Figure 2</th>
</tr>
</thead>
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<tr>
<td>Ability</td>
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<td>Numbers of books</td>
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*Note: Leading decimal points have been omitted. GATB-J = General Aptitude Test Battery—Part J; SES = socioeconomic status.*
Table 3
Product-Moment Correlations Among All Variables Used in LISREL Analyses

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<tr>
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<th>V3</th>
<th>V4</th>
<th>V5</th>
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<th>V10</th>
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<td>V12 School mean Gates Test</td>
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<td>108</td>
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Note. Decimal points omitted; Time 2 sample (N = 1,487) shown below diagonal, Time 5 sample (N = 1,257) shown above diagonal. GATB-J = General Aptitude Test Battery—Part J.

ment, whereas the self-concepts (both specific and global) have rather little impact of their own. (We note, of course, that this refers to the self-concepts of high school students, Self-concepts at a younger age may have more of an impact, perhaps including positive effects on earlier academic achievement.)

How is school mean ability related to educational attainment? There is a negligible positive direct effect (.06), balanced by an equally small but negative indirect effect via grades (−.12×.41 = −.05); thus the overall impact is essentially zero (the LISREL value for total effect—direct plus all indirect—is .02). These findings are fully consistent with our fourth prediction: With individual ability and family SES controlled, there was no lasting effect of school ability context on the educational attainment of our sample of young men in high schools throughout the United States.

Concluding Discussion

Comparison With the Marsh and Parker (1984) Study

The analyses just reported provide fairly solid evidence confirming the central prediction derived from the frame of reference hypothesis: that if individual ability is held constant, then there is a negative impact of school mean ability on individual self-concept of academic ability. However, this is by no means a replication of the Marsh and Parker (1984) findings, because our negative effect is very much smaller than the one they reported. Why do the findings differ so substantially? In the attempt to answer this question, it is useful to review a number of ways in which the two studies differ:

1. We concentrated primarily on LISREL analyses because the LISREL approach has several advantages, as indicated earlier. One aspect of the approach is that a number of assumptions must be made in both the causal model and the measurement model, and these assumptions can sometimes have major impacts on the resulting estimated coefficients. However, the models that we used are quite straightforward, and in cases in which judgments were required (for example, in estimating the amount of error in the self-report of grades), we tried various different assumptions, making sure that the results were not significantly affected. Although we have not reported the details, we also checked that the assumptions of linearity and additivity were reasonable for the relations analyzed. Furthermore, we have generally analyzed relations several ways (for example, in addition to LISRELS, we used ordinary least squares regressions with various sets of dependent and independent variables) before satisfying ourselves that the findings were robust. Most important, we have provided the key correlations and regressions that permit a more direct comparison with the Marsh and Parker (1984) findings, and that also provide readers with sufficient data so that they can replicate or revise our LISREL analyses. Recall that the LISREL analysis yielded an overall negative effect of school mean ability on academic self-concept of −.13 (or, for the sample used in Figure 2, −.14), in comparison with regression coefficients that were no stronger than −.11. Thus to the extent that our analysis methods differed from those of Marsh and Parker, our approach provided a slightly better opportunity for school climate effects to emerge as important.
2. Our conceptual model does not specify a causal order among the three exogenous variables. We have no trouble conceptualizing family SES as a factor influencing academic ability, and that matter has been treated at length in earlier analyses of Youth in Transition data (Bachman, 1970; Bachman, Green, & Wirtanen, 1971; Bachman et al., 1978; also Bachman & O'Malley, 1977). We would also be fairly comfortable treating family SES as a factor that influences school mean ability, because SES influences place of residence and what school a child attends. The problems arise when one tries to assert a single causal pathway relating individual academic ability (test scores) to school academic climate (school mean test scores). Our view is that it is better for one to treat both SES and ability as controlled when one examines the effects of school academic climate, but rather than representing school climate as somehow "caused" by SES and ability, we chose in this analysis to take the less complicated approach of treating all three as exogenous variables.

3. The two studies do not differ markedly in their measures of the most important individual characteristics. The academic self-concept measures are quite similar, and the test measures for the two studies seem also to be roughly comparable. The correlation between ability and self-concept is only moderately higher for the Youth in Transition sample ($r = .61$ for the Time 2 measure; see Table 1) than for the Marsh and Parker (1984) sample ($r = .52$, derived from regression coefficients in Model 1; p. 225). Although the Marsh and Parker measure of family SES is more limited than the Youth in Transition measure, the correlations between SES and ability are identical for the two samples. On the other hand, Marsh and Parker found that family SES showed nonlinear relations with both student and teacher ratings of academic self-concepts (p. 223), whereas the Youth in Transition sample shows a virtually straight-line relation between family SES and self-concepts of school ability (Bachman, 1970, p. 97).

4. One significant difference between the two studies is that Marsh and Parker (1984) sampled sixth graders, whereas Youth in Transition began with 10th graders, and we focused primarily on data collected at the end of 11th grade. It is quite possible that school context effects are smaller for high school students in comparison with those in elementary school, for at least two reasons. First, younger students may be more heavily influenced by school climate because they have had less time and opportunity to gain feedback about their abilities from sources outside their schools. Second, in the United States most high schools draw students from wider areas than do elementary schools; thus at the high school level the between-schools variance is lower and the within-schools variance is greater for family SES and such correlates as individual ability, which means in turn that academic contexts may not vary as widely at the high school level. But, having said that, we also note that the Youth in Transition sample indicates that substantial between-schools variance remains at the high school level, mostly strongly for family SES but also for individual ability.

5. The single most important difference between the two studies, in our view, is that we were able to use a large and nationally representative sample of schools, whereas Marsh and
Parker (1984) used data from only five schools. In a study limited to five schools, there are enormous opportunities for random factors to distort the findings. Indeed, we think the Marsh and Parker data contain evidence of this sort of distortion. Specifically, before using any controls for individual ability, Marsh and Parker found a slightly negative correlation between school mean ability and individual ability; however, a different selection of just one or two of their schools could have led to a small positive correlation, which would have been more consistent with our first prediction on the basis of the frame of reference hypothesis. If such a positive zero-order correlation had been found, the rest of the Marsh and Parker findings also would have been more similar to our findings. (We also note in passing that even if Marsh and Parker had used a much larger number of schools, there would still be the problem that their design involved deliberate selection of highest and lowest SES schools, and this approach of choosing extremes can be expected to yield correlation and regression coefficients that exaggerate those obtainable from a more representative sample.)

In sum, we conclude that the large difference between our findings and those of Marsh and Parker (1984) cannot be attributed primarily to measures, conceptual models, or analysis techniques. Nor do we think that age differences (sixth graders versus 11th graders) are primarily responsible. Rather, we conclude that the most likely explanation is that the Marsh and Parker sample simply was not appropriate for a detailed path analytic study of differential school climate effects, because far too few schools were involved.

![Figure 2. Causal model of educational attainment (EDUC ATT) related to global self-esteem (GLOBAL S-E), self-concept of academic ability (S-C ABIL), family socioeconomic status (FAM SES), school mean academic ability (SCH ABIL), and academic performance (ACAD PERF). (EDUC ATT is the level of education attained 5 years after high school; all other measures are as described in the notes to Figure 1. The proportions of explained variance for the four endogenous variables are .389 for ACAD PERF, .672 for S-C ABIL, .138 for GLOBAL S-E, and .488 for EDUC ATT. All coefficients greater than or equal in absolute value to .060 are statistically significant, t > 2.0, except the coefficients between S-C ABIL and EDUC ATT, -.086, t = -1.33, and between ACAD ABIL and GLOBAL S-E, -.075, t = -1.09.)](image-url)
Theoretical Implications

Our analyses and findings have a number of theoretical implications for those interested in the self-concept and social comparison processes. First, the results from this large-scale sample spanning 79 schools show that school ability contexts (variations in school mean ability) do have the effects predicted via the frame of reference hypothesis (Prediction 2): With family SES and ability held constant, students surrounded by schoolmates with relatively low ability have slightly higher self-concepts of ability than do those students whose schoolmates are more able.

However, the effects are quite weak, so much so that we are led to ask why high school ability contexts do not have stronger impacts. One reason may be that although there are substantial differences in mean ability from school to school, there are still very large variations in ability within most schools. This is particularly true for high schools, which generally cover wider and more socioeconomically diverse residential areas than elementary schools do. Thus by the time a student reaches high school (and often earlier than that), she or he has been exposed to such a sufficiently wide range of ability in schoolmates that mean differences from one school to another are not large enough to matter much. Furthermore, as we noted earlier, there is a variety of additional sources of feedback about abilities, and these have impacts that are largely independent of high school ability contexts.

Perhaps a more significant theoretical implication of this study is that the most important determinant of self-concept of academic ability is actual ability (as reflected in our several standardized tests). By what pathways does actual ability shape self-concepts? Our findings clearly show that one pathway is via classroom grades. But the findings also show that even more of the impact of actual ability on self-concepts occurs independent of grades. The additional sources of feedback about abilities probably include personal communications from teachers (e.g., “You are much brighter than these grades reflect”), comments by parents (perhaps along similar lines), information from other significant adults, and in many cases direct knowledge about performance on standardized tests of ability.

Another important finding that is consistent with the theorizing that led to our Prediction 3 is that self-concepts of ability seem to be the pathway through which academic abilities and successes (i.e., grades) have their impact on the broader dimension of global self-esteem. A related methodological observation is that our three-item measure does a good job of capturing the self-concept of academic ability, at least insofar as it is an ingredient in global self-esteem (although we must keep in mind that the LISREL program includes a correction for measurement errors in both dimensions).

It is of both theoretical and practical interest to consider whether high school students’ self-concepts of academic ability are accurate or realistic. We find that students’ self-ratings correlate strongly with their scores on standardized ability tests, and this might suggest a high degree of accuracy in self-ratings. But this study, like most others, also shows that far more students rate themselves above average than below average. This self-expectancy bias can hardly be termed realism; instead, it appears that most students have somewhat higher opinions of their abilities than could be supported by objective test data. Wylie (1979, pp. 665–667) discussed some of the reasons for such biases; these include a general need for self-enhancement, and also a tendency for parents and teachers to emphasize positive feedback. Even when a more negative sort of feedback is provided, students are far more likely to be told that their abilities exceed their performance than the other way around. Thus students performing at roughly average levels may be told that they are capable of doing much better work and therefore conclude that their abilities are above average, whereas it is rare that a student with average grades concludes that because he or she tries harder than most of his or her classmates, he or she is really below average in ability. (In fact, in a recent analysis of Youth in Transition data, Felson, 1984, showed a modest positive correlation between self-rated ability and self-reports of working hard in school.)

Practical Implications

Are there any really practical implications to be drawn from these analyses of school contexts and student self-concepts? Should parents, for instance, be making efforts to enhance students’ perceptions of their academic ability, and is one way of doing that to pick schools that have relatively low ability levels?

In these analyses we have explored the possibility that school ability contexts have some lasting effects on either global self-esteem or educational attainment, or both. We found no evidence of any such effects. As young people move through high school and into the world beyond, they are exposed to a rich variety of environments that include many opportunities for feedback about their own abilities and skills. Those abilities and skills do make important differences in their long-term outcomes, both educational and occupational. But our analysis suggests that it is the actual abilities, not the self-concepts, that make the difference. The evidence seems clear for our sample of young men who were followed from about age 15 to 23. It is, of course, possible that self-concepts at earlier, more formative ages may play a more crucial part in shaping later outcomes, including actual abilities at later ages. But at this point we think that the burden of proof lies with those who wish to argue that school ability contexts have any such lasting impacts on students.

For our part, we find this conclusion reassuring, because one practical recommendation that might have been extrapolated from the Marsh and Parker (1984) report is that a parent should seek to place her or his child in a school in which the classmates are somewhat lower in SES, and thus lower in ability, so as to maximize the child’s self-concept of academic ability. This strategy would not be easy to implement under any circumstances, and it would be altogether impossible if a majority of parents sought to follow it.3

Some practical implications are easily derived from this study; the hard part will be to implement them. Our findings indicate that the dimension that really matters for self-concept of ability is not school climate but actual ability. What is more important is that the dimension that really matters for long-range educational attainment is also actual ability, not self-concept. So if we

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3 Even less workable is the strategy that one might extrapolate from some sociological studies: In order to maximize college aspirations, one should try to place a child among schoolmates who average lower in ability but also higher in SES.
want students to do better academically, little is likely to be gained by placing them in schools with more limited classmates. A more promising approach would be to help them maximize the use of their aptitudes and thus actually raise their abilities. For what it is worth, that would also raise their self-concepts.

References


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