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ABSTRACT

Studies in New Jersey and California suggest that smaller schools or school districts produce higher aggregate achievement than larger schools or districts, especially in low socioeconomic status (SES) communities. Other studies have found that smaller schools have higher rates of student participation in extracurricular activities, and that participation has a positive effect on student outcomes. This paper examines a model in which school size regulates the direct effect of SES on individual achievement, as well as the indirect effect of SES as mediated by participation in extracurricular activities. Information on a weighted sample of 5,209 public school students was drawn from the High School and Beyond (HS&B) data set. Dependent variables were senior-year composite HS&B test score and four variables reflecting senior-year extracurricular participation. Both school size and grade cohort size were used to investigate the hypotheses. The results confirm the generally positive direct effect of extracurricular participation on academic achievement, when other influential variables are controlled. Regression analysis among three categories of school size suggests that SES exerts comparatively weaker direct effects on achievement and participation among students who attend small schools (under 500 students). However, the results of interaction analysis with product vectors fail to confirm the hypothesis that school size systematically mitigates the effects of low-SES background on either the participation or achievement of individual students. This report contains 42 references. (SV)

Extracurricular Participation and Achievement: School Size as Possible Mediator of SES Influence Among Individual Students

by

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Abstract

The High School and Beyond (HS&B) data set was analyzed to investigate the hypothesis that school size mediates between socioeconomic status and school performance among individual students. The weighted sample consisted of 5,209 public school students who were sophomores in 1980 and for whom relevant data were available in both 1980 and 1982. Dependent variables were (1) senior-year composite HS&B test score and (2) four variables reflecting senior-year extra-curricular participation. Both school size and grade cohort size were used to investigate the interaction hypotheses. Little evidence of interaction effect was found. Discussion compares these results to results of previous analyses using grouped (school and district) data and draws implications for researchers and policymakers.

Extracurricular Participation and Achievement:
School Size as Possible Mediator of SES Influence Among Individual Students

In the past, curriculum--particularly as implemented by large high schools capable of specializing both students and teachers--was widely believed to be the key influence on educational quality (Jackson, 1966; Stemnock, 1974). Nonetheless, studies of outcomes--particularly student achievement--yielded different conclusions about the possible effects of school size. Generally, achievement studies recommended smaller school sizes than studies based on curriculum (Howley, 1989).

Although some recent observers (e.g., Holland & Andre, 1987) still argue that focusing on student achievement ignores the "developmental" and "socialization" needs of students, cultivating achievement at high levels is obviously very important (National Governors' Association, 1990). Whereas authentic achievement encompasses the imperatives of noncognitive human development, it does not make them the center of schooling (Katz, 1971). Rather, school activities designed to meet noncognitive needs (e.g., extracurricular activities) should contribute positively to, rather than subvert, achievement outcome. The real challenge of schooling remains how to cultivate high achievement more widely among students of low socioeconomic status, rather than primarily among advantaged students (Hofstadter, 1963; Shea, 1989). This study examines an analytical model in which small size of schooling hypothetically works better than large schooling in improving the school performance of disadvantaged students.

Achievement and Small High Schools

The view that large high school size is a prerequisite for high achievement has been challenged by the studies of researchers and questioned by national policymakers (e.g., Haller, Monk, Spotted Bear, Griffith, & Moss, 1990; Cross, 1990). Recent studies that controlled for socioeconomic status, for example, have generally established a small positive relationship between school size and student achievement (e.g., Bidwell & Kasarda, 1975; Amos & Moody, 1981; Eberts, Kehoe, & Stone, 1984).

Two important studies, however, suggest the conclusion that small-scale schooling is clearly advantageous in comparison to large-scale schooling, especially for "at-risk" students. Using a dataset that described New Jersey school districts, Walberg and Fowler (1987) found that (with district SES controlled), smaller districts produced higher aggregate achievement per unit of expenditure. Using a California dataset that described both districts and schools, Friedkin and Necochea (1988) confirmed an interaction effect between SES and size, such that small size produced substantial positive effects on aggregate achievement in both low-SES schools and districts, whereas, in high-SES schools and districts, large size produced moderate positive effects. In other words, community SES regulated the influence of size on aggregate achievement at both the school and district level.

The two studies, however, share features that make broad generalizations dangerous. First, each employs organizations (schools or districts) as the unit of analysis. This focus is understandable, since recent school reform efforts focus on organizational effectiveness. Although these two studies contribute to such efforts, the processes that affect individual students may well differ from those that affect organizations (Bidwell & Kasarda, 1975). It is not clear if the

same processes that shape organizational outcomes (such as aggregate student achievement) similarly affect individuals. The variability of achievement among individuals may, for instance, be associated with more diverse sources of influence.

Second, each of these two studies draws its data from a single state. The best that can be said at present is that comparatively smaller school districts in New Jersey and California are more efficient in producing achievement than comparatively large school districts within those states, especially in low-SES communities. Generalizing the findings from these studies to individual students and schools across the nation, however, is not warranted, as both sets of authors clearly note.[1]

Extracurricular Participation and Small High Schools

One broad generalization about small high schools, however, does seem to be warranted on the basis of previous studies. In small, as compared to large high schools, more students take part in extracurricular activities. Barker and Gump (1964) were among the first to report this finding, which has since been replicated in many studies (Baird, 1969; Grabe, 1981; Lindsay, 1982; Marsh, 1988; Wicker, 1968).

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[1]California and New Jersey, for example, are the least rural states in the nation, with 4.3% and 0% of the population residing in nonmetropolitan areas, respectively (Statistical Abstract of the United States, 1989). But small schools, in general, are a feature of rural education (Council for Educational Development and Research, 1988). To conclude that small high schools are, in general, better alternatives than other schools for particular students is not warranted on the basis of these two studies. Rather--as both sets of authors note--policymakers should understand that small size may have important advantages, depending on the context in which such schools exist; and, further, that small size is not necessarily a justification for eliminating a school from a community.

At the same time, a few studies have confirmed a generally positive effect of participation in extracurricular activities on student outcomes. Evidence of a direct effect on achievement, however, is inconclusive (Holland & Andre, 1987). In general, some studies indicate that student athletes may have a slightly higher grade point average (GPA) than those who are not athletes (e.g., Dowell, Badgett, & Hunkler, 1972); however, when athletics is the only extracurricular activity of a student, Scholastic Aptitude Test (SAT) scores may be lower than national averages (e.g., Landers, Feltz, Obermeier, & Brouse, 1978). Nonetheless, according to Holland and Andre (1987), the positive effect of extracurricular participation--particularly athletics--on GPA and test scores are clear among low-SES students.

The relationship of measures of extracurricular participation to the variety of possible outcome measures is understandably complex. Not only does it vary in direction and magnitude depending on the particular activity and particular outcome, but a curvilinear relationship also seems to hold, in general. Degree of participation is the issue in this case. Beyond certain thresholds, the influence on a particular outcome may change from positive to negative, so that too much activity has a negative effect on some outcomes (Marsh, 1988).

These relationships are intriguing to anyone concerned with the responsiveness of schools to low-SES students. Anecdotal evidence suggests that small high schools ought to be more responsive than large high schools. Class sizes tend to be smaller in small schools (DeYoung, 1987); students may therefore get more individual attention from teachers (Baird, 1969); and students probably know one another and their teachers better in small than in large high schools (Bain & Jacobs, 1990).

Though seldom referenced in the literature on education, the relationship between group size and social differentiation is a classical theme in social psychology. A major finding is that group size is negatively associated with social differentiation. In small groups, members interact with one another more directly, more frequently, and more spontaneously than in large groups. Formal arrangements that mediate communications are not needed in small groups (Coser, 1977), and physical proximity, small number of actors, and intense interaction make the formation of a "primary group" possible (Davis, 1949; McGrath, 1984). According to Fine (1979), members of primary groups identify fully with the group and share a common pattern of communication and behavior ("idioculture"). The idioculture continuously reiterates group identity. One may argue that idioculture also helps primary group members redefine a social status that is otherwise normatively ascribed by the mechanisms of social stratification at work in the larger society. Small-size groups, then, may function to <u>blunt</u> the effects of structural inequality.

Large groups, on the other hand, must create formal agencies to mediate interactions among a large number of individuals in complex relationships (Coser, 1977). As a result, large groups are able to function, but the disadvantage is an increase in "social distance" and in inequality among both individuals and subgroups within the larger organization. Social distance and inequality in large groups often work to <u>reinforce</u> disparities and inequalities that characterize society at large.

The general findings of social psychology in this regard may well be applicable to the ways in which public schools perpetuate inequality (cf. Anyon, 1987; Oakes, 1985). The system of public schooling, after all, is a mammoth enterprise to which some observers have referred as a "sorting machine" (Spring,

1976). Both anecdotal evidence in education and the findings of social psychology suggest that school climate--generally more problematic in secondary as compared to elementary schools (Pallas, 1988)--might be better in small than in large high schools.

Model to Be Investigated

The question of whether or not the findings cited above (Friedkin & Necochea, 1988; Walberg & Fowler, 1987) apply, in general, to individual American students has not been investigated. It must be admitted that concern for the institutions of American schooling and concern for the experience of individuals are different. This study takes the individual student as the unit of analysis.

The study tests a hypothesis that parallels Friedkin and Necochea's (1988): the interaction of SES and school size. The present study, however, follows what we would call an "educational" model, in which student SES is taken as a given, and school size is accorded a hypothetically mediating role. We contrast this model with the "sociological" model, in which school size is accepted as a given and SES plays a mediating role (cf. Friedkin & Necochea, 1988).[2]

We conceive of size as regulating (1) the direct effect of SES on achievement and (2) the indirect effect of SES as mediated by participation in extracurricular activities. Hypothetically, in small schools, disadvantaged students do better in both extracurricular participation and academic achievement in comparison to identically disadvantaged students in large schools. In addition, we hypothesize that, as an indicator of social integration in school life, extracurricular

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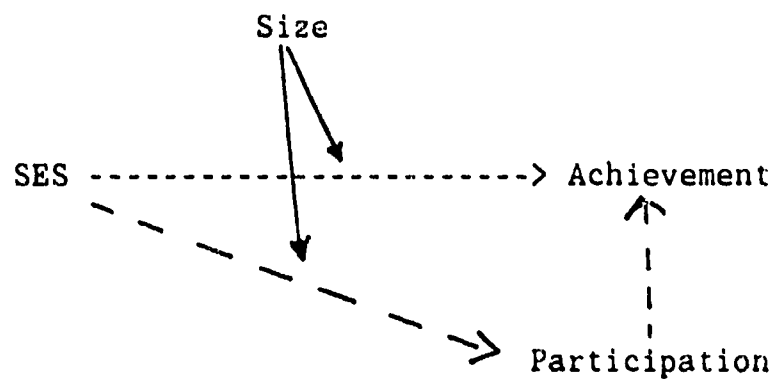
[2]Given the district or school as the unit of analysis, note that, in the sociological model, "changing SES background" would entail an entire school or district in raising its SES standing. It says little or nothing about a course of action appropriate to individual students or their families, irrespective of their ascribed SES standing.

participation in general has a positive influence on achievement, despite possible variation of the effect of different activities. Figure 1 presents our model.

Figure 1: Hypothetical Model



The Research Approach

Interaction effects are examined by multivariate regression analyses that involve two approaches: (1) controlling for school size and comparing the magnitude of raw regression coefficients (b values) of SES and race across three categories of school size, and (2) testing the statistical significance of R2 change due to interaction effects that are represented by cross-product vectors (Kerlinger & Pedhazur, 1973), i.e., size of schooling multiplied by socioeconomic variables. In order to analyze a more clear-cut pattern (i.e., participating in any activity versus not participating in any activity), the study also uses logistic regression modeling.

In examining the relationship between participation and achievement, factors that are considered as theoretically important and that have been identified as statistically significant in preliminary analyses (sex, race, SES measures, and racial composition of the school) are controlled in the analysis (e.g., Holland &

Andre, 1987; Marsh, 1988). Interaction effects on achievement between school size and SES indicators are tested with the two approaches described above, as in the analysis of extracurricular participation.

Measurement and Sampling Issues

The dependent variables in the analysis are the High School and Beyond Survey's first followup (1982) measures of participation rates, including the total rate and rates for academic, sports, and community activities separately (see Appendix). Composite test scores in the first followup survey (1982) are used as the dependent variable of academic achievement. The independent variables include both the base-year and the first followup measures of student characteristics, as well as the base-year and the 1981 measures of school characteristics. In addition, the base-year participation rate is taken as a predictor variable in the model.

Race is a dichotomous measure: white (excluding Hispanics) versus nonwhite. Student SES background is indicated by the father's educational attainment, which is categorized into six levels: less than high school, high school, less than two years vocational or college education, two or more years vocational or college education, four-year college graduate status, and postgraduate degree status. In logistic regression analysis, this variable is dichotomized: two or more years vocational or college education versus less than two years vocational or college education.

For the sake of presentation, school size and grade cohort size were recoded into intervals of 100 enrolled students (otherwise the b values for the two variables would be too small to present). School size is also analyzed as a categorical variable. We take a conventional classification of school size: schools with an enrollment fewer than 500 students are considered small; those

with an enrollment between 500 and 1000 are medium-sized; and those with an enrollment more than 1000 are categorized as large (e.g., Williams, 1990). Initial tests suggested that school characteristics other than the percentage of Hispanic students (percentages of the black students, dropout rates, and college entrance rates) are neither substantial nor statistically significant in relation to participation and achievement. They were therefore dropped from the analysis.

Extracurricular participation in the study is indicated by the participation rates of extracurricular activities (the counts of participated activities relative to the counts of activities listed in the HS&B questionnaire). Presumably, participation in different types of extracurricular activities is associated with different student and school characteristics and may have variable effects on achievement. Hence, participation rates were separately calculated for three categories of extracurricular activities (see Appendix), namely, academic activities (6 items), sports (4 items), and community activities (7 items). Total participation rate (the average of the three categorized rates on the 17-item list) was calculated as well. In addition, as the dependent variable in the logistic regression analysis, a dichotomous variable is created with effect coding based on the total rate (participation in one or more activities versus participation in none of the activities).

Because the focus of the study is on public schools, only public school students were included in the sample. Cases with missing values on any extracurricular participation items were dropped to assure that no unknown confounding factors would be involved in the measurement.[3] Additional cases were

[3]It is difficult to speculate on the causes of the missing value. Since the sample is sufficiently large for statistical analysis and since participation is the focus of the analysis, the safest strategy seemed to entail dropping any cases with missing values on the participation variables.

dropped because they: (1) did not contain information either from the base-year survey or the first followup survey, (2) did not contain the 1980 or 1981 school data, or (3) were flagged as dropouts or transfers during the time span between the two survey waves.

The sample resulting from such a treatment is biased on a key variable, school size: In comparison to the national distribution (see Table 1), the sampled proportion of students from large schools (with an enrollment greater than 1000) is 10 percent larger, whereas the sampled proportion of students from medium schools (with an enrollment between 500 and 1000) is 10 percent smaller. Hence, weighting was invoked to adjust such a bias. The process makes the percentages of students in the three school size categories closer to the national distribution while maintaining approximately the same sample size to guarantee the accuracy of significance tests (Moser & Kalton, 1972).

Table 1 compares key variables across the original sample, the manipulated sample (with missing values dropped), and the manipulated, weighted sample. In comparison to the original HS&B sample, these procedures have made the study sample more closely resemble the national population in racial composition, parents' educational attainment, and school size.[4] It is legitimate to have the working sample deviate from the original sample in which, according to the survey designers, the nonwhite population was intentionally overrepresented (see National Center for Educational Statistics, 1986). The results of the analyses based on the weighted sample can, therefore, be considered generalizable to the U.S. student population as a whole.

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[4]Such comparisons are approximate, since the national data on some variables during the same period of time (1980-1982) are not available. Further, the standard of grouping and measurement may not be identical between the national data and the sample data.

Table 1. Percentages distribution of students on selected variables: the original HS&B sample (public school only), manipulated sample (with missing cases treated), weighted sample, and the national population.

Selected variables	Original sample	Manipulated sample	Weighted sample	National distribution
N	11,798	5,129	5,209	14,003,602[a]
Sex				
male	49.2	49.1	49.3	n.a.
female	50.8	50.9	50.7	
Race				
white	60.9	70.5	71.3	70.4[b]
nonwhite	38.9	29.5	28.7	29.6
Father's education				
>1 year college	30.8	32.8	32.3	31.9[c]
no college	69.2	67.2	67.7	68.1
School size				
< 500	17.6	15.4[d]	17.4[d]	16.4[a]
500-999	23.0	21.9	30.2	31.2
>1000	53.7	62.7	52.4	52.4
Participation				
no	31.2	18.2	18.2	n.a.
yes	68.8	81.8	81.8	

a. Digest of Education Statistics 1990. p.104. Table 90. "Public elementary and secondary schools, by type and size of school: 1988-89."
b. Digest of Education Statistics 1990. p.60. Table 43. "Enrollment in public elementary and secondary schools, by race or ethnicity and State: Fall 1986."
c. Digest of Education Statistics 1990. p.21. Table 12. "Years of school completed by persons of age 25 and over, by State: April 1980."
d. There are 296 missing cases on school size in the sample.

SES Effect Change across School Size Categories

Two hypothetical relationships are implied in the proposed interaction model: (1) a positive correlation between SES and school performance (extracurricular participation and academic achievement) and (2) a positive association between white racial status and school performance. Multivariate regression of participation rates and achievement score on student characteristics and school characteristics (see Table 2 and Table 3) supports the first hypothesis, but not the second. In almost all the regression models (except those based on the category of small schools), father's education is a statistically significant predictor of extracurricular participation and achievement. On the other hand, racial status affects participation and achievement differently: white racial status is a positive predictor of academic achievement, but a negative factor in relation to participation. Opposite to the hypothesis, nonwhite students are found to be more active in school participation than white. Despite this finding, the interaction effect between school size and racial status can still be examined by looking at variation patterns across school size.

To test the interaction effects, a straightforward way is to see the variation of the effects of socioeconomic background (father education) and racial status on dependent variables across the categories of school size. This is done by comparing the magnitude of unstandardized regression coefficients (b's) of the given independent variables in equations based on different school-size categories. If our hypothesis holds, the b values on SES variables should be smaller in small school subsample than that in large school subsample. In such comparisons (Table 2), the impact of father's education on participation rates increases slightly among medium-sized and large schools. The pattern is more evident in the category of sports activities. The relationship, however, is weak

in general and does not look linear: the difference in the size of raw regression coefficients of father's education seems to be close among small schools and large schools. To further test the effect, product effects of interaction between father's education and school size, and between race and school size are needed.

Table 2. Regression coefficients for participation rates on variables of student background, school characteristics, and prior participation rates across the three categories of school size (standardized regression coefficients are in parentheses).

Independent variables	Small schools	Medium schools	Large schools
	Total participation rate		
Sex(male)	-.015(-.055)	-.039(-.147)***	-.019(-.078)***
Race(white)	-.015(-.049)	-.031(-.098)***	-.020(-.075)***
Father's ed.	.006(.058)	.008(.081)***	.008(.101)***
Base year Participation	.303(.406)***	.277(.339)***	.312(.392)***
Cohort Grade Size	-.011(-.073)*	.000(-.004)	-.004(-.063)***
% Hispanic	.007(.014)	-.004(-.025)	-.003(-.018)
Adjusted R^2	.186***	.171***	.191***
	Academic activities		
Sex(male)	-.059(-.139)***	-.078(-.188)***	-.042(-.106)***
Race(white)	.007(.016)	-.007(-.015)	-.017(-.041)*
Father education	.017(.108)***	.018(.124)***	.017(.131)***
Base year Participation	.254(.294)***	.316(.359)***	.313(.351)***
Cohort Grade size	-.020(-.087)**	-.005(-.042)	-.005(-.044)*
% Hispanic	.012(.016)	.002(.007)	.001(.004)
Adjusted R^2	.133***	.207***	.165***
	Sports activities		
Sex(male)	.065(.113)***	.036(.069)**	.034(.070)**
Race(white)	-.018(-.027)	-.061(-.100)***	-.033(-.064)***
Father education	.009(.045)	.018(.100)***	.018(.111)***

Base year Participation	.617(.611)***	.522(.528)***	.512(.509)***
Cohort Grade Size	-.018(-.056)*	.0012(.003)	-.005(-.042)*
% Hispanic	.015(.015)	-.012(-.037)	.000(-.001)
Adjusted R^2	.368***	.305***	.296***
	Community activities		
Sex(male)	-.008(-.022)	-.030(-.084)***	-.031(-.089)***
Race(white)	-.018(-.043)	-.049(-.119)***	-.041(-.108)***
Father education	.012(.079)*	.013(.101)***	.012(.099)***
Base year Participation	.328(.409)***	.352(.416)***	.324(.389)***
Cohort Grade Size	-.011(-.053)	.002(.018)	-.007(-.074)***
% Hispanic	-.014(-.021)	-.013(-.055)*	-.005(-.018)
Adjusted R^2	.179***	.208***	.190***

* p<.05 ** p<.01 ***p<.001

The same strategy is used to analyze the interaction effect between school size and socioeconomic variables on academic achievement (see Table 3). Across the three school size categories, little variation was found in magnitude of unstandardized regression coefficients of racial status and father's education. No interaction effect emerges in the analysis. Some general patterns in which the independent variables predict achievement, however, have emerged: in composite test scores, males and white students did substantially and statistically significantly better than female and nonwhite students, holding other things constant. Father's educational attainment also contributes to the student's higher test score.

The pattern in which participation in three types extracurricular activity differentially influences academic achievement is similar across the three categories of school size. Participation in extracurricular academic activities has a very strong effect in improving test score, regardless school size. Participation in sports has a weak positive effect on achievement and participation in community activities has a negative effect on test score, especially among small schools.

Cohort grade size may be a meaningful dimension of social interaction in school, since grade is a unit that organizes daily activities for students of basically the same developmental stage. In Table 2, the effect of cohort grade size on participation rates is statistically significant in some categories of school size and activities. In Table 3, the effect of cohort grade size on achievement is not important. Only among large schools does cohort grade size have a statistically significant effect on achievement, which, however, is possibly due to the comparatively large number of students from large schools, as the magnitude of the regression coefficient is not substantial. Percent of

Hispanic students in the school has little influence on either school participation or academic achievement, regardless of school size.

Table 3. Regression coefficients for academic achievement on variables of student background, school characteristics, and extracurricular participation rates across the three categories of school size (standardized regression coefficients are in parentheses).

Independent variables	Small schools	Medium schools	Large schools
Sex(male)	165.574(.096)**	160.957(.093)***	162.267(.093)***
Race(white)	541.827(.270)***	638.935(.318)***	502.874(.269)***
Father's ed.	109.749(.171)***	132.579(.217)***	127.667(.219)***
Followup year participation rates:			
Academic activities	946.688(.231)***	741.641(.176)***	890.094(.200)***
Sports activities	112.339(.036)	171.642(.052)*	142.048(.039)*
Community activities	-462.152(-.089)**	-234.015(-.048)	-164.322(-.033)
Cohort Grade Size	59.611(.062)	23.397(045)	28.351(.062)***
% Hispanic	-174.224(-.058)	-37.153(-.034)	-27.687(-.024)
R^2	.189***	.214***	.195***
Adjusted R^2	.183	.209	.192

* p<.05 ** p<.01 ***p<.001

Cross-product Vectors as Indicators of Interaction Effects

To examine further the hypothetical interaction effects, cross-product vectors were created for both school size and cohort grade size. Four product effect variables were created by multiplying (1) school size and father's education, (2) cohort grade size and father's education, (3) school size and racial status, and (4) cohort grade size and racial status. Again, the total participation rate and participation rates in three types of extracurricular activities were taken as the dependent variables in four equations. The result of multivariate analysis is shown in Table 4.

In each of the four equations with dependent variables of different types of participation rates, the four product effect variables were entered into the equations after other independent variables were entered. Little effect was found upon their entrance on either the R^2's and or the effects of other independent variables. The four product effect variables have coefficients approaching zero and none of them is statistically significant, except for the effect between cohort grade size and father's education on the community activity participation rate. The variation of unstandardized regression coefficients of father's education and student racial status found in previous analysis across school size categories is not statistically significant. The hypothesis that school size alters the effect of SES background on participation rates in extracurricular activities is not supported by the HS&B data.

Table 4. Regression coefficients for total participation rate and participation rates for three categories of activities on variables of student background, school characteristics, and product effects (standardized regression coefficients are in parentheses).

Variable	Total participation	Academic activity	Sports activity	Community activity
Sex(male)	-.025*** (-.096)	-.058*** (-.141)	.038*** (.073)	-.027*** (-.075)
Race(white)	-.028*** (-.096)	.017 (-.037)	-.051*** (-.088)	-.052*** (-.131)
Father education	.008** (.088)	.023*** (.161)	.018*** (.099)	.019*** (.152)
Base year Participation	.302*** (.382)	.298*** (.336)	.534*** (.533)	.341*** (.411)
Cohort grade size	-.008* (-.145)	-.012* (-.133)	-.017** (-.157)	-.004 (-.055)
School size	.001 (.074)	.002 (.066)	.002 (.071)	.0002 (.010)
% Hispanic	-.004 (-.019)	.001 (.004)	-.004 (-.011)	-.006 (-.024)
School size* father education	.000 (-.037)	.000 (-.031)	.000 (-.035)	.000 (.022)
Cohort Grade Size* father's ed.	.000 (.025)	-.001 (-.035)	.000 (.017)	-.002* (-.108)
School size* race(white)	.000 (-.068)	.000 (-.083)	-.001 (-.094)	.000 -.027
Cohort grade size* race(white)	.001 (.092)	.002 (.096)	.003 (.124)	.001 (.081)
R^2 change due to interaction	.000	.001	.001	.001
Adjusted R^2	.191***	.173***	.321***	.205***

* p<.05 ** p<.01 ***p<.001

Participation as a Dichotomous Variable

Factors affecting the extent to which students participate in extracurricular activities may be complex; more information, or information of a different quality, may be needed to examine them. To simplify the matter, a clear-cut demarcation may help: having participated in one or more activities versus having participated no activities is taken as the dependent variable and submitted to logistic regression analysis.[5] Based on the multivariate regression analyses, various logistic regression models are tested and a best-fit model is presented in Table 5. The finding confirms the result from multivariate analysis shown in Table 4. In general, female, nonwhite, and father having two or more years college education are characteristics that independently contribute to greater odds of extracurricular participation. School size and percent of Hispanic students in the school have little effect on the odds of participation. No hypothesized interaction effect is identified.

An interaction is found, however, between racial status and percent of Hispanic students in the school. This interaction effect can be understood as indicating that the direct negative effect of white racial status on the odds of participation grows as the percentage of Hispanic students in school increases. In other words, while in general, white students have a small log odds in participation (-2.584), they have an even smaller log odds as the percentage of Hispanic students in the school increases.

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[5]Such a dichotomized participation variable may alter the underlying concept to some degree: It appears to be an indicator of alienation rather than extent of social integration. Overall, however, the dichotomous measure still reflects the conceptual domain of social integration.

Table 5. Logistic regression coefficients for participation (dichotomized as having participated in one or more activities versus not participated in any activity) on student background, school characteristics, and interaction effects.

Independent Variables	Log odds	Odds	p
Intercept	1.120	3.0677	.488
Sex (male)	-.270	.763	.000
Race (white)	-2.584	.075	.038
Father education (college)	.132	1.141	.060
School size (<500)	.198	1.219	.227
% Hispanic	.810	2.249	.666
School size* Father's education	.003	1.003	.984
School size*Race	.232	1.261	.222
Race*% Hispanic	2.210	9.128	.048
Likelihood ratio X^2	3.703		
df	6		
p	.717		

Finally, academic achievement is regressed on the four product effect variables, student and school characteristics, and extracurricular participation variables. School participation as predictor variables are treated in two different ways. In equation 1, the participation rates for three types of extracurricular activities are used, whereas, in equation 2, the dummy variable of participation versus nonparticipation is used (see Table 6).

While school participation as indicated by the dummy variable is, in general, a positive factor in predicting achievement, the three types of activities have distinct effects on achievement. Participating in academic activities helps students most in enhancing test scores (an increase of more than 853 points associated with every participated activity, holding other factors constant). Though weaker, sports participation also contributes to achievement. Community activity, however, is negatively related to the test score.[6] The pattern is consistent with the similar result presented in Table 3.

Sex, racial status, and father's educational attainment effect student academic achievement in ways similar to those identified in previous analyses as well. The interaction hypothesis, however, is once again, not supported by the findings of the analysis. None of the interaction effect variables is substantial or statistically significant.

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[6]Again, see the Appendix for a list of the variables categorized as "community activities."

Table 6. Regression coefficients for academic achievement on student background, school characteristics, extracurricular participation, and interaction effects (standardized regression coefficients are in parentheses).

Independent Variables	Equation 1	Equation 2
Sex(male)	161.293(.091)***	133.033(.076)***
Race(white)	545.224(.283)***	552.038(.287)***
Father education	129.321(.216)***	146.428(.244)***
Total participation (participated)[a]	--	275.707(.119)***
Sports activity	146.286(.043)**	--
Academic activity	853.008(.199)***	--
Commun. activity	-281.583(-.058)***	--
Cohort grade size	62.695(.168)**	57.588(.154)*
School size	-11.685(-.109)	-10.349(-.097)
% Hispanic	-.967(-.001)	-.685(-.001)
School size* Father education	1.936(.073)	1.757(.067)
Grade size* Father education	-5.681(-.069)	-6.222(-.075)
School size* Race(white)	1.405(.064)	1.171(.054)
Grade size* Race(white)	-3.401(-.048)	-3.165(-.044)
R^2 change due to interaction	.001	.000
Adjusted R^2	.199***	.187***

* p<.05 ** p<.01 ***p<.001

[a] Dichotomized as participating (coded 1) versus not participating at all (coded 2).

Discussion

This study confirms the generally positive direct effect of participation in extracurricular activities on academic achievement, with other influential variables statistically controlled. In particular, participation in no extracurricular activity is definitely a factor detrimental to school success. Moreover, rate of participation in academic activities--with SES variables controlled--is significant, and participation in sports (with participation in academic activities controlled) explains an additional statistically significant amount of the variance in achievement.

With participation in these two types of activities controlled, however, participation in community activities exerts a modest but still significant negative effect on achievement. A speculative explanation is that participation in community activities as categorized in this study may serve to disengage students from an academic focus.

In regression analysis among three categories of school size (small, medium, and large), this study suggests that SES exerts a comparatively weaker direct effect on achievement and on participation among students who attend small schools (as defined in this study). The results of interaction analysis (product effects), however, fail to confirm the hypothesis that school size systematically mitigates the effects of low-SES background on either the participation or achievement of individual students in a representative national sample.

One interaction effect--the interaction of race (white/nonwhite) and percentage of Hispanic students in a student's school--is statistically significant in this study. Attending schools with high proportions of Hispanic students tends to further decrease the generally lower participation rate of white

students;[7] conversely, among nonwhite students, attending schools with low percent of Hispanic students tends to increase their participation.

Caveats and General Observations

This study used national survey data from individual students to address effects documented by two other studies (Freidkin & Necochea, 1988; Walberg & Fowler, 1987) that were not based on survey data and that used schools or districts as the unit of analysis. These critical differences must be regarded when interpreting the findings of the present study. Four caveats are in order, three are primarily analytical (though with methodological implications) and the other primarily methodological.

First, the variable of school size may itself be subject to state norms not reflected in the present analysis. That is, the organizational characteristics that function as "small school size" may well vary from state to state. In state context, a small New Jersey school, for instance, may be considered to be a medium-sized school in a less populated state. If these differences are not taken into account (as they were not in the present study), the effects of small size may be minimized. The importance of including context variables has become a topic of discussion only in recent years (e.g., Forgione & Orland, 1990; Hare, 1990; National Education Goals Panel, 1991; Stephens, 1988). Studies using state samples may, at present, be the most convenient way to control for such context variables. It may not, in fact, be valid to base state policy decisions on analyses from other states or from the nation as a whole.

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[7]In analyses not reported in this study, African American students tend to participate in extracurricular activities more than students of other ethnic backgrounds.

Second, school size may be a crude proxy variable for the effective influences that operate on individuals (Baird, 1969). One may draw relevant inferences from the literature on class size. Reviews of that literature (e.g., Mitchell, Carson, & Badarak, 1989) suggest that small size merely presents enhanced opportunities to implement effective practices. If educators ignore those opportunities, the potential benefits do not materialize. For example, if, in theory, small school size presents opportunities to derive such benefits as those reported in social psychology and referenced anecdotally by educators, what state or local circumstances allow those opportunities to be realized? More specifically, might school climate, or availability of resources, for example, be significant missing variables in analyses of the effects of school size? Such local context variables could well mediate the relationships observed in the present study.

Third, the construct of extracurricular participation as a measure of social integration seems to require better theoretical elaboration than it has so far received. The activities covered in the HS&B survey are, for the most part, formal activities that are a routine part of school life. Some of these extracurricular programs are possibly designed for specific subgroups of the student body, and participation in them may be not entirely motivated by students themselves. Participation rates in such programs therefore may not be an adequate reflection of social integration. Other dimensions of school interaction such as student-faculty relationships, family involvement, and peer influences should be considered in conceptualizing social integration.

Finally, in the data used in this study, composite SES correlated with various achievement measures at less than .40 (bivariate analysis). In general, according to Walberg and Fowler (1987), data aggregated at school, district, or

state levels show stronger correlations between achievement and SES than do individual data.[8] Jencks and colleagues (1972), for example, estimated a correlation between achievement and "family economic status" and (individual) "test scores" of approximately .35. SES measures gathered from documented income and family wealth data might reveal different relationships, but Jencks and colleagues (1972) reported that error associated with gathering data about family or parents' educational or economic status from students is <u>not</u> a significant source of error (see Jencks et al., 1972, pp. 116-117). Thus, it might be possible that interaction effects of size and SES govern the academic performance of districts and schools, but not individuals, possibly because individual determinants of achievement are much more complex.

Choice of the unit of analysis in studies that investigate the interaction of SES and school size appear to be important methodologically, but the choice may have critical conceptual implications, as well. The implications entail the means of education (organizations known as schools) and the ends of education (the learning of particular students).

That is, educators face the dilemma of addressing both organizational characteristics (e.g., school climate) and individual characteristics (e.g., the cognitive growth of particular students) simultaneously. Both efforts can work together to improve schooling, but this study suggests that national data may need to be augmented by local data (or national data transformed to reflect local contexts) if the <u>common processes</u> affecting both individuals <u>and</u> organizations are to be better understood.

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[8]Walberg and Fowler (1987), citing White (1982), estimate a median correlation of .73 for data aggregated at school or district levels. Thus, individual-level data account for considerably less variance than grouped data.

Conclusion and Recommendations

Contrary to the main hypothesis, this study, which used a nationally representative sample and took individual students as the unit of analysis, found little evidence that school size or grade cohort size exerts a systematic interaction effect on the relationship of SES to academic achievement or to extracurricular participation. In regression analyses based on the investigated model, however, it is clear that--with significant background variables controlled--extracurricular participation in some forms can enhance student achievement across all categories of school size, although some forms of participation may have no effect or even negative effects.

Within the province of participation in extracurricular activities, however, the effects of sex, race, and SES background are strong, and for that reason, school structures should be created to ensure that all students--particularly low-SES students--participate successfully in at least one extracurricular activity. This task may be less of a challenge in small high schools, where participation rates, in general, tend to be higher than in large schools.[9]

[9]In analyses of this sample not reported here, rates of participation in extracurricular activities were--as in previous research--significantly higher in small as compared to large high schools.

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Appendix

HS&B Questionnaire Items Used to Derive Participation Rates for Three Types of Extracurricular Activities.

First followup year (1982)

Academic:
- fy38d (debating or drama)
- fy38f (chorus or dance)
- fy38g (hobby clubs)
- fy38h (honorary clubs)
- fy38i (school newspaper or yearbook)
- fy38j (subject-matter clubs)

Sports:
- fy38a (varsity athletic teams)
- fy38b (other athletic teams)
- fy38c (cheer leading pep club)
- fy38e (band or orchestra)

Community:
- fy38k (student council government)
- fy38l (vocational education clubs)
- fy38m (youth community organizations)
- fy38n (church activity youth groups)
- fy38o (junior achievement)
- fy38p (service clubs community service activities)
- fy38q (sororities fraternities)

Base year (1980)

Academic:
- bb032b (debating or drama)
- bb032f (chorus or dance)
- bb032g (hobby clubs)
- bb032j (subject-matter clubs)

Sports:
- bb032b (other sports)
- bb032c (cheer leading pep clubs)
- bb032e (band or orchestra)

Community:
- bb032l (vocational education clubs)
- bb032m (community youth clubs)
- bb032n (church activities)
- bb032o (junior achievement)