Two Studies of Engagement and Achievement

This investigation of student engagement and disengagement comprises two studies conducted from a single data base. Study I asks the simpler question "Is there an association between engagement and academic achievement?" using data from a nationwide sample of eighth-grade public school students. Study II focuses on just those students who are at risk according to traditional status definitions, that is, minorities attending inner-city schools, students from low-income large families, and youngsters whose home language is not English. Among this group, a subgroup is identified whose academic performance is "acceptable" and another group whose performance is high. The investigation asks whether these two groups are distinguished from their less successful peers by their engagement behaviors in school. The sections that follow describe the data base and variables that were common to both studies.

Subjects

Data for the investigation were drawn from the files of the National Educational Longitudinal Study of 1988 (NELS:88). NELS:88 is a major longitudinal study designed to document the experiences of a nationwide sample of eighth grade students until they are well beyond the high school years. Although NELS:88 is designed as a longitudinal investigation, the wealth of data obtained at each time point provides important information for researchers and policymakers as well. This investigation is a cross-sectional analysis of base-year results, that is, data collected on students enrolled in eighth grade in 1988.

Subjects for the NELS:88 sample were selected through a two-stage stratified probability sampling design (see Spencer et al., 1990, for a complete description of sampling procedures). At the first stage, about 800 public and 200 private schools were selected that enrolled grade 8 pupils. At the second stage, an average of 24 eighth grade students were selected from each school, resulting in a total sample size of about 24,500 youngsters.

Both studies were conducted using data on those students attending public schools. After eliminating a small number of individuals for whom no test scores or school data were available, and those enrolled in special education programs, the resulting sample size was 18,307. These youngsters represent a cross section of eighth graders from all regions of the United States from four racial-ethnic groups: Asian or Pacific Islander; Hispanic, regardless of race; Black, not of Hispanic origin; White, not of Hispanic origin. There was not a sufficient number of American Indians or Alaskan Natives to include this group in the present analysis.

Study I was conducted using the entire data set, eliminating cases that were missing key variables for any particular analysis. Study II was conducted on a subsample of about 6,000 youngsters who could be considered "at risk" according to the criteria given in the study description below.

Measures

To a large extent, the two studies used the same or similar measures. These were drawn from all of the instruments administered in the NELS:88 survey, that is, surveys and achievement tests administered to the students, and surveys of parents, school administrators, and teachers. Significant attention was given--both by the NELS:88 staff and in the present study--to selecting the most reliable indicators of each variable assessed. For example, if both parent and student data were available regarding socioeconomic status (e.g., parents' education or occupation) the parents' data were used by NELS:88 researchers. In the present study, since two teacher ratings of individual students were available for most youngsters, the average of these was used instead of a single rating. In addition, a number of composite variables were formed--both by the NELS:88 staff and in the present investigation--since composites of closely related items are generally more reliable than responses to the individual items themselves.

The NELS:88 survey provided an index of socioeconomic status (SES) for each participant. This was obtained by combining information on the father's educational attainment, the mother's educational attainment, the father's occupation, the mother's occupation, and household income. Occupational data were coded using the Duncan SEI scale (Duncan, 1961). Each component was standardized and the five standard scores were averaged to yield the final SES composite. Socioeconomic status was used in Study I as a covariate and in Study II as one criterion for the selection of the at-risk subsample.

The NELS:88 achievement tests in reading comprehension, mathematics, science, and history/citizenship/geography were used in Study I as the primary outcome variables. The mathematics and reading subtests were used in Study II to classify youngsters into performance levels. The tests were constructed specifically for the NELS survey by Educational Testing Service; the items were based on the consensus of committees of subject matter specialists. Coefficient alpha reliabilities for the tests are .84, .90, .75, and .83, respectively. Further information about the test battery is available in Rock et al. (1990).

A brief description of the items and composites created just for this investigation is given below; more detailed information on each composite is given in Appendix A.

Classroom and School Academic Participation:

The six variables in this set constituted the primary measures of pupil participation in the classroom and academic program of the school. Three were obtained from the Student Questionnaire and three by averaging the average ratings of two of the student's teachers.

ATTENDANCE - Student's report of number of times missed school, skipped classes, arrived late, and number of times his/her parents were contacted about attendance problems.

PREPARATION - Student's report of number of times he/she came to class without pencil and paper, without books, and without homework completed.

BEHAVIOR - Student's report of number of times sent to office for misbehaving, parents received a warning about the pupil's behavior, and pupil getting into a fight with another student.

ABS-TARDY - Teachers' reports of whether the pupil is frequently absent from class or tardy.

WITHDRAWN - Teachers' reports of whether the pupil is exceptionally passive or withdrawn.

NOT-ENGAGED - Teachers' reports of whether the student rarely completes homework, is inattentive in class, and is frequently disruptive.

Identification with School:

This set of measures reflects the student's feelings of belonging in the school environment and the extent to which the student values school subjects as being important in his/her future years.

MOVES - The parent's report of the number of times the eighth grader has changed schools over the preceding years.

STU-TEACHER - The student's report about whether students get along well with teachers at this school, whether there is "real school spirit," whether teachers are interested in students, praise the student's effort, listen to what the student says, or whether the student feels "put down" by his/her teachers.

PERCEPTIONS - The student's assessment of whether students in the class see him/her as popular, athletic, a good student, and "important."

UTILITY - The student's agreement with the statement "Math will be useful in my future" and the same statement regarding English, social studies, and science.

Participation Outside the Regular School Program:

Five variables reflect the extent to which the student participates in academic and non-academic school-related activities that are beyond the regular school hours.

HOMEWORK - Student's report of the number of hours spent on homework per week, considering all subjects.

EXTCURR - Total number of extracurricular activities in which the student reports participating, from a checklist of 21 activities.

READING - The amount of reading the student reports doing on his/her own (not required by school), from none to 6 hours or more per week.

DIS-COUNSELOR - The student's report of discussing program plans, academic problems, and course topics with his/her school counselor.

DIS-OTHER - The student's report of discussing program plans, academic problems, and course topics with teachers or relatives and friends other than parents.

Parent Involvement in Student's School Work:

Four variables indicate the extent to which parents and their youngsters interact with regard to school work. These measures reflect both the pupil's involvement with school work when at home and the extent to which parents encourage and support the youngster's active participation in school.

CHK-HOMEWORK - The student's report of how often his/her parents check on whether homework has been completed.

DISCUSS - The student's report of the frequency with which school programs, activities, and topics studied are discussed with parents, and whether he/she talks with parents about planning a high school program.

PAR-TALK - The parent's report of the frequency with which parents talk to the student about school experiences and high school and post high school plans.

RESOURCES - The student's report about whether his/her home has a specific place to study, a daily newspaper, magazines, an encyclopedia, an atlas, a dictionary, and a typewriter.

Parents' Involvement:

Two variables reflect the extent to which parents have direct contacts with the youngster's school.

PAR-CONTACTS - The parent's report of the frequency with which the parents contacted the school to discuss the student's academic performance or academic program.

PAR-INVOLVE - The parent's report of whether the parents belonged, attended, or participated in the school's parent-teacher organization, volunteered to assist in school, or belonged to an out-of-school parents' group.

Statistical Analysis

The primary data analysis for both studies consisted of comparisons of group means using analysis of variance and covariance techniques. In Study I the total sample of eighth graders was classified by gender, race, and into one of four participation groups (highly engaged; middle-high; middle-low; not engaged). The dependent variables were measures of academic performance. In Study II the subsample of at-risk youngsters was classified by gender, race, and achievement level (successful; passing; unsuccessful). The dependent variables were several sets of participation and identification measures.

In each study, three-way multivariate analysis of variance and covariance for unequal *N*'s was used to compare the means of the various subgroups on the dependent variables; all analyses were performed using the MULTIVARIANCE program (Finn & Bock, 1985). Each three-way analysis involved 7 multivariate tests of significance (3 main effects plus 4 interactions); under the null hypothesis these tests are statistically independent. If an overall

type I error rate of .05 is assumed, this is achieved by using an α-level of .0073 for each multivariate test.

A general-to-specific or "protected test" approach was taken in analyzing mean differences. First, when the MANOVA showed that overall differences among race, participation, and achievement groups were statistically significant, particular contrasts were tested in multivariate (Hotelling's T^2) form. For race/ethnic groups, comparisons were made between each of the minority populations and non-Hispanic Whites. For participation groups (Study I) orthogonal polynomial contrasts were used to determine if the association of achievement with participation was approximately linear, or nonlinear. For performance groups (Study II), unsuccessful students were compared with the average of passing and successful youngsters, and the mean for passing students was contrasted with that for successful students, respectively. Second, when a contrast was found to be significant for the multivariate set, the same difference was tested for each measure. In this way, the specific variables that distinguish particular groups are identified.

Effect sizes were also obtained for each contrast to indicate the magnitude of the difference. For each variable separately, these are the estimated differences between means divided by the pooled within-group standard deviation. For the multivariate set, a similar index is provided by Mahalanobis's D, the number of within-cell standard deviations on a line that separates the group mean vectors or "centroids" (see Harris, 1985, pp. 128, 168).

Other analysis considerations. Because of the sampling design employed by the NELS:88 survey, two additional elements were needed in the analysis. First, the sampling of students within schools introduced an "intraclass correlation" into the data. In brief, the deviations of individual students' scores from the mean of the entire sample are not all independent because students within a particular school are drawn from a relatively homogeneous population of individuals exposed to a common curriculum and a common set of school experiences. This problem was remedied in the present study by re-expressing all

students' scores on measured variables as deviations from the mean in their school, that is, schools were "held constant" before the data were analyzed.[3]

Second, the NELS:88 survey used a weighting procedure both to compensate for unequal probabilities of selection of students into the sample and to adjust for students who were selected but did not respond to the questionnaires and tests. The major factors considered in selecting schools were school type (public or private), geographic region, urbanicity, and percent minority. Different numbers of students were selected in each school, with 24 as the targeted *N*, depending primarily on the school size. In addition, particular subpopulations were oversampled (e.g., Asian and Hispanic students). Each student's data record is accompanied by a weight that is based on the inverse of the probability that he or she is selected into the sample. These values were used throughout the present analyses. Before each analysis was performed, the weights for the particular subsample were "normed" (multiplied by a constant) so that their sum was the appropriate within-school degrees of freedom ($N_{students} - N_{schools}$). As a result, the degrees of freedom are consistent with the computation of deviation scores described in the preceding paragraph.

A different approach to the sampling complexities was taken in the analysis of the cross-tabulations of achievement with other background and performance characteristics in Study II. The computer program SUDAAN (Research Triangle Institute, 1991) is written specifically to analyze data collected in a multistage weighted sampling design, using a "Taylor series" approach to computing appropriate standard errors (Lee, Forthofer, & Lorimor, 1989). The SUDAAN procedure CROSSTAB was used to obtain weighted row and column percentages and to estimate standard errors for a series of two-way contingency tables and to compute a chi-square test of independence for each pair of variables.

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[3]As an alternative, a hierarchical linear model (HLM) approach may have been taken. However, it was not necessary in the present investigation because all of the variables in the analysis were measured at the student level.

Study I: Participation and Achievement

The primary question of Study I is straightforward: Is there a relationship between students' degree of participation in school-related activities and his/her academic achievement? To address this question, several participation measures were combined into a single four-point scale and youngsters were classified by this and by gender and race. Mean performance scores were compared through multivariate analysis of variance. The analysis examines the interactions of gender and race with participation as well as the participation main effect, that is, it will reveal whether the relationship is the same for males as for females and for all four racial/ethnic groups. As a follow-up, the analysis for Study I was repeated with the SES composite score as a "covariate" to determine if any differences were found could be attributed to differences among the groups in socioeconomic status.

Altogether, the investigation included 12 direct measures of student participation. Since some of the separate measures may not be highly reliable and because they reflect diverse aspects of student participation, the scales were combined into a single four-point participation index in two stages. First, factors were created based on principal component analyses of three sets of measures that represent three aspects of student participation. One reflects absenteeism and tardiness and is a weighted composite (first principal component) of student and teacher measures ATTENDANCE and ABS-TARDY, respectively. The second is a weighted composite of indicators of school-related activities and discussions outside of the regular program (HOMEWORK; EXTCURR; READING; DIS-COUNSELOR; DIS-OTHER; DISCUSS). The third is a weighted composite of three out of the original four classroom behavior indicators PREPARATION, BEHAVIOR, and NOT-ENGAGED. The fourth variable (WITHDRAWN), the teachers' reports of whether the pupil is exceptionally passive or withdrawn, did not contribute to this factor or to either of the others, nor did it seem to correlate with any outcome measure.

Next, each factor was dichotomized with a score of 0 indicating the preferred behavior and a score of 1 indicating poorer behavior. The attendance factor was

dichotomized with 78% of the sample in the preferred group and 22% in the "poorer" group because the distribution of scores was clearly bimodal with a break at this percentile point. Each of the other factors was dichotomized with 1/3 of the sample in the "poorer" group and 2/3 in the "preferred" group.

The three dichotomies were summed so that the final index ranges from 0 (high on all participation factors) to 3 (low on all three factors). The index can be viewed as the *number of participation dimensions on which an individual is deficient*. While many different strategies might have been taken in creating a composite index, this approach yielded four categories that allow us to examine nonlinear as well as linear associations with achievement and to focus on the extreme groups, particularly those at the lower end. The 1/3-2/3 cutoffs yielded "low" groups that were generally the size of those examined in other studies of inattentive or disruptive youngsters, that is, about 20% of the sample.

The distribution of participation levels by student race and gender is shown in Table 1. Because of the unique classification scheme used in this study, these (unweighted) values are not viewed as estimating a "true" distribution of participation in the population, but only as providing further information about the four categories that resulted.

Overall, 23% of the youngsters out of the total sample of 15,737 eighth-graders were classified as nonparticipants (17.8% + 5.2%). A greater percentage of females than males in the sample was classified as "participants," that is 82.7% of females as compared with 71.0% of males were in the *high* or *mid-high* participation groups. Among racial/ethnic groups, Asian students in the sample had the highest proportion in the high group alone and the highest total proportion of participants (high + mid-high). Hispanic students had the lowest proportion of participants and the highest proportion of individual in both the

Table 1

Distribution of Participation Levels by Race and Gender

Characteristic	Participation Group[a]				Percentage in "Low" Category			
	High (*n*=6506)	Mid-High (*n*=5606)	Mid-Low (*n*=2802)	Low (*n*=823)	Factor I: Attendance	Factor II: Extra Partic.	Factor III: Behavior	Total Number in Sample
Gender								
Male	32.4	38.6	22.5	6.5	20.1	38.1	44.9	7,693
Female	49.9	32.8	13.3	4.0	22.3	28.0	21.2	8,044
Race/Ethnicity								
Asian/ Pacific Islander	51.7	35.9	9.7	2.7	9.7	33.7	19.9	905
Hispanic	31.4	34.9	25.2	8.4	30.4	39.3	40.9	2,029
Black	34.3	38.2	22.2	5.3	25.9	27.1	45.7	1,964
White, not Hispanic	43.6	35.3	16.3	4.8	19.6	32.8	30.0	10,839
Total sample	41.3	35.6	17.8	5.2	21.2[b]	33.0[b]	32.8[b]	15,737

[a] All values are percentages; rows sum to 100 percent.

[b] These percentages were fixed by the scaling procedure.

mid-low and low groups. While more Whites than Blacks in the sample were in the highest participation category, about equal proportions of Whites and Blacks were in the lowest classification.

Table 1 also gives the percentage of each group that was classified as low on each participation dimension. Although males and females differed very little in attendance, a higher percentage of males were in the low category on educational participation outside of school and a much higher percentage of males was characterized as having behavior problems.

These percentages, intended to give a clearer picture of the four participation groups formed from the sample, yielded some patterns that are worthy of further investigation in their own right. In particular, each racial/ethnic group appeared to have its own behavior profile. Asian students attended class and came on time regularly, were relatively well-behaved in school, but did not discuss school matters or engage in out-of-school activities to any greater degree than other groups. Hispanic and Black eighth-graders had poorer attendance records than non-Hispanic Whites, with Hispanics having the highest absenteeism/tardiness rates of all three groups. Hispanic students also had the lowest degree of participation outside the regular school program (39.3% "low") but were <u>not</u> the worst behaved in class. In contrast, Black students reported <u>more</u> out-of-school participation than Whites but had the greatest proportion who scored low in terms of classroom behavior (45.7%).

Table 2 gives additional information about the educational histories of students in the sample. In total, almost equal percentages of Asian and Hispanic students came from homes where English was not the primary language. In spite of this, Asian students had the highest participation rates and Hispanic students the lowest participation rates of the four racial/ethnic groups (Table 1). For all students combined, participation levels decreased monotonically as the proportion of non-English-speaking homes increased; this trend was

Table 2

Background Characteristics of Four Participation Groups

Characteristic	Participation Group				All
	High	Mid-High	Mid-Low	Low	
Percent language minority					
Asian/Pacific Islander	58.8	57.8	53.4	33.3[a]	57.2
Hispanic	56.0	62.1	62.3	63.2	60.3
Black	4.9	4.0	4.0	6.7[a]	4.7
White, not Hispanic	2.4	2.7	3.3	4.0	2.7
All	12.0	13.6	15.9	17.5	13.5
Percent in bilingual program	2.8	2.8	2.3	3.5	2.8
Percent who attended nursery or pre-school	57.1	50.0	44.8	39.2	51.7
Percent retained one or more grades	10.8	19.2	31.3	41.1	18.9
Mean number of school changes	1.15	1.35	1.56	1.76	1.32

[a] Cell *n* is less than 10.

Table 4

Subgroup Means of Achievement Measures

	Variable			
Group	Reading	Mathematics	Science	History
Gender				
Male	-.342	.359	.360	.381
Female	.612	-.022	-.130	-.109
Race/Ethnicity				
Asian/Pacific Islander	.473	2.279	.729	.877
Hispanic	-.405	-1.118	-.432	-.580
Black	-.914	-1.922	-.963	-.878
White, not Hispanic	.370	.589	.333	.360
Participation				
High	1.374	2.293	1.039	1.300
Mid-high	-.218	-.292	- .109	-.079
Mid-low	-1.392	-2.689	-1.079	-1.449
Low	-2.166	-4.215	- 1.832	-2.484

only seen clearly among Hispanics and to some extent among other White groups not of Hispanic origin (e.g., families from other European countries). A small percentage of youngsters in the sample was attending bilingual education classes (2.8%) but no clear relationship emerged between this and school participation.

Over half of the sample attended some form of nursery school or preschool. Participation levels decrease monotonically with decreased attendance in nursery or preschool. It is possible that these early experiences have increased youngsters' predispositions to remain engaged throughout their school years. The NELS:88 data and the present analysis, however, do not preclude other explanations. Among them, it is possible that parents who give the highest priorities to their children's education send them to school at the youngest age and also provide the resources and support at home that keep their youngsters involved and achieving. These hypotheses are certainly worthy of further investigation.

Overall, almost 19% of the youngsters in the sample had been retained one or more years prior to eighth grade, with retentions among the nonparticipants substantially higher than among participants. Likewise the number of times the youngsters changed schools was highest among the nonparticipants in the sample and lowest among the participants. Although no tests of significance of these trends were conducted, it is clear that the highest and lowest participant groups in the sample were quite distinct in terms of prior educational experiences, that is, nursery or preschool attendance, grade retentions and, to some extent, school mobility.

RESULTS

Table 3 summarizes the tests of significance for the three-way gender-x-race/ethnicity-x-participation design with four achievement tests as dependent variables. The results for gender and race/ethnicity provide a backdrop against which to view those for participation

Table 3

MANOVA Results for Achievement Measures

Effect[a]	Multivariate Test[b]	Univariate Tests			
		Reading	Mathematics	Science	History
Gender	$p<.0001$	$p<.0001$	$p<.0001$	$p<.0001$	$p<.0001$
Race	$p<.0001$	$p<.0001$	$p<.0001$	$p<.0001$	$p<.0001$
Gender x Race	$p<.0001$	$p<.05$		$p<.05$	
Participation	$p<.0001$	$p<.0001$	$p<.0001$	$p<.0001$	$p<.0001$
Gender x Participation				$p<.01$	$p<.01$
Race x Participation			$p<.001$	$p<.01$	
Gender x Race x Participation					

Note: Results indicated are those with p-values less than 05.

[a] The nonorthogonal design required tests of significance in several orders (Finn & Bock, 1985). The results presented here were obtained as follows: Gender and Race were tested eliminating both other main effects; every other effect was tested eliminating all terms listed above it in the table.

[b] Obtained from F-approximation from Wilks' likelihood ratio.

groups. The means for each gender and racial/ethnic group are given in Table 4 and mean differences in the form of "effect sizes" are shown in Table 5.

There are significant performance differences between males and females on the multivariate set of measures and for each measure individually. On the average, eighth-grade females perform better than eighth-grade males in reading by .21σ (see Table 5) and more poorly than males in mathematics, science, and the composite history/citizenship/geography. There are also significant racial/ethnic differences overall and the multivariate contrast of each minority group with non-Hispanic white students is significant as well. On average, Asian students score better than whites in mathematics but do not differ significantly in any of the other three areas. Both Hispanic and Black students score significantly below non-Hispanic whites on every achievement measure. In the sample, Black students had the lowest average scores of the three minority groups. The significance of all gender and race effects remained at the same level when SES was controlled statistically.[4]

The gender-x-race interaction evident in the multivariate test is accompanied by significant univariate *F*-statistics for Reading and Science only. Separate interaction contrasts (not included in the tables) indicate that the interaction for Reading is between gender and the Hispanic-White difference. On average, non-Hispanic White males and females have higher reading scores than Hispanic males and females, and females of both racial/ethnic groups have higher scores than males. The significant interaction is obtained because the mean for White females is substantially higher than the means of the other three groups; the latter are fairly homogeneous in comparison. This effect is reduced to nonsignificance when SES is added to the model as a covariate.

[4]Because the analysis-of-covariance results with SES as a covariate were almost identical to the analysis-of-variance results, no separate tables were constructed.

Table 5

Estimated Mean Difference Among Gender, Race/Ethnicity, and Participation Groups

		Univariate[b]			
Effect	Multivariate	Reading	Mathematics	Science	Histo
Gender (M-F)	.90***	-.21***	.30***	.42***	.37*
Race/Ethnicity					
Asian - White[c]	.51***	-.03	.37***	.12	.14
Hispanic - White[c]	.29***	-.20***	-.28***	-.24***	-.23*
Black - White[c]	.64***	-.52***	-.57***	-.57***	-.42*
Participation					
Linear Trend	.75***	-.60***	-.69***	-.58***	-.64
Quadratic Trend	.09**	.08***	.08***	.06**	.05
Cubic Trend	.03	.00-	.02	.00+	.02

Note: Significance indicated as follows: *p<.05; **p<.01; ***p<.001.

[a] Mahalanobis's D.

[b] Least-squares estimate of mean difference in the unequal-N analysis of variance model, divided by the pooled within-cell standard deviation of the particular variable. Standard deviations are given in the Appendix.

[c] Non-Hispanic White Students.

The interaction for Science is attributable to the Black-White contrast. Males of both races have higher average scores than females, and Whites of both sexes have higher average scores than Blacks. However, the gender difference for Black students is smaller than for Whites, with White males scoring substantially higher than all three other sex-race combinations. This effect remains significant at the .05 level when SES is controlled as a covariate.

Participation Group Differences

The four participation groups differed on the set of four achievement measures and on each scale separately. The achievement means (Table 4) decrease in all subject areas with reductions in class and school participation. Overall it is clear that the association of academic achievement with school engagement--as exhibited through attendance, classroom behavior and participation outside the regular program--is strong and consistent. These results (and the trend analysis described below) remained unchanged when SES was introduced as a covariate.

The trend analysis was conducted to determine if there was a simple (linear) or more complex relationship between achievement scores and the number of participation factors on which students scored "low;" the results are summarized in the bottom section of Table 5. Both the linear and quadratic trends are statistically significant for the multivariate set and for each achievement test. Least-squares "fitted means" (not given in the tables) were computed to give a more complete description of this effect, although the same pattern can be seen in the observed means of Table 4.

For each achievement test, the difference in performance between the high and mid-high participation groups is larger than the difference between the mid-high and mid-low groups; this in turn is larger than the difference between the mid-low and lowest participation group. In other words, larger increments in achievement are obtained at higher levels on the participation scale. Scoring high on 2 participation factors (compared with 1) is associated

with a larger achievement advantage than scoring high on 1 participation factor (compared with none). Scoring high on all 3 participation factors (as compared with 2) is associated with an achievement gain that is still larger. In negative terms, the mid-low and low participation groups--individuals whose engagement in class and school is minimal--are not as distinct as groups at the higher levels. Thus, while higher achievement is associated with increased participation at all points on the scale, it appears that the greatest achievement advantages are obtained by students who display most or all of the forms of participation assessed here, that is, attendance, positive classroom behavior, and school-related activities outside the regular program.

For the set of achievement measures as a whole, there is no interaction of race or gender with participation. That is, the association with participation with achievement is equally characteristic of males and females, and of Asian, Hispanic, Black, and non-Hispanic White students alike. Several univariate *F*-ratio's exceeded their critical values; these might simply be spurious findings given the large number of statistical tests that were conducted, but may also reflect small differences that are worthy of exploration in future studies. Two of these were for the interaction of gender with participation and two were for race and participation. The respective means were examined to see if further consistencies were apparent. Indeed, all four interactions showed the same pattern: decreasing differences among groups at the lower end of the participation scale. For example, the sex difference in science decreased from .29σ among the highest participation students to .21σ for the mid-high group to .14σ for the mid-low group to .13σ for the low participation group. Likewise racial differences in both mathematics and science were greatest at the upper end of the scale and smallest at lower degrees of participation. Again the data suggest that higher degrees of participation are associated with the greatest amount of differentiation in academic achievement.