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ABSTRACT

The two exploratory studies presented in this research report used multilevel data obtained in the 1983-84 National Assessment of Education Progress (NAEP) to investigate the relationship between minimum competency testing (MCT) programs and student reading proficiency. A "school effects" paradigm was used in Study 1 to assess the effect of a school-level MCT program after adjusting for students' age, sex, region of the country, family background, school-level composition, socioeconomic status, students' academic behaviors, school-level remedial program, and instructional dollars per pupil. Within-race/ethnic group analyses were conducted to investigate whether or not the effect of MCT programs on reading proficiency was similar for each race/ethnic group. The second study examined the relationship between the type of state testing program and reading proficiency for each grade cohort after adjusting for students' age, sex, district and school-level SES variables, family background, and race. These studies demonstrate the limits and potential of using NAEP data to inform public policy issues. Appendices include (1) a description of the NAEP proficiency levels; (2) the coding procedures and listing of types of MCT programs by state; (3) a description of the NAEP variable "size and type of community;" and (4) nine pages of tables containing supportive data. (Author/JAZ)

RR-87-15

RESEARCH REPORT

THE RELATIONSHIP BETWEEN MINIMUM COMPETENCY TESTING PROGRAMS AND STUDENTS' READING PROFICIENCY: IMPLICATIONS FROM THE 1983-84 NATIONAL ASSESSMENT OF EDUCATIONAL PROGRESS OF READING AND WRITING

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The Relationship Between Minimum Competency Testing Programs and Students' Reading Proficiency: Implications from the 1983-84 National Assessment of Educational Progress in Reading and Writing

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The Relationship Between Minimum Competency Testing Programs and Students' Reading Proficiency: Implications from the 1983-84 National Assessment of Educational Progress in Reading and Writing

Abstract

Exploratory studies presented in this report used multilevel data obtained in the 1983-84 National Assessment of Educational Progress to investigate the relationship between minimum competency testing (MCT) programs and student reading proficiency. A "school effects" paradigm was used in Study 1 to assess the effect of a school-level MCT program after adjusting for students' age, sex,region of the country, family background, school-level composition, and socioeconomic status, students' academic behaviors, school-level remedial program, and instructional dollars per pupil. Within-race/ethnic group analyses were conducted to investigate whether or not the effect of MCT programs on reading proficiency was similar for each race/ethnic group. The second study examined the relationship between the type of state testing program and reading proficiency for each grade cohort after adjusting for students' age, sex, district and school-level SES variables, family background, and race. These studies demonstrate the limits and potential of using NAEP data to inform public policy issues.

Executive Summary

Since the mid-seventies, over 35 states have required local school districts to give minimum competency tests to students in elementary, junior high, and senior high school. In 1984, forty states were actively involved in some aspect of minimum competency testing (MCT); nineteen states were using test performance as a basis for high school graduation, and five states were using tests as a basis for grade promotion. The legislation for MCT can be viewed within the larger context of the accountability movement in education which focuses concern upon the output of the educational system. MCT programs were designed to address accountability issues such as the basic skills level of high school graduates, and to identify and provide remediation to students at other grade levels who failed to acquire basic skills. Many of these programs were initiated from outside the educational establishment and originated from legislators and state boards. However, school districts and schools have been required to implement these programs in growing numbers.

Minimum comptency testing may be defined as a program to test students in terms of, and only in terms of, whatever competencies state or local authorities have decided are the minimally acceptable outcomes of an education. As a result, minimum competency is what minimum competency tests assess. There are few commonly agreed upon definitions of the exact nature of minimum competency testing programs. States differ dramatically on a number of dimensions, for example, economic climate, expenditures on education, and educational policies. As might be expected, they also differ in what they label and define as a minimum competency testing program. MCT programs vary substantively as well as procedurally. Substantive differences include the purpose, content, and grade levels assessed. Procedural differences include the agency that sets the performance standards, the determination of passing scores, and the degree of discretion allowed local school districts. Of relevance to the studies included here was the content dimension, and the degree of discretion allowed local school districts.

Content of MCT

There are wide discrepancies in skills tested in minimum competency testing programs. The majority of states assess reading and mathematics; however, there is little consensus regarding the assessment of survival or life skills. Assuming that the majority of

state mandated programs assess basic skills, the difficulty level of the content of MCT programs varies from state to state. Additionally, the various formulas used to derive passing scores limits the generalization and the evaluation of student outcomes across various types of programs. The differences between programs in each state make it virtually impossible to assess the impact of MCT on other than an intra-state basis.

Discretion Available to Local Districts

Moreover, differences between state MCT programs involve differing requirements, options, regulations, and guidelines to local school districts in implementing such programs. These differences result in varying degrees of discretion available to local school districts. For example, in some state programs, the purpose, the performance levels, the test, and the grade levels assessed, are determined at the state level; e.g. New Jersey. In other state programs, the actual test, the performance levels, grade levels assessed are left up to the local district. For example, in California, the state requires students to pass a test to graduate but allows the local districts to choose both the test and the passing score.

The level of implementation of a state MCT program in a particular school may vary as a function of the amount of local discretion allowed. Change can be successfully implemented at the individual school level given the appropriate conditions, procedures, and support systems. Some research suggests that the individual school is a unit of decision making with its own incentive structures. Thus, in tightly-controlled state MCT programs, principals and teachers who are actually responsible for students' learning may have a lower degree of ownership and less involvement in implementing state-mandated testing programs. In these particular schools, the effect of MCT programs on students' learning outcomes may differ from that found in schools functioning with more discretion; e.g., selecting the test, grade level, or whether or not to implement the state program. Schools that are successful in facilitating basic skills in reading have been characterized by such school-level factors as, principals' instructional leadership, monitoring of student and teacher progress, high teacher expectations for students' achievement, curriculum articulation and organization, and school-wide staff development. Thus, one important dimension of MCT programs considered in assessing student outcomes was the degree of discretion allowed to the local districts and schools.

Rationale

Among the many unresolved issues surrounding MCT are, for example, the effect on the curriculum, teachers and students' expectations, and the achievement of low-socioeconomic and minority students. Todate, information regarding achievement outcomes resulting from MCT programs derives primarily from intra-state assessment data. There is little or no information regarding the extent to which MCT programs implemented have led to improvement in student reading achievement and higher educational standards in the nation. Investigations of these issues require an objective measure of student reading achievement common to all states. Data collected in the 1983-84 National Assessment of Educational Progress (NAEP) were used to provide some insight on these issues.

NAEP is an on-going congressionally-mandated project established to report on the educational achievement of American students. Since 1969, when NAEP was established, national assessments were conducted annually up until 1980. From 1980 to the present, assessments have been conducted biennially. The 1983-84 survey assessed reading and writing. Reading proficiency as an objective was determined by consensus because of its relevance and importance, measurement procedures were designed to assess reading, and group performance data is available on those objectives. As noted by Messick (1985):

> In sum, as currently conceived and implemented, NAEP incorporates three key elements of a responsible standard-setting process -- namely, the choice of educational objectives, the description of current group performance ranges and trends, and the identification of educational contexts differentially related to performance. In addition, NAEP's reliance on comparative data and implicit comparative standards highlights the need for quality standards if issues of minimal requirements and excellence are to be resolved in American education. Educational progress, in an of itself, is a weak and insufficient standard (P. 11).

NAEP reading proficiency data provided an opportunity to explore the feasibility of conducting analyses of the relationship between minimum competency testing programs and student reading proficiency from a national perspective.

Theoretical Perspective

School systems are viewed as consisting of "nested layers" in which actions at the higher layers can help determine conditions in lower layers. The characteristics and conditions at the state, district, community, and, school, levels interact to influence school

level functioning which ultimately affects teaching and learning in the classroom. Moreover, it is generally the case that schooling achievement outcomes differ for various race/ethnic and socioeconomic groups. These differences are often attributed to family background or class differences. In studies that use a school production function model, statistical control of these factors are used to isolate properties of a school organization that facilitate students' learning and achievement. In this study, MCT programs were viewed as a potential "school effects" variable.

Within this framework, numerous other variables which potentially affect the relation between MCT programs and reading outcomes must be considered at both the school and student level. For example, at the school level, factors which might be included consist of regional variations in implementing reforms, grade-level differences, level of implementation, year of implementation, type of program, remedial programs, monetary resources for instruction, socioeconomic and racial composition of the school, and school retention and dropout rates. At the student level, race/ethnic group, age, family background, and time spent reading and on homework are potential factors influencing student reading proficiency.

Although, it was possible to control for several of these independent variables, it was difficult to construct a precise definition of the nature of a MCT program at either the state or school level. NAEP data were not collected to obtain detailed information on this particular issue. Thus, in addition to exploring potential relationships between MCT programs and student reading proficiency, a major question of interest was also in the feasibility and utility of NAEP data to investigate and extract such relationships.

Purpose

The studies reported here were exploratory in the use of a "school effects" framework and in the use of NAEP data. The purposes were: 1) to investigate the relationship between school-level MCT programs and student reading proficiency within White, Black, and Hispanic groups, and 2) to investigate the relationship between discretion allowed local districts in implementing MCT programs and student reading proficiency. The NAEP data provided a common measure of reading proficiency across a nationally representative sample of students at fourth, eighth, and eleventh grades, respectively.

Sample

The data for the present study were taken from the 1983-84 assessment of the National Assessment of Educational Progress (NAEP). Each NAEP assessment has involved a random cross-sectional survey of in-school 9 ,13, and 17-year olds. In the 1983-84 assessment, in addition to sampling by age, students of the corresponding modal grades 4, 8, and 11 were also sampled. Each age/grade cohort included approximately 30,000 students. The NAEP sample was based on a highly stratified, three-stage sampling design in which, first, counties; second schools; and third, students were sampled. In selecting schools, those in large cities with high concentrations of low socioeconomic status students and those in extremely rural areas were sampled at twice the rate of other schools.

In addition to the assessment of student-level data, NAEP collected school-level information concerning staffing patterns, curriculum, and student services from school administrators. The five-page questionnaire was completed by the principal or his/her representative. The survey response rates for schools were 81% for grade 4/age 9 cohort, 75% for grade 8/age 13 cohort, and 75% for grade 11/age 17 cohort.

Subsample

Schools included in all analyses were a non-random subsample of the original NAEP sample. Schools were included only if the principals or other personnel a) responded to the NAEP school questionnaire b)provided responses to the MCT questions that met certain consistency criteria, and c) indicated that the MCT program had been implemented prior to 1980. The school response rates for the MCT item were 49% for grade 4, 52% for grade 8, and 60% for grade 11. The percentage of the total NAEP student sample included in the analyses included 39.8% at Grade 4, 41.8% at Grade 8, and 55.2% at Grade 11.

Procedures

In the 1984 assessment, NAEP utilized a Balanced Incomplete Block (BIB) spiralling procedure, in which the total assessment battery was divided into blocks of approximately 15 minutes each. Each student was administered a booklet containing three blocks as well as a six- minute block of general background questions. The balanced incomplete block part of themethod assigned blocks to booklets such that each block appeared in the same number of booklets and each pair of blocks appeared in at least one booklet. In the 1984 assessment, 57 different booklets for each age level were used. The spiralling portion of the method then

cycles the booklets for administration so that no two students in any assessment session in a school received the same booklet. At each age group, each block is administered to approximately 2000 students and each pair of blocks to a smaller number depending upon the particular BIB design (NAEP, 1985).

Reading Proficiency

The measure of reading proficiency employed in this study used item response theory (IRT) technology to estimate reading proficiency levels. IRT defines a students' probability of answering an item correctly as a mathematical function of an underlying proficiency or skill. The main objective of the IRT analysis is to provide a common scale on which performance can be compared across groups and subgroups whether tested at the same time or a number of years apart (NAEP, 1985). The scale also allows NAEP to make comparisons across age levels. The scale ranges from 0 to 500 with a standard deviation of 50.

As the goal of NAEP is to estimate group means rather than individual proficiency, each respondent may answer only a few of the total number of assessment items. Indicators of proficiency are computed as random draws from the expected distribution of proficiency of each respondent given the observed data, in this instance responses to NAEP reading exercies and background variables. The distribution of such draws, one taken for each respondent and weighted in inverse proportion to the respondent's probability of appearing in the sample, estimates the distribution of proficiency in the population as a whole or in a given subpopulation. However, the resulting values do not represent precise estimates of proficiency for individual respondents. Five draws are provided for each student who were administered at least one block with reading items.

Study 1 - The relationship between school-level MCT and student reading proficiency

Method

In study 1, analysis of covariance within a multiple regression framework was conducted for each race/ethnic group (White, Black, and Hispanic) with each of the three grade cohorts assessed (grades 4, 8 ,and 11). There were nine parallel regression equations, each incorporating the same predictor variables. Individuals' student reading proficiency was used as the dependent measure. Covariates at the student-level were age, sex, family background (a composite of parental education and possessions in the home) and students'

academic behaviors (a composite of amount of homework and number of pages read). Covariates included at the school-level were region of the country, SES, and racial composition. The effect of minimum competency testing program was included as a school-level variable identified from principals' responses to the NAEP school questionnaire and was dummy coded to reflect the presence or absence of this program. School-level remedial program, and instructional dollars per pupil were included as two potential school-level explanatory variables.

Results

At grade 4, after controlling for student -level variables (sex, student's age, students' and parents' academic values) and school-level variables region, SES, racial composition, remedial program, and instructional dollars per pupil) there were no significant effects attributed to the school-level MCT variable for any of the race/ethnic groups.

At grade 8, after controlling for the same student level variables, region, school-level SES, and racial composition there was a positive effect attributed to the school-level MCT variable for White and Black students, but not Hispanic students. This effect represented aboout an 8 (.29 s.d.) point advantage for Whites and a 10 (.38 s.d.) point advantage for Blacks in mean reading proficiency as compared to their respective counterparts in schools indicating they had no MCT programs. The effect size (Glass, 1977) calculated as the difference between treatment and comparison adjusted means divided by the standard deviation of the comparison group is shown in parentheses. Effect sizes of .3 or greater are considered important (Cohen, 1977). The inclusion of a school-level remedial program and instructional dollars explained part but not all of the MCT effect. Inclusion of these variables reduced the effect for White students by about 29% and for Black students by about 31%.

At grade 11, after controlling for the same variables, there were significant positive effects for all race/ethnic groups. This effect represented a 2 (.06 s.d.) point advantage in reading proficiency for White students attending schools with MCT programs, a 7 (.26 s.d.) point advantage for Blacks, and a 6 (.19 s.d.) point advantage for Hispanics as compared to their respective counterparts in schools without MCT programs. Inclusion of a school-level remedial program and instructional dollars per pupil statistically explained the effect for White students, explained a negligble portion of the effect for Hispanic students, and caused the effect for Black students to become larger.

Study 2 - The relationship between type of state MCT program and student reading proficiency.

Method

In study 2, school-level MCT responses were identified by state of origin for the purposes of classifying the type of state MCT mandate that existed at the school when NAEP was administered. The system categorized school responses at grades 4 and 8 according to: 1) whether they were in a state controlled MCT program 2) a state MCT program that allowed local option(s) or 3) there was no state or local mandate for MCT, but a state assessment program. At grade 11, school responses were categorized according to 1) whether they were in a state program that included MCT as a graduation requirement, 2) a state that allowed the MCT as a graduation requirement as a local option and 3) a state with no MCT graduation requirements. School responses (Yes-MCT vs No-MCT) were combined with the three categories of state programs which resulted in 6 potential cells in the design. For example, in cell 1 were schools that had implemented a local MCT program and were in states where there was a state-controlled MCT program. In cell 2 were schools that had implemented a local MCT program and were in states where there were local options available regarding MCT programs. In cell 3 were schools that had implemented a local MCT program and were in states where there was a state assessment program. In cell 4 were schools which reported no local MCT program but were in states where there was a state-controlled mandated program. The number of responses in this category were minimal and were excluded from the analyses. In cell 5 were schools with no local MCT programs and in states which allowed local options. Schools in cell 6 served as the reference category. These were schools that had not implemented a local MCT program nor was there one required by the state.

In this study, analysis of covariance within a multiple regression framework was conducted for each grade cohort. Individual student reading proficiency was used as the dependent measure. The covariates included at the individual student level were family background, and students' race. Covariates at the district level included the Orshansky percentile and at the school level, the percentage of students on free lunch.

Results

At grade 4, after controlling for students' age, sex, parental academic values, race and district and school-level SES, the average reading proficiency of students in schools in which there was a state controlled MCT program was lower than students in schools in the reference group; i.e., where there was no MCT program at the school or state level.

At grade 8, after adjusting for the same set of variables, the average reading proficiency of students in schools in state- controlled MCT program was 9 (.31) points higher than students in schools in the reference group. In schools in which there was a local MCT program and where the state program included options, the difference in mean reading proficiency was 8 (.28 s.d.) points.

At grade 11, after adjusting for the same set of variables, there was a 7 (.22 s.d.) point advantage in the average reading proficiency of students in schools where MCT is a mandatory graduation requirement compared to students in schools in the reference group. There was a 6 (.18 s.d.) point difference in reading proficiency between students in schools where MCT as a graduation requirement was a local option compared to students in the reference group.

Discussion

A major purpose of study 1 was to investigate the relationship between school-level MCT programs and student reading proficiency within race/ethnic groups. Students included in the subsample were a random sample, however schools included were based on self-report. Descriptive data examined for school and student-level variables by school questionnaire response suggest that the subsample of schools did not differ substantially from schools which did not respond. However, one must be cautious in generalizing results obtained to schools in the entire nation.

Moreover, both studies were exploratory in using data from NAEP to investigate and extract potential relationships between MCT programs and student reading outcomes. Students' reading proficiency were estimates derived from IRT techniques. Because these values are conditioned on certain variables; e.g., parental education, race, region, age, and not others, e.g, school-level variables, the effects of nonconditioned variables are underestimated by about 15 to 20% when such variables are included in a regression analysis. Although the substance of any conclusions derived from this study would be

essentially unchanged if all biases were removed, any effect due to a nonconditioned variable such as, school-level MCT program, is likely to be extremely conservative when using NAEP data. Conversely, effects of conditioned variables; e.g, parents' education, race, are likely to be overestimated.

In study 1, the effect of a school-level MCT program on student reading proficiency differed by grade and race/ethnic group. At fourth grade, after controlling for sex, age, region of the country, school context and SES and family background, and student academic behaviors, no significant effect due to MCT was isolated. At eighth grade, a positive effect was found for White and Black students, but not Hispanics. A portion of the effect for White and Black students was explained by the inclusion of a specific school-level remedial program, and instructional dollars per pupil. At eleventh grade, positive effects were found for all race/ethnic groups. The effect for White students was statistically explained by school remedial program and per pupil instructional dollars. These same variables, however, acted as suppressor variables in the regression equation for Black students and explained little of the effect found for Hispanic students. This pattern suggests that certain variables may operate differently in different contexts.

The failure to find an effect at fourth grade for any of the race/ethnic groups might suggest that there may be little or no advantage in implementing MCT programs at this grade level. In general, in elementary schools, there is an emphasis on instruction in basic skills, particularly reading, and perhaps the addition of a MCT program is superfluous. However, one possible explanation for no effect might be due to the unreliability of self-report data obtained at the fourth grade level. Additionally, schools included in this sample had the lowest response rate to the MCT questionnaire item. Since only one time point is being examined, the direction of causality between the variables cannot be established. Schools with MCT programs had students with lower reading proficiency, and perhaps this situation resulted in schools implementing a local MCT program. Additionally, there are many other important variables; e.g., academic engaged time, and content covered which are critical in explaining students' reading proficiency and which were not included in these analyses. The results, however, suggest that additional studies should be conducted of the effects of school-level MCT programs on students' reading proficiency at the elementary level.

The positive effects found at eighth grade suggest that those schools with MCT may be

considered effective in facilitating students' reading proficiency. This effect may be due to the implementation of a MCT program. Alternatively, there may be other factors associated with the program but not measured, or other unmeasured school characteristics which contribute to this effect. Information was not available on school retention or dropout rates. An alternative explanation may be that schools who have institutionalized a MCT program have higher dropout and/or retention rates. The failure to find a MCT effect on the reading proficiency of Hispanic eighth graders suggests that the variables included in the analysis may be insufficient in explaining proficiency of Hispanic students at this grade level. There are other variables which might influence proficiency for these students; for example, language dominance, language spoken in the home and in peer groups, and years of residence in the U.S. These results suggest the need to investigate effects of school-level MCT for Hispanic students at this grade level.

At eleventh grade, the MCT effect on White students' reading proficiency could be explained by a school level remedial program and instructional dollars per pupil. For Blacks and Hispanics, this was not the case. Remedial program and instructional dollars were suppressor variables in the regression equation for Blacks. Other research suggests that remedial programs for MCT may be less effective in facilitating reading achievement of Black students than for White students. However, remedial program in this study was a school-level rather than a student-level variable, and therefore cannot adequately address this issue. The results are merely suggestive that remedial programs in schools with MCT may have different effects on different groups. Instructional dollars per pupil was the amount spent on instructional materials only, and may not relate to total per pupil school expenditure.

The positive effects isolated at eleventh grade may be due to the inclusion of a school-level MCT program. Alternatively, the effect may be due to other unmeasured characteristics of these particular schools. As suggested in the discusison of eighth grade results, information on school dropout or retention rates was not available in NAEP. There is the increased possibility that those students who are doing poorly or have failed a MCT are no longer in the school at eleventh grade. In general, Black and Hispanic dropout rates are higher than those of White students. The dropout rates, and possibly average reading proficiency might be higher in schools that have institutionalized MCT programs.

Study 2

The objective of study 2 was to investigate the relationship between the type of state program and reading proficiency. The recoding of the initial school responses provided additional information on policies of state mandated programs regarding discretion allowed to local school districts. Schools were categorized according to whether state programs were completely controlled at the state level, there were some options available, or there was a state testing program only. Different effects were found by grade level and type of state mandate. At fourth grade, students in schools with state controlled MCT programs had slightly lower reading proficiency compared to students in schools in which there was no state or local MCT program. At eighth and eleventh grades, there were positive effects due to a state-controlled MCT program; however, there were similar positive effects due to state MCT programs in which local options were allowed. This pattern suggests that at the upper grade levels, the two types of state programs have about the same effect on students' reading proficiency.

The discrepancy between fourth grade, and eighth and eleventh grade results may be due to differential influences of the various types of state programs on the school reading curriculum. One study indicated that in districts that use test-management strategies similar to MCT, the mode of teaching changes from performance-oriented activities; e.g., reading books, discussing ideas, to test-oriented activities; e.g., fill-in the blank worksheets, memorization of facts and drill or rote skills. These strategies may be detrimental to elementary students' reading proficiency since they are still learning how to read at this level. Moreover, those elementary schools characterized as successful in facilitating basic skills exercise a considerable amount of discretion in solving, problems locally, e.g., school-wide staff development, and frequent and careful monitoring of students' progress. It may be the case that externally-mandated programs operate against this type of local discretion and negatively influences student reading proficiency outcomes.

In eighth grade, students attending schools with local MCT programs and in which the state maintained controlled had higher reading proficiency compared to students in the reference group. Similarly, students in schools with a local MCT program and where there were local options had higher reading proficiency compared to students in the reference group. At the eighth grade level, the implementation of a school or state-level program that

emphasizes the attainment of basic skills may provide the opportunity to learn skills that students failed to acquire at the elementary level. In general, during the middle and junior high grades, schools are generally departmentalized and organized around various subject matter areas. It may be that the MCT programs at this level orients the schools and teachers to continuing basic skill development for particular groups of students. The finding that regardless of the type of state MCT program (state controlled vs local option), students at this grade had higher reading proficiency outcomes compared to the reference group might support this notion.

In eleventh grade, students attending schools with a local MCT program and in which successful completion of the program was a state graduation requirement had higher reading proficiency compared to students in the reference group. Students in schools with a local MCT program and in which MCT as a state graduation requirement was optional also had higher reading proficiency compared to students in the reference group. Again, one possible explanation may be that schools and teachers are including additional opportunities for continued skill development for students who previously failed to acquire such skills. At this particular grade level; however, the sample may be more selective than at the other grades due to dropout rates.

In general, the results of study 2 suggest that it may be possible to isolate differential effects of state policies regarding minimum competency testing programs on student reading proficiency at various grade levels.

Summary and Conclusions

In conclusion, the results of the two exploratory studies conducted using NAEP data suggest it is possible to isolate a relationship between MCT programs and student reading proficiency as an outcome. Based on analyses presented in these studies, this relationship appears to differ depending on the grade level, race/ethnic group, and type of state program assessed. At the elementary level, school-level MCT programs did not appear to be related to students' reading proficiency as an outcome. In addition, at this grade level, there was a small negative relationship between reading proficiency and MCT programs administered and controlled at the state level.

At eighth grade, positive effects of school-level MCT programs were isolated for White and Black students, but not Hispanic students. The effects of state-controlled MCT programs

and state MCT programs which allowed local options appeared to be equally effective at producing higher student reading proficiency. Similarly, at eleventh grade, positive effects of school-level MCT were isolated for each race/ethnic group. Students in schools in states requiring MCT as a graduation requirement, or in states allowing this as an option were found to have higher reading proficiency compared to students in states where there was no state or local MCT required at high school.

The remaining discussion will present some of the conceptual and methodological limitations of the studies presented here. First, the definition of a MCT program was initially limited to a schools' response on the NAEP questionnaire regarding whether or not they had a MCT program, and the year the program was implemented. There was little information available on the exact nature of the local school program. It would seem important to know the purpose, additional personnel or curriculum used, whether the MCT was commercially prepared or locally prepared, the content, and performance standards, and the proportion of students in the schools failing to meet requirements, retention and dropout rates. Future NAEP questionnaires might include 2-3 additional items which would characterize in more detail the nature of a particular school-level MCT program.

Second, school-level MCT is a proxy variable for other important school characteristics. Although additional descriptive information on the nature of the program might be obtained in a large-scale survey, the "process" variables and interactions within schools which might accompany the implementation of a MCT and influence students' reading proficiency; e.g., teachers' expectations, opportunity to learn, might not be adequately derived from such measures. Additional qualitative studies of schools implementing MCT programs would be useful in this area.

Third, this study was conducted from data collected at one point in time, and as such presents the status of students' reading proficiency in schools at that time period. In order to assess change in students' reading proficiency due to MCT, one must necessarily have data over two or more time periods, and preferably for cohorts of students. Ideally, one would want to look at the same schools, or same students over two or more time periods to investigate a potential school effect due to the implementation of a MCT program. This type of information is not within the design or scope of NAEP, and other longitudinal data bases might be explored.

Fourth, school organizations are viewed as consisting of "nested layers". In any explanation of student outcomes, it is necessary to consider teachers and classroom practices as well as school-level variables. Classroom or teacher variables were not directly examined in this study. Moreover, individual student-level data concerning participation in MCT and remedial programs would be preferable to using school-level aggregates of such variables. In conducting multi-level analyses of school data, we know that many of the assumptions based on aggregate data do not reflect reality; e.g., pupils actually receive differential exposure to school resources and facilities. This may be especially true of MCT programs in general, and remedial programs, more specifically. Individual participation might include measures of additional engaged time or content covered in such programs. It is only with such data that the question of effectiveness of MCT for various groups of students can be adequately assessed.

Fifth, additional variables potentially related to Hispanic reading proficiency in schools with MCT at eighth grade need to be explored. These variables might include such student-level characteristics; e.g., languge dominance, years of residence in the U.S., participation in remedial reading or other special programs for language minority students.

Sixth, results from these studies should be replicated using other available national data bases. The unique psychometric techniques employed by NAEP in deriving individual reading proficiency estimates; i.e., conditioning on background variables, provide accurate population and subpopulation estimates of reading proficiency. However, when both conditioning and nonconditioned variables are included in a regresion analysis, the effects due to nonconditioned variables are underestimated, in this case, by about 15 to 20%. Thus, results presented in these studies provide extremely conservative estimates of the school- and state policy level MCT effect.

Finally, the categorization system used in study 2 might be refined to obtain a more precise operational definition of discretion available to local school districts. It may be that the number of available options is important or that different options; e.g., the schools' ability to select a test aligned with the curriculum, might be more relevant to reading proficiency outcomes. Other classifications of state policies regarding MCT, for example whether or not a MCT program is used for local remediation funding or for grade-to-grade

promotion might also differentially influence students' reading proficiency.

The diversity of local and state policies related to MCT make it extremely difficult to characterize precisely the nature and outcomes of this educational reform in the nation. Although NAEP data were not designed to specifically address the particular issues explored in these studies, the analyses and results demonstrate both the limits and potential of using NAEP data to inform national policy issues. Additional studies using NAEP and other national data bases are needed to further explore and refine relations investigated in this study. Moreover, these studies will provide information necessary to determine whether educational reforms, such as MCT are actually improving students' reading proficiency and educational standards in the nation, rather than merely improving students' scores on minimum competency tests and also contributing to national dropout statistics.

SECTION I

INTRODUCTION

Overview of the Problem

Since the mid-seventies, over thirty-five states have required local school districts to give minimum competency tests to students in elementary, junior high, or senior high school (Pipho, 1983). In 1984, forty states were actively involved in some aspect of minimum competency testing (MCT); nineteen states were using test performance as a basis for high school graduation, and five states were using tests as a basis for grade promotion (Anderson & Pipho, 1984). The legislation for MCT can be viewed within the larger context of the accountability movement in education which focuses concern upon the output of the educational system (Wise, 1977).

Wise (1977) suggests that there are two different problems which MCT is designed to solve. The first addresses the declining value of a high school diploma. Some students who graduate from high school lack basic skills in reading, writing, and mathematics. MCT is designed to ensure that high school graduates have the basic skills necessary to pass a state or local examination. The second problem hoped to be addressed by implementing MCT is to influence educational practice by improving the acquisition and teaching of basic skills of students who fail to acquire these skills, and for those teachers who fail to teach the basic skills (Wise, 1977).

The purpose of what MCT hopes to accomplish is clear. However, the underlying assumptions concerning how that aim is to be achieved do not consider the process of education. The focus of MCT is on the clarification of the goals of schooling; i.e., basic skills of reading and math, and assessing performance of these goals with tests. Wise (1977)

states: "Thus, educational policy is designed to alter the practice of education without an understanding of how education actually occurs" (P.22). The assumption underlying MCT appears to be that legislating goal attainment is sufficient for such attainment to occur (Wise, 1977). Districts, schools, and classrooms across the nation have been required to respond to this policy.

What is Minimum Competency Testing

Minimum comptency testing may be defined as a program to test students in terms of, and only in terms of, whatever competencies state or local authorities have decided are the minimally acceptable outcomes of an education (Lazarus,1981). As a result, minimum competency is what minimum competency tests assess. There are few commonly agreed upon definitions of the exact nature of minimum competency testing programs. States differ dramatically with respect to economic climate, educational expenditures, and policies. Among the many policy differences is what is labeled and characterized as a MCT program. MCT programs vary substantively as well as procedurally. Substantive differences include the purpose, content, and grade levels assessed. Procedural differences include the agency that sets the performance standards, the determination of passing scores, and the degree of discretion allowed local school districts. There are numerous published listings that summarize state MCT across these various dimensions (Pipho, 1981, 1983; Plisko & Stern, 1985) and reports which examine MCT programs in depth (Goertz, 1985; Gorth & Perkins, 1979; Pipho, 1979, 1980). A comprehensive review of all of the substantive and procedural dimensions will not be provided here. (See Jaeger & Tittle,1980 for a discussion of various dimensions, models and consequences of MCT). However, a brief review of the content of MCT programs, and the discretion allowed to local school districts is provided.

Content of MCT

There are wide discrepancies in skills tested in minimum competency testing programs (Lazarus, 1981). The majority of states assess reading and mathematics (Pipho, 1978, 1984). However, there is little consensus regarding the assessment of "life skills" (Lazarus, 1981). These skills might include those that would enable individuals to cope with practical problems in everyday life; e.g., health and nutrition or consumer rights. Alternatively, "life skills" might include school-related tasks such as applying skills learned in math to calculate a sales tax or balance a checkbook. Chall (1983) indicated that the commercial publishers of MCT prefer to include real life content, whereas the states are divided, half preferring basic skills and half preferring life skills.

Even if we were to assume that the majority of state mandated programs focus on basic skills, the difficulty level of the content of MCT programs varies from state to state. One analysis found considerable differences in competency level (defined by mean passage difficulty) among 8 minimum competency tests in reading administered to 11th graders (Chall, 1983). The various permutations and manipulations used to derive passing scores only exacerbates the problems of comparing outcomes which results from state MCT programs. The differences between programs in each state make it virtually impossible to assess the impact of MCT on other than a intra-state basis.

Discretion Available to Local Districts

Moreover, differences between state MCT programs involve differing requirements, options, regulations, and guidelines to local school districts in implementing such programs. These differences result in varying degrees of discretion available to local school districts.

As noted in the introduction, minimum competency testing was not initiated by educators, but largely by those outside of the educational system. As a result, there was little concern for the active participation or ownership on the part of school personnel. Boyer (1985) notes that as more authority shifts away from the local school, we may be shaping a bureaucratic education model that leaves teachers and principals more accountable, but less empowered. Among the various state programs, there is variation in the degree of discretion available to local districts in implementing and administering MCT programs. For example, in some state programs, the purpose, the performance levels, the test, and the grade levels assessed, are determined at the state level; e.g. New Jersey. In other state programs, the actual test, the performance levels, grade levels assessed are left up to the local district. For example, in California, the state requires students to pass a test to graduate but allows the local districts to choose both the test and the passing score.

The level of implementation of a state MCT program in a particular school may vary as a function of the amount of local discretion allowed. Change can be successfully implemented at the individual school building level given the appropriate conditions, procedures, and support systems (Fullan, 1985; Goodlad,1984). The school may also be viewed as a unit of decision making with its own incentive structures (Darling-Hammond & Wise, 1985). Thus, in tightly-controlled state MCT programs, principals and teachers who are actually responsible for students' learning may have a lower degree of ownership and less involvement in implementing state-mandated testing programs. In these particular schools, the effect of MCT programs on students' learning outcomes may differ from that found in schools functioning with more discretion; e.g., selecting the test, grade level, or whether or not to implement the state program. Schools that are successful in facilitating

basic skills in reading have been characterized by such school-level factors as, principals' instructional leadership, monitoring of student and teacher progress, high teacher expectations for students' achievement, curriculum articulation and organization, and school-wide staff development (MacKenzie, 1983; Purkey & Smith, 1983; 1985; Venezky & Winfield, 1979).

Darling-Hammond & Wise (1985), in a discussion of state policies suggest that policies should be "reticent " in nature since they rely on technical and political implementation through many layers of bureaucracy. They state: "Where technologies are uncertain and means-end connections are tenuous, the use of an axe to perform heart surgery may kill the patient" (P.333). Thus, one important dimension of MCT programs to be considered in assessing student outcomes may be the degree of discretion allowed local districts and schools.

Rationale

Among the many unresolved issues surrounding MCT are, for example, the effect on the curriculum, teachers and students' expectations, and the achievement of low SES and minority students. Todate, information regarding outcomes of MCT derive primarily from intra-state assessment data. There is little or no information regarding the extent to which MCT programs have led to improvement in student reading achievement and higher educational standards in the nation. Investigations of these issues require an objective measure of achievement common to all states. Data collected in the 1983-84 National Assessment of Educational Progress (NAEP) may provide some insight on these issues.

NAEP is an on-going congressionally-mandated project established to report on the educational achievement of American students. Since 1969, when NAEP was established, national assessments were conducted annually up until 1980. From 1980 to the present,

assessments have been conducted biennially. The 1983-84 survey assessed reading and writing. Reading proficiency as an objective was determined by consensus because of its relevance and importance, measurement procedures were designed to assess reading, and group performance data is available on those objectives. As noted by Messick (1985):

> In sum, as currently conceived and implemented, NAEP incorporates three key elements of a responsible standard-setting process -- namely, the choice of educational objectives, the description of current group performance ranges and trends, and the identification of educational contexts differentially related to performance. In addition, NAEP's reliance on comparative data and implicit comparative standards highlights the need for quality standards if issues of minimal requirements and excellence are to be resolved in American education. Educational progress, in and of itself, is a weak and insufficient standard (P. 11).

(See Messick, 1985 for a discussion of the role of NAEP results in clarifying and assessing educational standards and engaging the public with these issues). Although NAEP data were not specifically collected to investigate the issue of MCT programs and student outcomes, the 1983-84 NAEP provide an opportunity to explore potential relationships from a national perspective.

Theoretical Perspective

In this study school systems are viewed as consisting of "nested layers" in which actions at the higher layers can help determine conditions in lower layers (Purkey & Smith, 1983). The characteristics and conditions at the state, district, community, and school levels interact to influence school level functioning which ultimately affects teaching and learning in the classroom. Moreover, it is generally the case that school achievement outcomes differ for various race/ethnic and socioeconomic groups. These differences are often attributed to family background or socioeconomic status. In studies which use a school production function model, statistical control of these factors are necessary to isolate properties of a school

organization that facilitate students' learning and achievement.

In this study, MCT programs were viewed as a potential school effects variable. Within this framework, there are numerous other variables that potentially affect the relation between MCT programs and student reading outcomes. For example, school factors which might be considered important include regional variation, level and year of implementation, resource allocation, remedial programs, racial and socioeconomic composition, retention, and dropout rates. At the student-level, factors, such as race/ethnic group, family background, time spent reading and on homework, and grade level also potentially influence reading achievement outcomes. Although it is possible to control for several of these independent variables in analyses, it is difficult to construct a precise definition of the nature of a MCT program at the school or state level from the available data. In conducting secondary analyses, questions are posed and available data explored in a post hoc fashion. NAEP data were not collected specifically for this purpose. In addition to exploring potential realationships between MCT programs and student reading outcomes, another objective was to explore the feasibility and utility of NAEP data to inform national policy issues.

Purpose

The studies reported here were exploratory in the use of a "school effects" paradigm, and the use of NAEP data to: 1) to investigate the relationship between school-level MCT programs and White, Black, and Hispanic student reading proficiency as assessed by NAEP, and 2) to investigate the relationship between discretion allowed local districts in implementing state MCT programs and student reading proficiency. The NAEP data provide a common measure of reading proficiency across a nationally representative sample of students at fourth, eighth, and eleventh grades, respectively.

SECTION II

DESCRIPTION OF SAMPLE, PROCEDURES, AND VARIABLES

Sample

The data for the present study are from the 1983-84 assessment of the National Assessment of Educational Progress (NAEP). Each NAEP assessment has involved a random cross-sectional survey of in-school 9 ,13, and 17-year olds. In the 1983-84 assessment, in addition to sampling by age, grades 4, 8 and 11 were also sampled. Each age/grade cohort included approximately 30,000 students. The NAEP sample was based on a highly stratified, three-stage sampling design in which, first, counties; second schools; and third, students were sampled. In selecting schools, those in large cities with high concentrations of low socioeconomic status students and those in extremely rural areas were sampled at twice the rate of other schools. Less than 5% of the students sampled were excluded because of limited-English proficiency or a severe handicap.

In addition to the assessment of student-level data, NAEP collected school-level information concerning staffing patterns, curriculum, and student services from school administrators. The five-page questionnaire was completed by the principal or his/her representative. The overall survey response rates were 81% for grade 4, 75% for grade 8, and 75% for grade 11.

Subsample

Schools included in this study are a non-random subsample of the original NAEP sample. Schools were included only if the principals or other personnel: a) responded to the school questionnaire, and b) provided responses to the minimum competency questions that met certain consistency criteria.[1] The school response rates for the item requesting information

on minimum competency testing were lower than overall survey response rates and were 49% for grade 4, 52% for grade 8, and 60% for grade 11. The unweighted and adjusted weighted frequencies of schools and students in the subsample are shown in Table 1.[2]

Procedures

In the 1984 assessment, NAEP utilized a Balanced Incomplete Block (BIB) spiralling procedure, in which the total assessment battery was divided into blocks of approximately 15 minutes each. Each student was administered a booklet containing three blocks as well as a six- minute block of general background questions. The balanced incomplete block part of the method assigned blocks to booklets such that each block appeared in the same number of booklets and each pair of blocks appeared in at least one booklet. In the 1984 assessment, 57 different booklets for each age level were used. The spiralling portion of the method then cycles the booklets for administration so that no two students in any assessment session in a school received the same booklet. At each age group, each block is administered to approximately 2000 students and each pair of blocks to a smaller number depending upon the particular BIB design (NAEP, 1985).

Student Level Variables

Reading Proficiency. The measure of reading proficiency employed in this study uses item response theory (IRT) technology to estimate reading proficiency levels. IRT defines a students' probability of answering an item correctly as a mathematical function of an underlying proficiency or skill. The main objective of the IRT analysis is to provide a common scale on which performance can be compared across groups and subgroups whether tested at the same time or a number of years apart (NAEP, 1985). The scale also allows NAEP to make comparisons across age levels.

As the goal of NAEP is to estimate group means rather than individual proficiency, each respondent may answer only a few of the total number of assessment items. Indicators of proficiency are computed as random draws from the expected distribution of proficiency of each respondent given the observed data, in this instance responses to NAEP reading exercies and background variables (see Mislevy, 1985, for the statistical foundations of this approach). The distribution of such draws, one taken for each respondent and weighted in inverse proportion to the respondent's probability of appearing in the sample, estimates the distribution of proficiency in the population as a whole or in a given subpopulation. However, the resulting values do not represent precise estimates of proficiency for individual respondents. Five draws are provided for each student who were administered at least one block with reading items (approximately 85% of each cohort).

The NAEP reading proficiency scale ranges from 0 to 500. Five levels of reading proficiency were identified on the proficiency scale: rudimentary, (150) basic (200), intermediate (250), adept (300) and advanced (350). These levels were defined by the kinds of reading tasks that most readers at each level would be able to do and are based on the complexity of the passage, the familiarity with the subject matter, and the kinds of questions asked (NAEP,1985). [3] A brief description of each level can be seen in Appendix A.

Family Background. A composite veriable was formed which included responses to items on parental education, reading materials in the home, and the extent of family reading. Parental education was assessed on a four-point scale: did not finish high school, graduated from high school; went on to another school after high school and graduated from college. In cases where answers for both parents were available, the highest level of the two parents was used. Cases where answers for both parents had been omitted were maintained separately

since a substantial number of the younger respondents did not respond to either question. Items measuring reading in the home consisted of an affirmative response regarding the presence of a dictionary, an encyclopedia, more than 25 books and whether or not the family receives newspaper and magazines regularly. Items measuring extent of family reading consisted of the frequency of family members reading the newspapers, magazines, and books. The response scale included five categories ranging from "almost every day" to "never or hardly ever". The composite variable was calculated as the sum of two or more affirmative responses to any of the items included in the set of family background items. The composite ranged from a low value of 1 to a high value of 9. Alpha reliability coefficients for this composite were .47 for grade 4, .50 for grade 8, and .59 for grade 11.

Students' Academic Behaviors. A composite variable was formed which consisted of items requesting the number of pages read for school and the amount of homework. The item on number of pages read: About how many pages a day, do you have to read in school and for homework? The response categories were "5 or fewer", "6-10", "11-15" "16-20" or "more than 20". The homework item read: "How much time did you spend on homework yesterday? The response categories "no homework was assigned" and "had homework but didn't do it" were combined. The remaining three categories were maintained separately: "less than 1 hour", "1-2" hours", and "more than 2 hours". The composite variable ranged in value from a low value of 1 to a high value of 8. Alpha reliability coefficients for this composite were .10 for grade 4, .25 for grade 8, and .46 for grade 11.

School Level Variables

School-level variables included from the NAEP school characteristics questionnaire were categorized as policy, demographic, school composition, and socioeconomic variables.

School Policy. School-policy variables consisted of whether or not a MCT program existed at the school, and if so whether a specific remedial program existed for students failing the test in reading.

Minimum Competency Testing Program. There were four questions on the NAEP "school characteristics and policy questionnaire" related to MCT. Two of the items which requested information on MCT in reading were used in this study. One item read: "In which of the following subjects are students required to pass a minimum competency test?" Respondents were required to answer either "yes" or "no" to items identifying several subject areas, one of which was reading. The second item read: "In what year was each of the following minimum competency tests first administered?" Affirmative responses to the MCT item on reading were then coded according to whether or not the program had been implemented prior to 1980. This group formed the majority of the responses.[4]

School-level responses to the MCT questionnaire item were identified by state of origin for the purposes of delineating type of state MCT program.[5] These responses were categorized according to whether or not: 1) there was a state-mandated MCT program which was, to a large extent controlled at the state level,e.g., the state sets the performance standards, develops and administers tests, decides the grade levels; 2) there was a state mandate; however, there were options available at the local level; e.g., grade level assessed, test used, or whether or not to implement a MCT program; and 3) there was no state or local mandate for MCT, but a state assessment program.

School responses in Grade 11 were classified similarly but with the additional information of whether or not there was a proficiency, exit, or minimum competency test required for graduation at any of grades 9 through 12. When the school level questionnaire

responses (MCT yes/no) are combined with the three types of state programs, there are six possible combinations of school program types or 6 cells in the design.

For grades 4 and 8, schools in cell 1 are those that responded "yes" to the MCT item on the NAEP survey, and originated from states where MCT programs are controlled at the state level. Schools in cell 2 are those schools that responded "yes" and originated from states where there were options available regarding the state mandate. If one option is whether or not to implement a program, these schools opted to do so. Schools in cell 3 are those that responded "yes" and originated from states where there is a state testing program only. These schools are those that may be involved in a local competency testing initative. Schools in cell 4 are those schools that responded "no" and originated from states where MCT programs are controlled by the state. These schools represented fewer than 5% of the total number of responses at each grade and were excluded from all subsequent analyses. Schools in cell 5 are those that responded"no" and originated from states where local options are available. If the option was whether or not to implement a MCT program, these particular schools did not. Schools in cell 6 represent those that responded "no" and originated from states where there is a state testing program only.

For grade 11, schools in cell 1 are those that responded "yes" and originated from a state where a proficiency test was mandatory as a graduation requirement at any of grades 9 through 12. Schools in cell 2 are those responding "yes" and originated from a state where a proficiency test as a graduation requirement was a local option. Explanation of the other categories for grade 11 follow the same logic as described for grades 4 and 8. Additional details of the procedures used in categorizing responses and the listing of state-mandated programs by state developed for coding purposes are shown in Appendix B. (NOTE: All

states are shown on the listing but all states were not included in the NAEP sample, schools were sampled in approximately 38 of the states.) The adjusted weighted frequencies and percentage of schools and students by type of state program are shown in Table 2.

Demographic Variables. Demographic variables included the four geographical regions of the country included in NAEP: northeast, southeast, central, and west. The NAEP categories of "Size and Type of Community" were examined for descriptive purposes. A brief explanation of these categories is presented in Appendix C.

School Composition and Socioeconomic Variables. School composition consisted of the percentage of White, Black, and Hispanic students in a school. Socioeconomic variables examined included the Orshansky percentile, the percentage of students in a school receiving free lunch, and instructional dollars per pupil. The Orshansky index measures the percentage of students under the poverty guideline as a percentage of total school age children in the district. Instructional dollars is a measure of spending on instructional materials. This measure; however, may not relate to the total level of spending in a school. Instructional dollars per pupil was originally measured categorically with each category providing a range of expenditures. These categories were recoded to reflect the midpoint of the interval: 1=$14.99, 2=$19.99, 3=$29.99, 4=$39.99, 5=$49.99, 6=$59.99, 7=$69.99 and 8=$79.99.

Characteristics of Schools with MCT Programs

Because analyses were based on a subsample of the total NAEP sample, school-level and student-level descriptive data are provided for each grade level by school type (MCT-yes/MCT-no) and for each race/ethnic group included in the study.

Grade 4. An examination of the percentage of schools by response type indicated that

schools with MCT programs were distributed equally across each of the four regions. Schools without MCT programs were more likely to originate from the Central region and least likely to originate from the Southeast. Schools which did not respond to the MCT item (no-response group) were distributed equally across each of the four regions. Schools in all three groups were from diverse types of communities as represented by the NAEP categories of "Size and Type of Community". However, there was a larger percentage of "disadvantaged urban" schools included in the sample of schools with MCT programs as compared to the percentage included in the sample of schools without MCT programs. On the average, schools with MCT programs had larger school enrollments, and a lower percentage of white students compared to schools without MCT and schools in the no-response groups. Schools with MCT programs also tend to have specific remedial programs for students failing reading compared to schools without MCT programs. Demographic data and weighted school means by response groups for Grade 4 are shown in Table 3.

Grade 8. An examination of the percentage of schools by response type indicated that schools with MCT were likely to be distributed equally across each of the four regions. Schools without MCT programs were more likely to originate from the Central region and least likely to originate from the Southeast. Schools in the no response group were distributed across all four regions. Schools in all three groups were from diverse types of communities as represented by the NAEP categories of "Size and Type of Community". However, similar to fourth grade, there was a larger percentage of "disadvantaged urban" schools included in the sample of schools with MCT programs as compared to the percentage included in the sample of schools without MCT programs. On the average, schools with MCT programs had a lower percentage of white students compared to the schools without MCT

programs and schools in the no-response groups. Schools with MCT programs tend also to have specific remedial programs for students failing reading compared to schools without MCT programs. Demographic data and weighted school means by response groups for Grade 8 are shown in Table 4.

Grade 11. An examination of the percentage of schools by response type indicated that schools with MCT were more likely to originate from the southeast and western regions and least likely to originate from the Central region. Schools without MCT were more likely to originate from the Central region and least likely to originate from the Southeast. Schools in the no -response group were from all four regions; however more likely to originate from the Central region. Schools in all three groups were from diverse types of communities as represented by the NAEP categories of "Size and Type of Community". On the average, schools with MCT programs schools had larger school enrollments and a lower percentage of white students. Schools with MCT programs tend to also have specific remedial programs for students failing reading compared to schools without MCT programs. Demographic data and weighted school means by response groups for Grade 11 are shown in Table 5.

Characteristics of Schools with MCT Programs By Race/Ethnic Groups

The magnitude of the differences in the school composition and school -level SES variables among race/ethnic groups suggest that there are substantial differences in the nature of the schools attended by Whites, Blacks, and Hispanics regardless of school type.

At all three grade levels and in both schools with and without MCT programs, on the average, Black and Hispanic students were more likely to attend schools in which there was a higher proportion of low-SES students, and a lower percentage of White students. Goertz (1985) in a description of the total NAEP sample found a similar pattern. She indicated that

a White student was more likely to attend a school where the student body is 80% or more White whereas a Black or Hispanic student was most likely to attend a school where more than 50% of the students are minority. In this subsample, there was more variation in SES and school composition variables among race/ethnic groups than between types of schools, or within each race/ethnic group. As might be expected, at all three grade levels and for all race/ethnic groups, the average instructional dollars per pupil average was higher in schools with MCT programs compared to schools without such programs.

Characteristics of Students by Race/Ethnic Group

At grade four, the average parental education was similar across types of schools and race/ethnic groups. On the average, fourth grade students reported parents' education as category 3 "going on to school after high school." The average parental education reported by Hispanic students was lower than that reported by White and Black students. However, there is the possibility that the similarity across race/ethnic groups may be due to less accuracy in fourth-graders' self report. There was a higher proportion of missing data for fourth graders' reporting of parental education (38%) compared to the other grades (11% at grade 8, 5% at grade 11) and it is possible that when younger students do not know their parents' educational level, they bias their answers upward. However, there was a greater disparity among race/ethnic groups when possessions in the home were included to form the family background composite. On the average, this composite was higher for White students than for Blacks or Hispanics.

At both eighth and eleventh grades, parents' education was slightly higher for students attending schools with MCT programs as compared to schools without such programs. White students reported higher averages of this variable compared to Black students, who reported

slightly higher averages than Hispanics. Similar to the pattern in fourth grade, there was a greater disparity among race/ethnic groups in the composite variable "family background" as compared to reported parents' educational levels. The average for White students was higher than that of Blacks and Hispanics.

In both eighth and eleventh grades, students attending schools with MCT reported higher averages of student academic behaviors (homework + pages read) as compared to students in schools without MCT programs. This pattern was consistent across race/ethnic groups. The averages for school-level and student-level variables in the no-response sample fell within the ranges of averages reported for the two types of schools. School-and student-level descriptive data by race/ethnic group for grades 4, 8, and 11 are shown in Tables 6, 7, and 8, respectively. Comparable data for the schools that did not respond are shown in Appendix D.

Unadjusted Reading proficiency by race/ethnic group by school type

The achievement gap between minority and non minority students has been documented (NAEP 1985). NAEP's report on reading proficiency among the nation's 9,13, and 17 -year olds indicated that despite gains by minority students in the last 10 years, Black and Hispanic students continue to read at a significantly lower level than Whites (NAEP, 1985). Figure 1 depicts the average reading proficiency by grade by race/ethnic group for the total NAEP sample.

In the subsample of students included in this study, the gap in reading proficiency between minority and non minority students exists at all three grade groups and regardless of school type. However, this study and the discussion of reading proficiency focuses on comparisons of reading proficiency within race/ethnic group by school type. Unadjusted

reading proficiency means and standard deviations by grade by race/ethnic group by school type are shown in Table 9.

Grade 4. In general, at fourth grade, the average unadjusted reading proficiency of students attending schools with MCT programs is lower than or similar to that of students attending schools without MCT programs. For White and Hispanic students, this difference represents 5 (.16 s.d.) and 4 (.13 s.d.) points in reading proficiency, respectively. For Black students, there was no difference in the average reading proficiency of students attending either type of school.

On the average, White and Hispanic students in schools without MCT programs and in which there was a specific remedial program for students failing the reading tests had slightly higher reading proficiency compared to their respective counterparts in schools with MCT and a specific remedial program. However, Black students in schools with MCT and no specific remedial program had slightly higher reading proficiency compared to Black students in schools with MCT and a specific remedial program. (NOTE: Remedial program is a school-level variable and information was not obtained at the student level. Thus, student proficiency is an aggregate of all students within a school and not just students who receive remedial instruction). Unadjusted reading proficiency by school type by remedial program for each grade level is shown in Appendix E.

An examination of NAEP proficiency levels by school type indicated that for all race/ethnic groups, in schools with MCT programs, there were substantial proportions of students reading at or below the basic and rudimentary levels as compared to the proportion of students reading at or below those levels in schools without MCT programs, and in schools that did not respond. (Of course, we do not know how much of the proportion of students at

the lower reading levels may be due to retention or other factors). The distributions of fourth grade students performing at or below each NAEP proficiency levels by school type are depicted graphically for each race/ethnic group in Figures 2, 3, and 4.[6] Sample sizes and percentages for these groups are presented in Appendix F.

Grade 8. At eighth grade, the average reading proficiency of students attending schools with MCT was higher than that of students attending schools without MCT programs. For White students, this difference represented 7 points (.26 s.d.); for Black students 12 points (.44 s.d.), and for Hispanic students, 8 (.26 s.d.) points in reading proficiency.

On the average, White and Black students in schools with MCT and a specific remedial program had higher reading proficiency compared to their respective counterparts in schools with MCT and no specific remedial program. For Hispanic students, average reading proficiency was similar in schools with MCT regardless of whether or not there was a remedial program.

An examination of NAEP reading proficiency levels by school type at eighth grade indicated that there was a lower proportion of students reading at or below the basic and intermediate levels, and a higher proportion at or below the adept and advanced level in schools with MCT programs as compared to the proportion of students reading at these levels in schools without MCT programs. This pattern was evident for Whites and Blacks, but not Hispanics. For Hispanic students, there was a slightly higher proportion of students at or below the advanced level but also a higher proportion of students at or below the basic level in schools with MCT programs as compared to similar proportions in schools without MCT programs. The distributions of eighth graders performing at or below each NAEP proficiency levels by school type are shown for each race/ethnic group in Figures 5, 6, and 7.

Grade 11. At eleventh grade, the average reading proficiency was higher in schools with MCT programs for all race/ethnic groups. For White students, there was a 7 (.23 s.d.) point difference, for black students a 5 (.18 s.d.) point difference, and for Hispanics a 7 (.22 s.d.) point difference.

On the average, White and Hispanic students in schools with MCT and in which there was a remedial program had higher reading proficiency compared to their respective counterparts in schools with MCT and no remedial programs. Black students in schools with MCT but with no remedial programs had slightly higher reading proficiency compared to Black students in schools with MCT and a remedial program.

An examination of NAEP reading proficiency level by school types indicated that for White students, there was a higher proportion of students reading at or below the adept and advanced levels and fewer students at or below the basic and intermediate levels in schools with MCT programs as compared to the proportion of students at these levels in schools without MCT programs. For Black students, in schools with MCT programs, a similar pattern was evident for students reading at or below the adept level. For Hispanic students, the distributions of students by reading proficiency levels were similar regardless of school type. The distributions of eleventh graders performing at or below each NAEP proficiency levels by school type are shown for each race/ethnic group in Figures 8, 9, and 10.

SECTION III

STUDY 1 - THE RELATIONSHIP BETWEEEN SCHOOL-LEVEL MCT PROGRAMS AND STUDENTS' READING PROFICIENCY

Purpose

There were two major questions of interest in the study. First, what is the relationship between school-level MCT programs and students' reading proficiency within racial groups? In the analysis related to this question, the reading proficiencies of students in each race/ethnic group were examined after adjusting for students' age and sex, region, school-level SES, family background, and students' academic behaviors, school-level MCT, remedial program, and instructional dollars per pupil. Second, what is the relationship between student reading proficiency and type of state MCT program as defined by the discretion allowed to local districts? In these analyses, students' reading proficiencies for each grade cohort was examined after adjusting for the type of state program, student age, sex, school and district-level SES, family background, and race.

Design

In conducting multilevel analysis of schools, there is no consensus among social scientists concerning the appropriate unit. Pedhazur (1982) notes that the issue is not merely one of choice of an appropriate unit but also conceptualizing and developing analytical approaches that will make full use of the different types of information contained in the different levels. In general, results obtained from regression analyses using individual-level data will differ from those obtained in analyses using aggregates as the unit of analysis (Burstein & Miller, 1981).

In study 1, school level data were merged with individual student common background

items and reading proficiency data. Individual reading proficiency was used as a dependent measure. The question of interest was the relationship between school-level MCT program and reading proficiency within race/ethnic groups. From a statistical framework, one might ask, what proportion of total variance in reading proficiency; e.g., among black students, can be accounted for by school-level MCT programs after controlling for SES and background factors? And, are the effects of MCT the same for all race/ethnic group? The question posed in the second study might be phrased similarly; i.e., what is the proportion of total variance in student proficiency accounted for by various types of state programs, controlling for school-level SES, and other factors?

Ideally, to answer either of these questions we would want to look within schools at individual student level achievement to examine changes in the distribution of reading proficiency for various race/ethnic and SES groups over a period of time. In this study, we are limited to the available data for one time period to investigate relationships between schools and student reading proficiency.

We know that many of the assumptions made when using multilevel data in an analysis do not reflect reality. For example, school level aggregates are assumed to affect all students equally but we know that pupils receive differential exposure to school resources and facilities. This may be especially true with respect to MCT, since most programs are targeted toward students who, by some criterion fail to acquire basic skills in reading. Moreover, resources and facilities per se do not influence reading proficiency, but how schools use such resources and facilities (Madaus, Airasian & Kellaghan, 1980).

Other limitations to this approach are reflected in the operational definitions of the independent and dependent variables. In study 1, the independent variable, MCT is based on

principals' self-report, so that we have no knowledge of specific characteristics of the program or whether or not a MCT program exists at the school. Similarly, the dependent measure, individual students' reading proficiency is an estimate of proficiency, and as such, includes a certain degree of error.[7] These studies are therefore viewed as exploratory in two areas: 1) investigating the relationship between MCT as a potential school effect and 2) using the NAEP data to inform policy issues.

Subsample Size

The adjusted weighted sample sizes for grades 4, 8, and 11 were 10,367 ,10,829, and 13,513. These numbers represent 39.8% of the total NAEP 4th grade cohort, 41.8% of the Grade 8 cohort, and 55.2% of the Grade 11 cohort.[8] The number in each racial/ethnic group was 7,491 Whites, 1,733 Blacks and 1,143 Hispanics in grade 4; 7,574 Whites, 1,906 Blacks and 1,349 Hispanics in grade 8; and 9,203 Whites 2,112 Blacks and 2,198 Hispanics in grade 11.

Data Analysis

The purpose of study 1 was to investigate the relationship between school-level minimum competency testing program and student reading proficiency. An analysis of covariance within a regression framework was conducted for each race/ethnic group (White, Black, and Hispanic) with each of the three grade cohorts. This model assumes that the within-group regression coefficients are homogeneous for schools with and without MCT programs, and that one may test differences between groups after adjusting for the effects of other attributes. There were nine parallel regression equations each incorporating the same predictor variables. Individuals' student reading proficiency was used as the dependent measure. Covariates at the student level were age, sex, family background, and students'

academic behaviors. Covariates included at the school level were region of the country, percentage of students on free lunch, Orshsansky percentile[9], and racial composition. The school-level MCT variable was dummy coded, 1=yes and 0=no. School-level remedial program for reading (dummy coded, 1=yes, and 0=no) and instructional dollars per pupil were included as two potential school-level explanatory variables. Variables were entered in the following order: 1) student age and sex, 2) region of the country, 3) school level SES and composition 4) family background 5) student academic behaviors, 6) school-level MCT program and 7) school level remedial program, and 8) instructional dollars per pupil.

All possible interactions were not tested; however, the interactions between the MCT variable and the variables: student age, school-level SES, region, MCT, percentage of students on free lunch, percentage of white students, family background, and students' academic behaviors were tested as a block, entered last, and were found to be nonsignificant. All regression analyses were conducted on students in the grade samples (rather than age samples) which included approximately 78% of each age/grade cohort. Listwise deletion of missing cases was used in all analyses.[10]

Results

Table 10 presents the unstandardized regression weights and standard errors for the MCT dummy- coded variable obtained from the regressions of individual student reading proficiency on school- and student-level variables for each race/ethnic group in each grade.[11] The first column presents the effect of MCT after adjusting for sex, age, region of the country, school-level SES, family background, and students' academic behaviors. The second column presents the effect after adjusting for all of the student and school-level variables in addition to the explanatory variables, per pupil instructional dollars, and

school-level remedial reading program.

At grade 4 , after controlling for student, school-level and explanatory variables, there were no significant effects attributed to the MCT dummy variable for any of the race/ethnic groups. At grade 8, after adjusting for student and school-level variables, there was a positive effect for both White and Black 8th graders. This effect represented about an 8 (.29 s.d.) point advantage for Whites and a 10 (.38 s.d.) point advantage for Blacks in average reading proficiency as compared to their respective counterparts in schools without MCT programs. The effect size (Glass, 1977) as calculated by the difference between treatment and comparison adjusted means divided by the standard deviation of the comparison group is shown in parentheses. Effect sizes of .3 are greater are considered important (Cohen, 1977). The inclusion of a school-level remedial program and instructional dollars per pupil explained part but not all of the MCT effect. Inclusion of these variables reduced the effect for White students by about 29% and for Black students by about 31%. No signficant effect was isolated for Hispanic students.

At grade 11, after controlling for student and school-level variables, there were positive effects for all race/ethnic groups. This effect represented a 2 (.06 s.d.) point advantage in average reading proficiency for White students attending schools with MCT programs, a 7 (.26 s.d.) point advantage for Blacks, and a 6 (.19 s.d.) point advantage for Hispanics as compared to their respective counterparts in schools without MCT programs. Inclusion of a school-level remedial program and instructional dollars explained the effect for White students, accounted for a negligible portion of the effect for Hispanic students, and caused the effect for Black students to become larger.[12] Zero order correlation coefficients for the MCT dummy-coded variable and reading proficiency are shown in Appendix H.

SECTION IV

STUDY 2- STATE MCT PROGRAMS AND STUDENT READING PROFICIENCY

Design

The purpose of study 2 was to investigate the relationship between school-level MCT progams and type of state mandate. Type of state program was identified by state of origin and responses were classified as: 1) state mandate for MCT controlled at the state level, 2) state mandate with local option(s) or 3) state assessment program only. Listwise deletion of missing cases was used in all analyses. There were 12,361 students included in the analyses of grade 4, 16,719 in grade 8, and 18,326 in grade 11. The racial composition of each of these samples can be found in Appendix G.

Data Analysis

Analysis of covariance within a regression framework was conducted for each grade/age cohort. Individual student proficiency was used as the dependent measure. The covariates included at the individual student level were family background, and students' race (dummy coded 1=White, 2=Black, and Hispanic as other). Covariates at the school level included school and district-level SES. The type of state program was dummy coded for each cell included in the design with students in schools having no state or local level MCT program coded as other. Type of state program was entered first, and control variables entered hierarchally in blocks.

Results

The purpose of study 2 was to investigate the relationship between MCT and type of state program. The unadjusted average reading proficiency of students in the subsample attending schools located within the various types of state programs are presented in Table 11. The

unstandardized regression coeffficients are presented in Table 12.[13] These effects have been adjusted for students' age and sex, district, and school SES, family background, and race.

As shown in Table 12, at grade 4, after controlling for student and school-level variables, the average reading proficiency of students in schools in which there was a state controlled MCT program was slightly lower than students in schools in the reference group.This effect represented a 4 (.12 s.d.) point difference in mean reading proficiency. Students in schools with local MCT programs and in which there was a state testing program also had slightly lower reading proficiency compared to students in schools in the reference group. This effect represented a 3 (.11 s.d.) point difference in mean reading proficiency.

At grade 8, after adjusting for student and school-level variables, the average reading proficiency of students where there was a state controlled MCT program differed by 9 (.31 s.d.) points as compared to students in schools in the reference group. In schools in which there was a MCT program and in which the state allowed local options, there was an 8 (.28 s.d.) point difference in mean reading proficiency as compared to the reference group. Smaller positive effects were found for students in schools in the other categories.

At grade 11, after adjusting for student and school-level variables, there was a 7 (.22 s.d.) point difference in the average reading proficiency of students in schools where MCT was a mandatory graduation requirement compared to students in schools in the reference group. There was a 6 (.18 s.d.) point difference in reading proficiency between students in schools where MCT as a graduation requirement was a local option compared to students in schools in the reference group.

SECTION V

DISCUSSION

A major purpose of study 1 was to investigate the relationship between school-level MCT programs and student reading proficiency within race/ethnic groups. Students included in the subsample were a random sample, however schools included were based on self-report. Descriptive data presented for school and student-level variables by school response suggest that the schools included in the study did not differ substantially from schools which provided no response to the NAEP questionnaire item concerning MCT. One must be cautious, however, in generalizing results obtained to schools in the entire nation.

Moreover, both studies were exploratory in using data from NAEP to investigate and extract potential relationships between MCT programs and student reading outcomes. The measures of students' reading proficiency were estimates derived from IRT techniques. These values were conditioned on certain variables; e.g., parental education, race, region, age, and not others, e.g, school-level variables. When NAEP reading proficiency estimates are used as outcome measures and both conditioning and nonconditioned variables are included in a regression analysis, the effects of nonconditioned variables are underestimated. In this study, this underestimate is in the range of 15 to 20% (See Note * 7). Although the substance of any conclusions derived from this study would be essentially unchanged if all biases were removed, any effect due to a nonconditioned variable such as, school-level MCT program, is likely to be extremely conservative when using NAEP data. Conversely, effects of conditioning variables; e.g, parents' education, race, etc. are likely to be overestimated.

In study 1, the effect of a school-level MCT program on student reading proficiency differed by grade and race/ethnic group. At fourth grade, after controlling for sex,age,

region of the country, school context and SES and family background, and student academic behaviors, no significant effect due to MCT was isolated. At eighth grade, a positive effect was found for White and Black students, but not Hispanics. A portion of the effect isolated for White and Black students was explained by the inclusion of a specific school-level remedial program, and instructional dollars per pupil. At eleventh grade, positive effects were found for all race/ethnic groups. The effect for White students was statistically explained by school remedial program and per pupil instructional dollars. These same variables, however, acted as suppressor variables in the regression equation for Black students and explained little of the effect found for Hispanic students. This pattern suggests that certain variables may operate differently in different contexts.

The failure to find an effect at fourth grade for any of the race/ethnic groups might suggest that there may be little or no advantage in implementing MCT programs at this grade level. In general, in elementary schools, there is a general emphasis on instruction in basic skills, particularly reading, and perhaps the addition of a MCT program is to some extent redundant. However, one possible explanation for no effect might be due to the unreliability of self-report data obtained at the fourth grade level. Additionally, schools included in the fourth grade sample had the lowest response rate to the MCT questionnaire item. Since only one time point is being examined, the direction of causality between the variables cannot be established. Schools with MCT had students with lower reading proficiency, and perhaps this situation resulted in schools implementing a local MCT program. Additionally, there are many other important variables; e.g., classroom practices, academic engaged time, and content covered which are critical in explaining students' reading proficiency and which were not included in these analyses (Winfield, 1987a). The results, however, suggest that

additional studies should be conducted of the effects of MCT programs on students' reading proficiency at the elementary level.

One possible explanation for the positive effects found at eighth and eleventh grade is that by restricting the variance in background factors to within groups, the probability increased of demonstrating an effect due to school variables. (This should also hold for fourth grade as well). Other studies, using a similar method, have found that among schools attended by students of the same SES background or race, it was possible to identify some that were consistently "effective or ineffective" (Frederiksen, Bolt, Beranek, and Newman, 1975).

Those schools with MCT may be considered effective in facilitating eighth grade students' reading proficiency. This effect may be due to the implementation of a MCT program. Alternatively, there may be other factors associated with the program but not measured, e.g., monitoring of student progress, or other unmeasured school characteristics which contribute to this effect. The distributions of White and Black students' NAEP proficiency levels in schools with MCT programs were shifted upward for all students, and not just for those students at the lower reading proficiency levels. This might suggest that the effect may not be due solely to MCT, but to other school programs and characteristics in those schools with MCT programs. However, information on school retention or dropout rates was not available. It may be that schools that have institutionalized a MCT program have higher levels of retention and/or dropout among lower-performing students.

The failure to find a MCT effect on the reading proficiency of Hispanic eighth graders suggests that the variables included in the analysis may be insufficient in explaining reading proficiency of Hispanic students at this grade level. There are other variables which might influence proficiency for these students; for example, language dominance, language spoken

in the home and in peer groups, and years of residence in the U.S. Alternatively, the school variables included may operate differently in different contexts. Hanushek (1970) found differences in teachers and classrooms related to the achievement of White students, but not Mexican students. These results suggest the need to investigate effects of school-level MCT for Hispanic students at this grade level.

At eleventh grade, the MCT effect on White students' reading proficiency could be statistically explained by the inclusion of school level remedial program, and instructional dollars per pupil. For Blacks and Hispanics, this was not the case. Remedial program and instructional dollars were suppressor variables in the regression equation for Blacks. Based on unadjusted average proficiency, Black students in schools with no specific remedial reading program performed as well on the NAEP reading proficiency scale as Black students in schools with remedial programs. Other research suggests that remedial programs for MCT may be less effective in facilitating reading achievement of Black students than for White students (Serrow, 1984). However, remedial program in this study was a school-level rather than a student-level variable, and therefore cannot adequately address this issue. The results are merely suggestive that remedial programs in schools with MCT may have different effects on different groups.

The positive effects isolated at eleventh grade for each race/ethnic group may be due to the inclusion of a school-level MCT program. Alternatively, the effect may be due to other unmeasured characteristics of these particular schools. As suggested with respect to 8th grade results, there is the increased possibility that those students who are doing poorly or have failed a MCT are no longer in the school by 11th grade. In general, Black and Hispanic dropout rates are higher than those of White students (NCES, 1985). If there is a greater

degree of exclusion and selection in schools with MCT programs, then one might expect the average reading proficiency to be higher in those schools. The results obtained for the eleventh grade may pertain to a more select population compared to fourth and eighth grades. This may be especially true of minority groups. Burton and Jones (1982) reached a similar conclusion regarding NAEP data for 17 year olds. In a comparison of achievement trends of Black and White youth, they suggested that it would not be possible to assess whether the relative improvement observed in the Black population at ages 9 and 13 persisted at age 17 because of the differential dropout rates by race and sex. They indicated that an out-of-school, 17-year old sample would be needed to assess the trend. There is also evidence that 25% of students who initially failed a state MCT program withdrew from school prior to graduation (Serrow, 1984).

Study 2

The objective of study 2 was to explore the relationship between the type of state program and reading outcomes. The recoding of the initial school responses provided additional information on policies of state mandated programs regarding discretion allowed to local school districts. Schools were categorized according to whether state programs were completely controlled at the state level, there were options available, or there was a state testing program only. Different effects were isolated by grade level and type of state mandate.

In 4th grade, after adjusting for school-and student-level factors, students attending schools with MCT program and in which the state had control had slightly lower reading proficiency compared to students in schools with neither of these characteristics. Students in schools with local MCT programs and in which there was a state testing program only also had lower reading proficiency compared to students in schools in the reference group.

In eighth grade, students attending schools with local MCT programs and in which the state maintained controlled had higher reading proficiency compared to students in the reference group. Similarly, students in schools with a local MCT program with state-allowed options had higher reading proficiency compared to students in the reference group. Smaller positive differences in reading proficiency were found for students in schools in which there was a local MCT program and a state testing program only, and for students in schools in which there was no local MCT program and the state program allowed options.

In eleventh grade, students attending schools with a local MCT program and in which successful completion of the program was a graduation requirement had higher reading proficiency compared to students in schools in which neither of these characteristics were present. Students in schools with a local MCT program and in which MCT as a graduation requirement was optional also had higher reading proficiency.

In general, the results of study 2 suggest that it may be possible to isolate differential effects of state policies regarding minimum competency testing on student reading proficiency. At fourth grade, students in schools with state controlled MCT programs had lower reading proficiency compared to students in schools in which there was no state or local MCT program. At eighth and eleventh grades, there were positive effects due to a state-controlled MCT program; however, there were equally positive effects due to state MCT programs in which local options were allowed. This pattern suggests that at the upper grade levels, the two types of state programs may have similar effects on reading proficiency.

The discrepancy between fourth grade, and eighth and eleventh grade results may be due to influences of the various types of state programs on the school reading curriculum. One study indicated that in districts that use test-management strategies similar to MCT, the

mode of teaching changes from performance-oriented activities; e.g., reading books, discussing ideas, to test-oriented activities; e.g., fill-in the blank worksheets, memorization of facts and drill or rote skills (Darling-Hammond and Wise, 1985). These strategies may be detrimental to elementary students' reading proficiency since they are still learning how to read at this level. Moreover, those schools characterized as successful in facilitating basic skills exercise a considerable amount of discretion in solving problems locally (Purkey & Smith, 1983). It may be the case that externally-mandated programs operate against this type of local discretion at the elementary level and negatively impact student reading outcomes. Alternatively, it is often at fourth grade that students' reading achievement results begins to decline. The small negative effect found due to type of state program may be due to a general decline in student achievement at this grade level.

In eighth grade, the students attending schools with local MCT programs and in which the state maintained controlled had higher reading proficiency compared to students in schools with neither of these characteristics. Similarly, students in schools with a school MCT program and where there were local options also had higher reading proficiency. At this grade level, the implementation of a school or state-level program that emphasizes the attainment of basic skills may provide the opportunity to learn skills that students failed to acquire at the elementary level. Traditionally, during the middle and junior high grades, schools are generally organized around various subject-matter areas. It may be that the MCT programs at this level orients the schools and teachers to continuing basic skill development for particular groups of students. Alternatively, results may be due to higher retention rates in schools implementing MCT programs.

In eleventh grade, students attending schools with a local MCT program and in which

successful completion of the program was a state graduation requirement had higher reading proficiency compared to students in the reference group. Students in schools with a local MCT program and in which MCT as a state graduation requirement was optional also had higher reading proficiency. Again, one possible explanation may be that additional opportunities are being provided for basic skill development for students who previously failed to acquire such skills. At this particular grade level; however, the sample may be more selective than at the other grades due to dropout rates.

Summary and Conclusions

In conclusion, the results of the exploratory studies conducted using NAEP data suggest that it is possible to isolate relationships between MCT programs and student reading proficiency outcomes. The relationship appears to differ depending on the grade level, race/ethnic group, and type of state program assessed. At the elementary level, school-level MCT programs appeared to have no significant effects on reading proficiency for any of the race/ethnic groups studied. Those MCT programs administered and controlled at the state level appeared to have a slight negative impact on students' reading proficiency at this level.

At eighth grade, positive effects of school-level MCT programs were isolated for White and Black students, but not Hispanic students. The effects of state-controlled MCT programs and state MCT programs which allowed local options were related to higher student reading proficiency. Similarly, at eleventh grade, positive effects of school-level MCT were isolated for each race/ethnic group. Students in schools in states requiring a MCT for graduation, or in states where this was an option were found to have higher reading proficiency compared to students in schools where there was no state or local MCT required at high school.

The remaining discussion will present conceptual and methodological limitations of the

studies. First, the definition of a MCT program was initially limited to a schools' response on the NAEP questionnaire regarding whether or not they had implemented a MCT program and the year in which the program was initiated. There was little detailed information available on the exact nature of the local school program. It would seem important to know the purpose, special personnel or curriculum used, whether the MCT was commercially prepared or locally prepared, the content and performance standards, the proportion of students in the schools failing to meet requirements, retention and dropout rates. Future NAEP school questionnaires might consider including 2-3 additional items to obtain additional detailed information on the nature of the school or state level MCT program. It is generally the case that most of the available large-scale data bases have been less than optimal for conducting certain types of policy analyses (Plisko & Ginsburg & Chaikend, 1985).

Second, school-level MCT is a proxy variable for other important school characteristics. Although descriptive information on the nature of the program might be obtained in a large-scale survey, the process variables and interactions within schools which might accompany the implementation of a MCT and influence students' reading proficiency; e.g., teachers' expectations, opportunity to learn, might not be adequately derived from such measures. Additional qualitative studies of schools implementing local and state MCT programs would be useful in this area.

Third, this study was conducted from data collected at one point in time, and as such presents the status of students' reading proficiency in schools at that time period. In order to assess change in students' reading proficiency due to MCT, one must have data over two or more time periods, and preferably for cohorts of students. This type of information is not within the design or scope of NAEP, and other longitudinal data bases might be explored

Fourth, school organizations are viewed as consisting of nested layers. In any explanation of student outcomes, it is necessary to consider teachers and classroom practices as well as school-level variables. To some extent, the effects of these variables are subsumed in an overall school effect, however, teacher or classroom-level variables deserve direct examination. These were not within the scope of this study. Moreover, individual student-level data on participation in MCT and remedial programs would be preferable to using school-level aggregates of such variables. In conducting multilevel analyses of school data, we know that many of the assumptions of using aggregated data do not reflect reality; e.g., pupils actually receive differential exposure to school resources and facilities. This may be especially true of "at-risk" students (Winfield, in press) who are likely to be in remedial programs as a result of MCT. Individual student participation might include measures of additional academic engaged time or content covered in such programs. It is only with individual student-level participation data that the question of effectiveness of MCT for various groups of students can be adequately assessed.

Fifth, additional variables potentially related to Hispanic reading proficiency in schools with MCT programs at eighth grade need to be explored. These variables might include such student-level characteristics; e.g., language dominance, years of residence in the U. S., participation in remedial reading or other special programs for languge minority students.

Sixth, results from these studies should be replicated using other available national data bases. The psychometric techniques employed by NAEP provide accurate population and subpopulation estimates of reading proficiency. However, in regression analyses using reading proficiency estimates as outcome measures, and including both conditioning and nonconditinoed variables, the regression effects due to nonconditioned variables are

underestimated. In this particular study, this underestimate amounts to 15 to 20%. Thus, results presented in the studies presented here provide extremely conservative estimates of the school-and state policy level MCT effect.

Finally, the categorization system used in study 2 might be refined to obtain a more precise operational definition of discretion available to local school districts. It may be that the number of available options is important or that different options; e.g., the schools' ability to select a test aligned with the curriculum, might be more relevant to reading proficiency outcomes. Other classifications of state policies regarding MCT, for example whether or not a MCT program is used for remediation funding or for grade to grade promotion might also differentially influence students' reading proficiency.

The diversity of local and state policies related to MCT make it extremely difficult to characterize precisely the nature and outcomes of this educational reform in the nation. Although NAEP data were not designed to specifically address the particular issues explored in these studies, the analyses and results demonstrate both the limits and potential of using NAEP data to inform national policy issues. Additional studies using NAEP and other national data bases are needed to further explore relations investigated in this study. Moreover, these studies will provide information necessary to determine whether educational reforms, such as MCT are actually improving students' reading proficiency and educational standards in the nation, rather than merely improving students' scores or passing rates on minimum competency tests and also contributing to national dropout statistics.

NOTES

[1] Approximately 1-2% of the responses at each grade/age group were inconsistent and were not included in subsequent analyses. Inconsistent responses were respondents who answered "no" to the first MCT question used and subsequently completed the second MCT item on grade implemented or the third item on year implemented.

[2] Because the NAEP sample design employs stratifications and clustering (students within schools, schools within PSUs), the resulting sample has different statistical characteristics from those of a simple random sample. To account aproximately for the effects of the sample design, a design effect of 2 was used. This has the effect of dividing the sample size in half and using the adjusted sample size in the computation of errors. This method was used in lieu of the ETS jacknife technique employed in estimating sampling variability of statistics included in NAEP reports. Because NAEP produces a representative national sample, each student or school has an associated sampling weight to account for the differential probability of selection and adjustments for non-response and post-stratification. To insure adequate representation, certain subgroups were sampled at a higher rate than the rest of the population. Thus, in all analyses, a student's or school's weight was adjusted so that the sum of the rescaled weights equalled the number of cases included in each analysis. This rescaled weight was divided by two (the design effect). All analyses reported here were conducted using adjusted weights. (See NAEP User's Guide, June 1986 for procedures to be used when analyzing NAEP data).

[3] In the scale anchoring process, NAEP selected sets of items that were good discriminators between proficiency levels. The criterion used to identify such items was that students at any given level would have at least an 80% probability of success with those reading tasks while students at the next lower level would have less than a 50% probability of success (NAEP, 1985).

[4] At grade 4, 7% of the school responses fell in the category of implementing MCT after 1981, at grade 8, 4.8% and at grade 11, 4.2%.

[5] A 10% random sample of schools that did not respond to the MCT item were also identified by state. Results of this informal analysis yielded no consistent pattern of particular states that did not respond.

[6] In figures 2 through 10 depicting NAEP proficiency levels, the percentage of students depicted were those whose reading proficiency estimates fell within the following score intervals: 1-150= (at or below)Rudimentary, 151-200 (at or below) Basic, 201-250 (at or below) Intermediate, 251-30 (at or below) Adept, and 301-500 (at or below) Advanced.

[7] The dependent variables used in the regression analyses reported here are "plausible values" for reading proficiency from the 1983/84 NAEP reading assessment. The construction and properties of these variables are described in detail in the NAEP Technical Report (NAEP, 1986). One property is particularly pertinent to the present paper. Item response theory was employed in the reading assessment, leading to the NAEP Reading scale upon which the results here and elsewhere have been reported. Too few items are presented to each respondent, however, to allow the estimation of proficiencies for each individual in the sample. "Plausible values" are intermediate steps in the evaluation of integrals that yield consistent estimates of selected margins of the national population; specifically, these are gender, ethnicity, parents' education, size and type of community, age, region of the country, and grade. These may be referred to as the "conditioning variables." Analyses involving other background variables are subject to regression effects. In regression analyses, regression coefficients for background variables other than the conditioning variables tend to be underestimated by 15-20%, and coefficients for conditioning variables may be inflated. These effects are present to an extent that depends on the nature and strength of the relationship among conditioning variables, nonconditioned variables, and reading proficiency (Misley, 1986, personal communication). Details and numerical illustrations are included in the Technical Report (NAEP, 1986).

[8] These percentages reflect the number of students after: 1) excluding schools which implemented a MCT program after 1981,2) students whose racial/ethnic classification was

not White, Black or Hispanic, and 3) students who were not administered a reading block, and 4) students who were not in the grade sample. Since the age samples also encompass most of each cohort (approximately 75%), the overlap between the grade and age samples are great (approximately 54%). In other words, over half of each cohort is in both the age and grade samples. This means that the analysis do not differ substantially between limiting the sample on the basis of grade or age. However, it is incorrect to base the analysis on the entire cohort since the cohorts include both students who are overaged (i.e., older than the model age of students in their grade) and undergraded (i.e., in a lower grade than the model grade of students of the same age). Both of these groups have lower reading proficiency than students in the model grade and age group, thus they downwardly bias the proficiency level for the cohort. This downward bias is even more exaggerated among Black and Hispanic students since they are more likely to be overaged (or undergraded) Ortiz (1986).

[9] The Orshansky index was omitted from regression equations at grades 8 and 11, however it was significant at grade 4 and retained in the regression analyses. At grade 4, there may be a higher degree of unreliability in students' self report of parental education and possessions in the home, and thus, the additional measure of SES (although on a district-level-basis) contributes in the overall equation.

[10] An examination of missing data for each race/ethnic group due to listwise deletion is included in Appendix I. The school-level variable that consistently had a substantial number of missing information was remedial program. For Hispanic students in grades 4 and 8 where sample sizes are smaller compared to other groups, and deletion of cases might distort the samples, an additional regression analysis was conducted using pairwise deletion. Results did not differ substantially from those obtained using the listwise deletion method.

[11] Unstandardized regression coefficients shown in the table are the average of the MCT effect obtained from regressions using each of the 5 "plausible" values as a dependent measure. These values are random draws from a probability distribution which estimates proficiency given an individual's response to NAEP exercises and background variables. The spread of these plausible values reflects the uncertainty about the proficiency value associated with a respondent. The standard errors have been adjusted to reflect the square

roots of the sum of the variance due to imputation and the variance due to sampling which also includes a design effect of 2. In addition, the appropriate degress of freedom for NAEP analyses are based, not on the number of observations, but on the number of psus minus the number of strata. Thus, significance tests based on degrees of freedom on the number of observations will be too liberal. For this reason, significance levels are not reported and greater emphasis is placed on the magnitude of the differences. See NAEP, User's Guide, 1986 for a detailed explanation of these and other procedures to be considered when analyzing NAEP data.

[12] In the regression equation for Black students, remedial program and per pupil instructional dollars acted as suppressor variables. A specific remedial program in the school although not correlated with proficiency (r=.01) is correlated with having a MCT program (r=.70) and thus adds irrelevant variance to the variable MCT and reduces the relationship with proficiency. Similarly, instructional dollars per pupil although not correlated with proficiency (r=.04) is correlated with MCT (r=.27) and acts in a similar manner. The inclusion of these two variables in the equation suppresses the unwanted variance in reading proficiency and increases the relationship between proficiency and MCT. For a discussion of suppression in complex regression models, see Cohen & Cohen (1983).

[13] The same procedures were followed as indicated in Footnote 11.

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SECTION VI TABLES, FIGURES, AND APPENDICES

TABLE 1

UNWEIGHTED AND ADJUSTED WEIGHTED FREQUENCIES OF SCHOOLS AND STUDENTS BY SCHOOL RESPONSE TO NAEP MCT ITEM

	SCHOOLS			STUDENTS		
	UNWEIGHTED	WEIGHTED	%	UNWEIGHTED	WEIGHTED	%
GRADE 4						
Minimum Competency						
YES	169	334	25.3	7,226	11,121	29.0
NO	154	312	23.6	5,289	7,952	20.7
No response	340	676	51.1	13,489	19,222	50.3
TOTAL	663	1,322	100	26,004	38,295	100
Grade 8						
Minimum Competency						
YES	141	262	27.0	6,744	13,426	32.1
NO	110	235	24.3	4,521	8,431	20.1
NO RESPONSE	235	472	48.7	10,573	20,004	47.8
TOTAL	486	969	100	21,838	41,921	100
Grade 11						
Minimum Competency						
YES	118	203	30.6	9,170	17,621	41.5
NO	82	152	25.2	5,454	9,778	23.0
No response	131	238	44.2	8,119	15,067	35.5
TOTAL	331	638	100	22,788	42,466	100

TABLE 2

ADJUSTED WEIGHTED FREQUENCIES OF SCHOOLS AND STUDENTS BY TYPE OF STATE PROGRAM

	SCHOOLS		STUDENTS	
	No.	%	No.	%
Grade 4				
MCT-yes/State controlled	72	13.9	2,598	19.2
MCT-yes/Options	138	26.7	3,939	29.1
MCT-yes/Test Program	34	6.6	959	7.2
MCT-no/Options	169	32.8	3,659	27.1
MCT-no/Test Program	102	19.8	2,363	17.4
	515	100.	13,518	100
Grade 8				
MCT-yes/State controlled	58	13.9	2,658	15.4
MCT-yes/Options	123	29.5	5,576	32.3
MCT-yes/Test Program	31	7.4	448	2.6
MCT-no/Options	146	35.0	5,714	33.1
MCT-no/Test Program	58	13.9	2,865	16.6
	416	100	17,261	100
Grade 11				
MCT-yes/State controlled	120	34.8	7,650	35.7
MCT-yes/Options	59	17.1	4,637	21.6
MCT-yes/Test Program	8	2.3	293	1.3
MCT-no/Options	107	31.1	5,836	27.2
MCT-no/Test Program	50	14.5	3,037	14.2
	350	100	21,453	100

TABLE 3
NAEP 1983-84 READING GRADE 4/AGE 9
Selected Demographic and School Characteristics

	PERCENTAGE OF SCHOOL RESPONSES		
	Minimum Competency		No
	Yes	No	Response
Demographic Region			
Northeast	24.6	22.8	23.3
Southeast	22.4	9.7	23.7
Central	23.8	45.7	29.8
West	29.2	21.8	23.2
	100	100	100
Size & Type of Community			
Rural	11.9	10.5	8.9
Disadvantaged Urban	18.2	6.4	5.6
Advantaged Urban	11.4	9.3	13.9
Big Cities	8.4	5.8	8.4
Fringe of big cities	16.4	9.7	5.8
Medium Cities	14.0	11.3	19.4
Small places	19.8	47.0	38.1
	100	100	100

	WEIGHTED SCHOOL MEANS		
	Minimum Competency		No
	Yes	No	Response
School Composition & SES			
% White students	72	87	83
% Black students	19	7	11
% Hispanic students	9	6	6
Orshansky %	11.3	9.7	11.4
% of students/free lunch	40.0	44.0	39.0
Inst. $ per pupil[a]	58.9	53.2	56.1
Instructional			
No. of students	410	338	351
teacher-student ratio	1-20	1-20	1-20
# days in school yr	178	182	179
Minutes/long per class	47	47	45
#standard class periods/day	6.7	7.0	7.4
#class periods per student	6.0	6.4	7.6
% with remedial read.program	57.3	20.6	22.1

[a] aggregated from student-level data

TABLE 4
NAEP 1983-84 READING GRADE 8/AGE 13
Selected Demographic and School Characteristics

	PERCENTAGE OF RESPONSES		
	Minimum Competency		No
	Yes	No	Response
Demographic Region			
Northeast	25.3	14.7	24.7
Southeast	22.8	11.3	22.6
Central	23.9	48.5	29.2
West	28.0	25.5	23.5
	100	100	100
Size & Type of Community			
Rural	10.7	17.3	7.4
Disadvantaged Urban	15.0	5.4	8.1
Advantaged Urban	12.1	9.0	9.0
Big Cities	8.2	6.9	8.3
Fringe of big cities	9.8	12.7	8.4
Medium Cities	19.3	9.8	12.7
Small places	25.0	38.9	46.2
	100	100	100

	WEIGHTED SCHOOL MEANS		
	Minimum Competency		No
	Yes	No	Response
School Composition & SES			
% White students	72	86	87
% Black students	17	8	9
% Hispanic students	11	6	4
Orshansky %	12.2	9.9	10.5
% of students/free lunch	38	41	35
Instruction $ per pupil[a]	58.9	53.1	56.1
Instructional			
No. of students	477	437	454
*teacher-student ratio	1-20	1-17	1-20
# days in school yr	179	178	179
Minutes/long per class	47	47	47
#standard class periods/day	7.1	7.1	7.3
#class periods per student	6.2	6.4	6.3
% with remedial read.program	75.2	24.0	52.3

[a] aggregated from student-level data

TABLE 5
NAEP 1983-84 READING GRADE 11/AGE 17
Selected Demographic and School Characteristics

	PERCENTAGE OF RESPONSES		
	Minimum Competency		No
	Yes	No	Response
Demographic Region			
Northeast	22.9	18.0	24.7
Southeast	31.1	8.7	21.6
Central	10.5	43.9	33.4
West	35.5	29.3	20.4
	100	100	100
Size & Type of Community			
Rural	11.1	15.2	10.6
Disadvantaged Urban	7.2	2.0	5.5
Advantaged Urban	13.4	5.5	15.2
Big Cities	9.3	3.1	5.5
Fringe of big cities	9.5	1.4	4.1
Medium Cities	15.7	11.5	13.5
Small places	33.8	61.4	45.6
	100	100	100

	WEIGHTED SCHOOL MEANS		
	Minimum Competency		No
	Yes	No	Response
School Composition & SES			
% White students	77	91	88
% Black students	14	6	7
% Hispanic students	9	3	5
Orshansky %	13.7	13.3	11.6
% of students/free lunch	23.8	32.4	26.7
Inst. $ per pupil[a]	58.5	56.7	58.1
Instructional			
No. of students	960	640	883
*teacher-student ratio	1-14	1-14	1-11
# days in school yr	179	179	178
Minutes/long per class	51	49	50
#standard class periods/day	6.3	6.8	6.7
#class periods per student	5.9	5.9	5.6
% with remedial read.program	75.1	11.6	52.3

[a] aggregated from student-level data

TABLE 6

GRADE 4
SCHOOL AND STUDENT-LEVEL CHARACTERISTICS
WEIGHTED AVERAGES[a] BY RACE/ETHNIC GROUP BY SCHOOL TYPE

	WHITE		BLACK		HISPANIC	
	MCT		MCT		MCT	
	Yes	No	Yes	No	Yes	No
School-level Variables						
% White students	77 (21)	91 (12)	35 (30)	37 (38)	49 (27)	62 (36)
Orshansky %	12 (11)	8 (8)	17 (10)	19 (13)	15 (13)	13 (13)
% of students/free lunch	39 (32)	39 (34)	64 (32)	62 (30)	46 (33)	48 (37)
Instructional $ per pupil	58 (23)	49 (23)	58 (22)	63 (15)	60 (22)	50 (28)
Student-level variables						
Parents' Education	3.03 (1.10)	3.09 (1.15)	3.02 (1.11)	3.06 (1.04)	2.93 (1.15)	2.79 (1.04)
Family Background (b)	6.07 (2.14)	6.21 (2.02)	5.71 (2.17)	5.82 (2.10)	5.42 (2.28)	5.47 (2.11)
Students' Academic Behaviors	3.44 (1.70)	3.34 (1.67)	3.46 (1.75)	3.26 (1.80)	3.36 (1.62)	3.21 (1.61)
Students' Age	9.25 (.52)	9.29 (.51)	9.34 (.61)	9.45 (.67)	9.38 (.65)	9.36 (.61)

a Standard deviations in parentheses

b Composite of parents' education plus possessions in the home.

TABLE 7

GRADE 8

SCHOOL AND STUDENT-LEVEL CHARACTERISTICS
WEIGHTED AVERAGES[a] BY RACE/ETHNIC GROUP BY SCHOOL TYPE

	WHITE		BLACK		HISPANIC	
	MCT		MCT		MCT	
	Yes	No	Yes	No	Yes	No
School-Level Variables						
% white students	76 (22)	89 (16)	37 (31)	43 (34)	39 (27)	39 (26)
Orshansky %	10 (9)	11 (10)	17 (10)	23 (25)	11 (7)	27 (18)
% of students/free lunch	23 (24)	41 (30)	49 (28)	58 (33)	44 (27)	61 (30)
Instructional $ per pupil	63 (15)	53 (13)	65 (16)	55 (11)	66 (14)	48 (11)
Student-Level Variables						
Parents' Education	3.01 (1.03)	2.71 (1.02)	2.72 (1.06)	2.62 (1.10)	2.52 (1.14)	2.05 (1.09)
Family Background (b)	7.23 (1.62)	7.03 (1.57)	6.39 (1.87)	6.27 (1.95)	5.70 (2.03)	5.24 (2.04)
Students' Academic Behaviors	3.63 (1.90)	3.58 (1.68)	3.53 (1.75)	3.48 (1.70)	3.56 (1.77)	3.33 (1.70)
Students' Age	13.3 (.52)	13.3 (.53)	13.4 (.73)	13.7 (.90)	13.4 (.57)	13.6 (.70)

a Standard deviations in parentheses

b Composite of parents' education plus possessions in the home.

TABLE 8

SCHOOL AND STUDENT-LEVEL CHARACTERISTICS WEIGHTED AVERAGES[a] BY RACE/ETHNIC GROUP BY SCHOOL TYPE

Grade 11

	WHITE		BLACK		HISPANIC	
	MCT		MCT		MCT	
	Yes	No	Yes	No	Yes	No
School-Level Variables						
% White students	79 (19)	88 (15)	45 (32)	62 (21)	35 (29)	55 (31)
Orshansky %	12 (11)	12 (13)	19 (12)	32 (21)	22 (17)	21 (12)
% of students/free lunch	15 (16)	22 (20)	38 (27)	39 (25)	34 (23)	40 (25)
Instructional $ per pupil	61 (17)	57 (14)	65 (15)	50 (19)	62 (16)	59 (11)
Student-Level Variables						
Parents' Education	3.08 (1.02)	2.74 (1.01)	2.61 (1.09)	2.33 (1.00)	2.14 (1.14)	2.04 (1.00)
Family Background (b)	7.60 (1.47)	7.25 (1.41)	6.72 (1.66)	6.40 (1.62)	5.91 (1.87)	5.83 (1.71)
Students' Academic Behaviors	4.30 (2.06)	3.93 (1.94)	4.12 (1.91)	3.86 (1.94)	3.93 (1.93)	3.72 (1.93)
Students' Age	17.0 (.60)	17.0 (.50)	17.3 (.80)	17.3 (.80)	17.3 (.80)	17.4 (.70)

[a] Standard deviations in parentheses

b Composite of parents' education plus possessions in the home.

TABLE 9

UNADJUSTED AVERAGE READING PROFICIENCY BY GRADE BY RACE/ETHNIC GROUP BY SCHOOL TYPE[a]

	GRADE 4			GRADE 8			GRADE 11		
	MCT		No	MCT		No	MCT		No
	Yes	No	Response	Yes	No	Response	Yes	No	Response
White	222.0	227.0	219.6	267.7	260.6	266.9	298.1	290.8	291.1
	(31.5)	(30.5)	(32.7)	(27.2)	(28.5)	(27.7)	(29.9)	(31.5)	(32.3)
Black	194.9	194.4	189.0	243.9	232.3	239.5	267.7	262.7	261.6
	(28.3)	(28.6)	(30.5)	(27.2)	(27.8)	(28.0)	(28.2)	(31.5)	(31.3)
Hispanic	197.9	202.3	194.9	243.7	236.4	244.1	269.0	261.9	263.8
	(31.1)	(29.8)	(32.7)	(29.8)	(28.5)	(27.2)	(32.2)	(34.4)	(34.0)

[a] Standard deviations in parentheses.

TABLE 10

UNSTANDARDIZED REGRESSION WEIGHTS FOR MINIMUM COMPETENCY DUMMY-CODED VARIABLE

	GRADE 4		GRADE 8		GRADE 11	
	Adjusted[a]	Final[b] Step	Adjusted	Final Step	Adjusted	Final Step
White	-1.66	-1.08	7.79	5.54	2.18	.42
(S.E.)	(1.09)	(1.08)	(1.29)	(1.51)	(1.01)	(1.58)
Black	-.30	2.89	10.90	7.60	6.62	12.34
(S.E.)	(2.58)	(3.97)	(2.51)	(3.23)	(2.91)	(3.48)
Hispanic	-2.86	-3.00	-1.21	.06	5.93	5.76
(S.E.)	(3.01)	(3.23)	(3.50)	(3.71)	(3.48)	(4.33)

[a] at each grade level, effect adjusted for sex, student age, region of the country, school-level SES, family background, and student academic behaviors.

[b] at each grade level, effect adjusted for student and school level variables in addition to school-level remedial program (dummy coded 1=yes, 0=no) and instructional dollars per pupil.

TABLE 11

UNADJUSTED READING PROFICIENCY BY SCHOOL RESPONSE PROGRAM BY TYPE OF STATE MANDATE

Grade 4

	TYPE OF STATE MANDATE		
NAEP Response	**MCT-state controlled**	**MCT- local options**	**Test Program only**
MCT-YES	210.4 (32.6)	214.9 (33.3)	213.8 (33.4)
MCT-NO	*	221.3 (31.7)	224.8 (32.1)

Grade 8

	TYPE OF STATE MANDATE		
NAEP Response	**MCT-state controlled**	**MCT- local options**	**Test Program only**
MCT-YES	258.9 (29.0)	260.9 (29.6)	267.3 (30.6)
MCT-NO	*	258.9 (29.0)	251.0 (32.0)

Grade 11

	TYPE OF STATE MANDATE		
NAEP Response	**MCT-state controlled**	**MCT- local options**	**Test Program only**
MCT-YES	289.7 (32.7)	287.4 (32.9)	269.1 (34.2)
MCT-NO	*	288.5 (32.8)	283 (33.4)

*omitted from all analyses.

TABLE 12

UNSTANDARDIZED REGRESSION WEIGHTS BY TYPE OF STATE MANDATE FOR MINIMUM COMPETENCY TESTING[a]

	GRADE 4		GRADE 8		GRADE 11	
	B	SE	B	SE	B	SE
Sch. Yes MCT/State-controlled	-3.89	(1.15)	9.19	(.49)	7.10	(1.42)
Sch. Yes MCT/State-option(s)	-1.81	(1.41)	8.28	(.79)	5.63	(1.24)
Sch. Yes MCT/State test	-3.59	(2.22)	4.27	(2.40)	-.29	(4.03)
Sch. No MCT/State-option(s) (Ref. Group Sch. No MCT/ State-no MCT)	-1.78	(1.18)	3.56	(.86)	1.56	(1.49)

a Adjusted for district and school context and SES, parents' academic values, and race.

Figure 1
Average Reading Proficiency by race/ethnic group
by grade level for total NAEP Sample

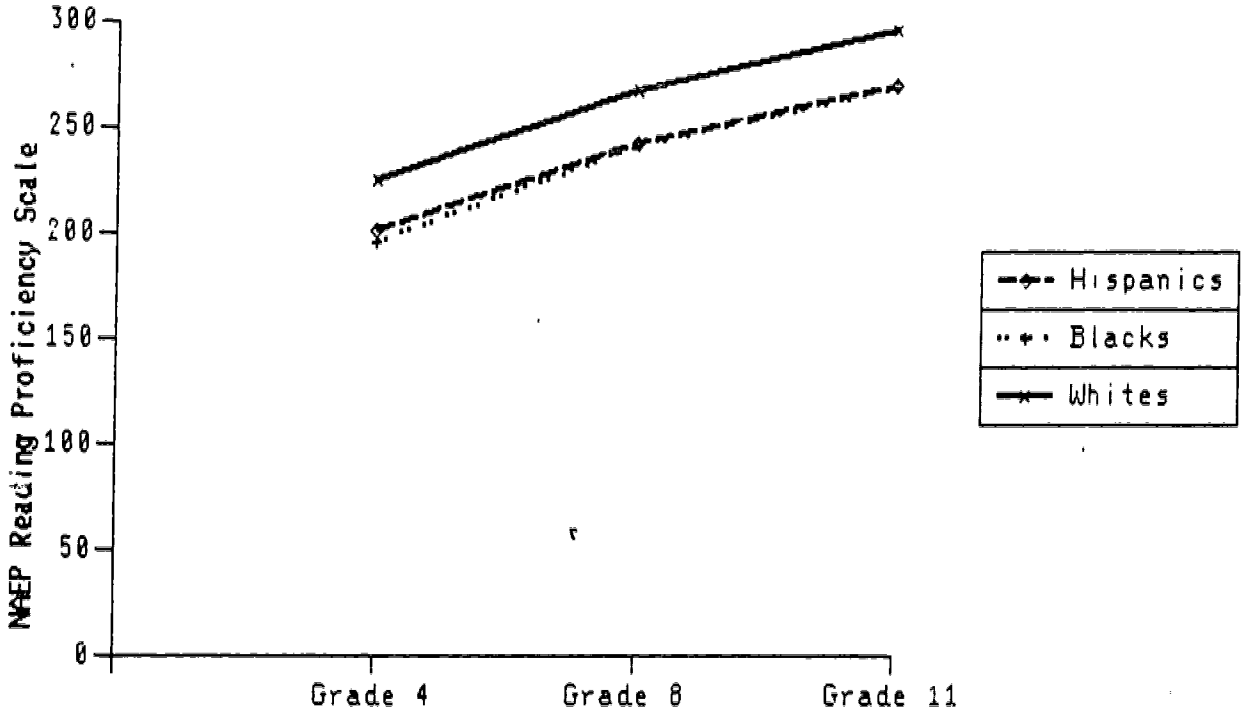


Figure 2
Proportion of NAEP 4th Grade White Students at or Below
Each Proficiency Level by MCT School Response

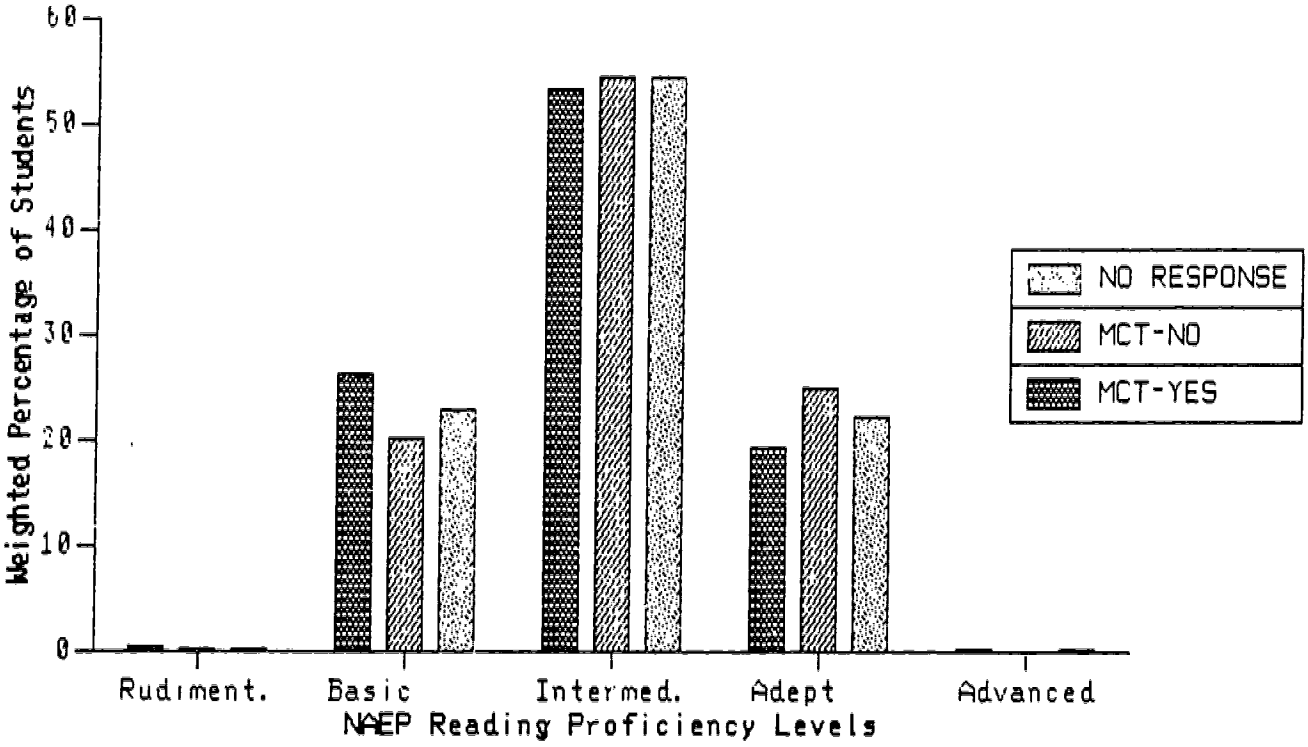


Figure 3
Proportion of NAEP 4th Grade Black Students at or Below
Each Proficiency Level by MCT School Response

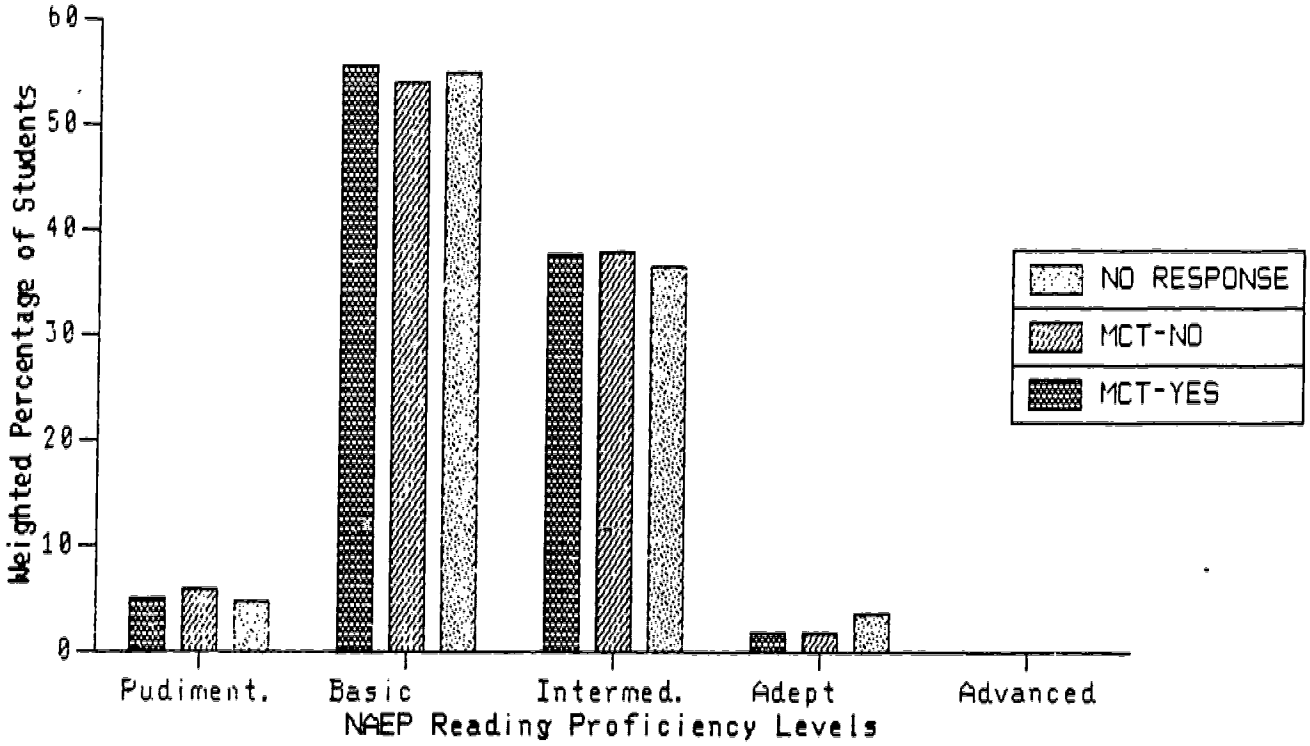


Figure 4
Proportion of NAEP 4th Grade Hispanic Students at or Below
Each Proficiency Level by MCT School Response

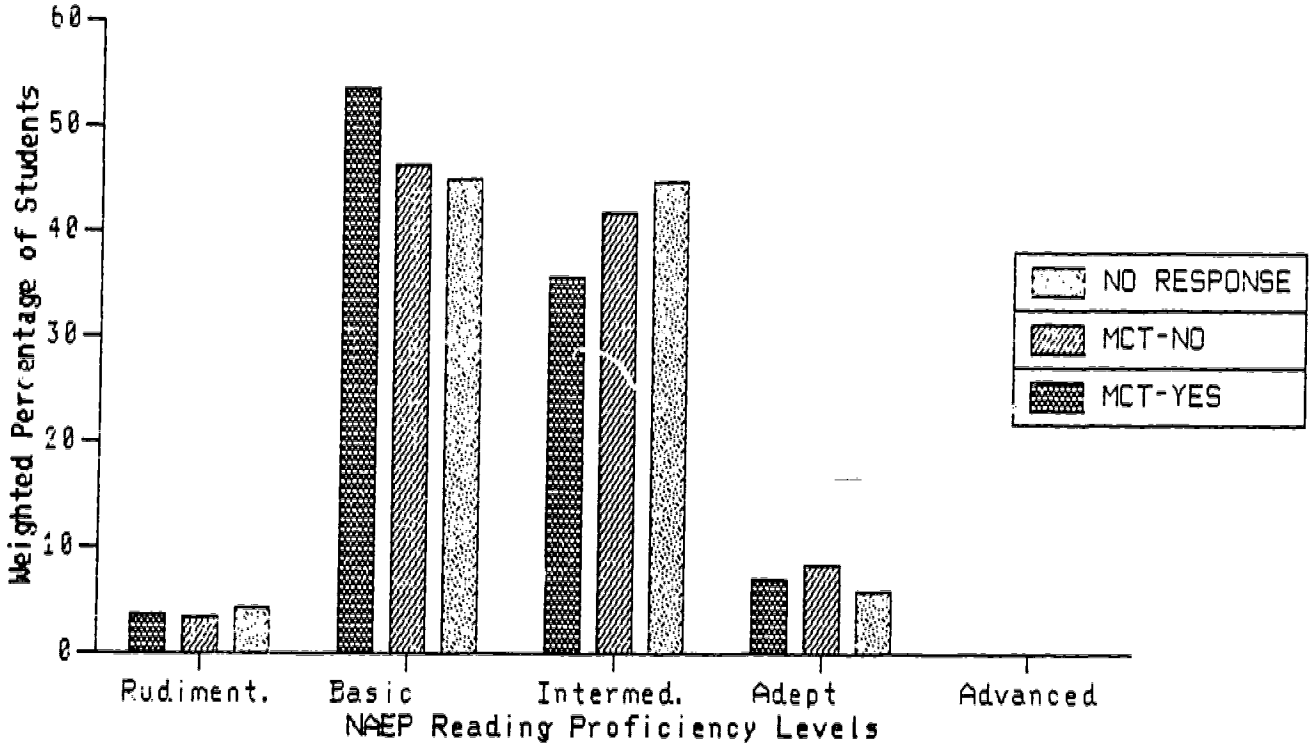


Figure 5
Proportion of NAEP 8th Grade White Students at or Below
Each Proficiency Level

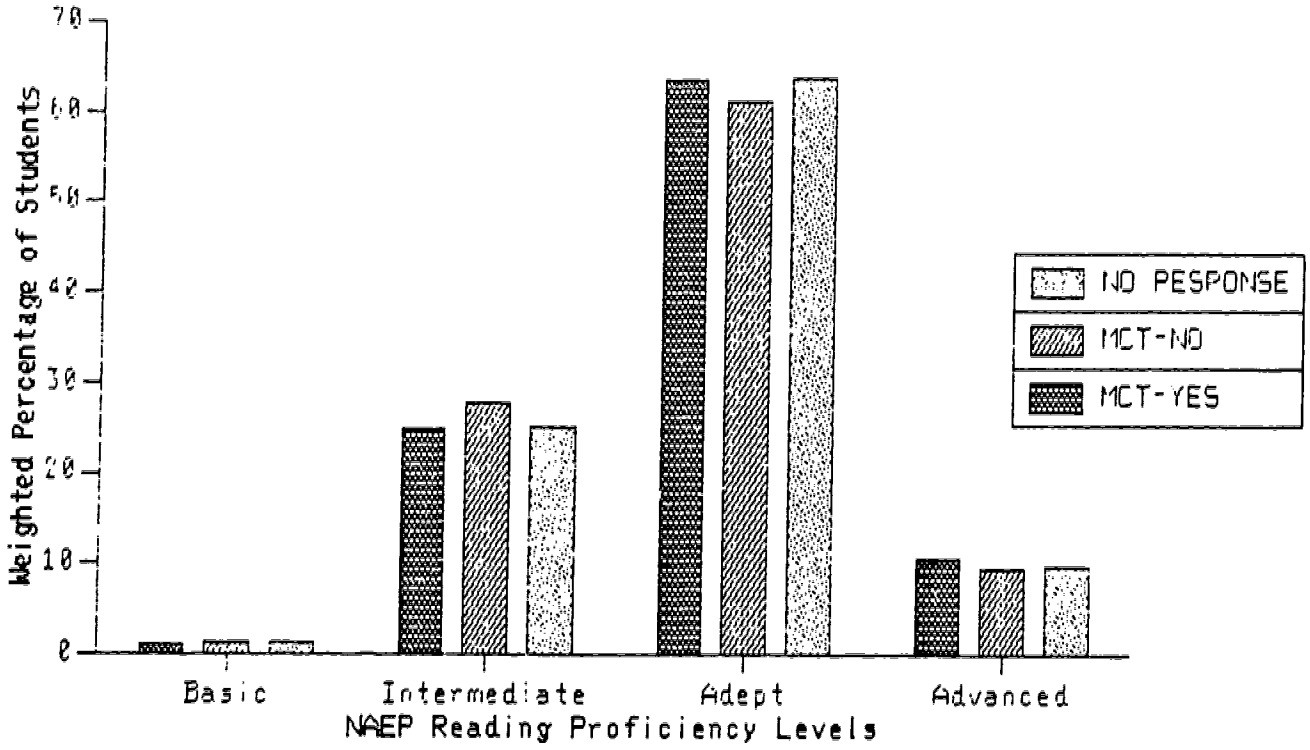


Figure 6
Proportion of NAEP 8th Grade Black Students at or Below
Each Proficiency Level by MCT School Response

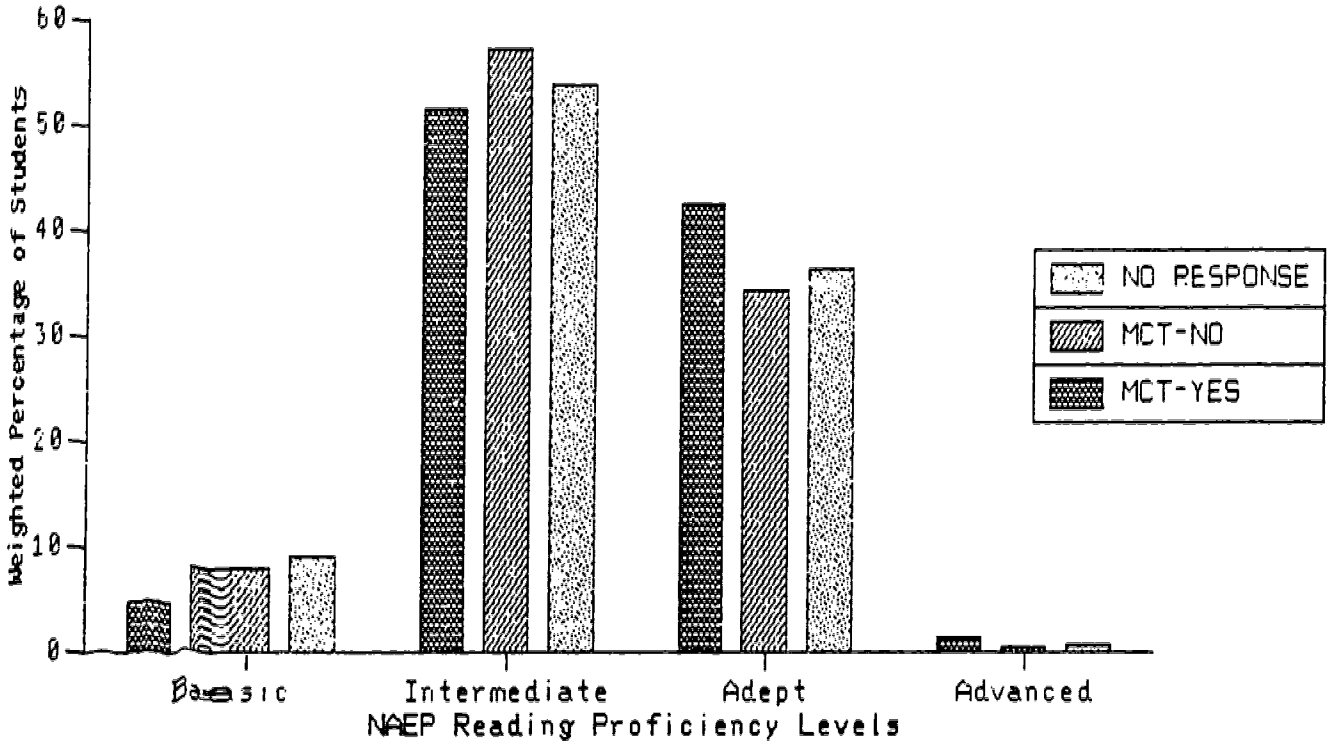


Figure 7
Proportion of NAEP 8th Grade Hispanic Students at or Below Each Proficiency Level by MCT School Response

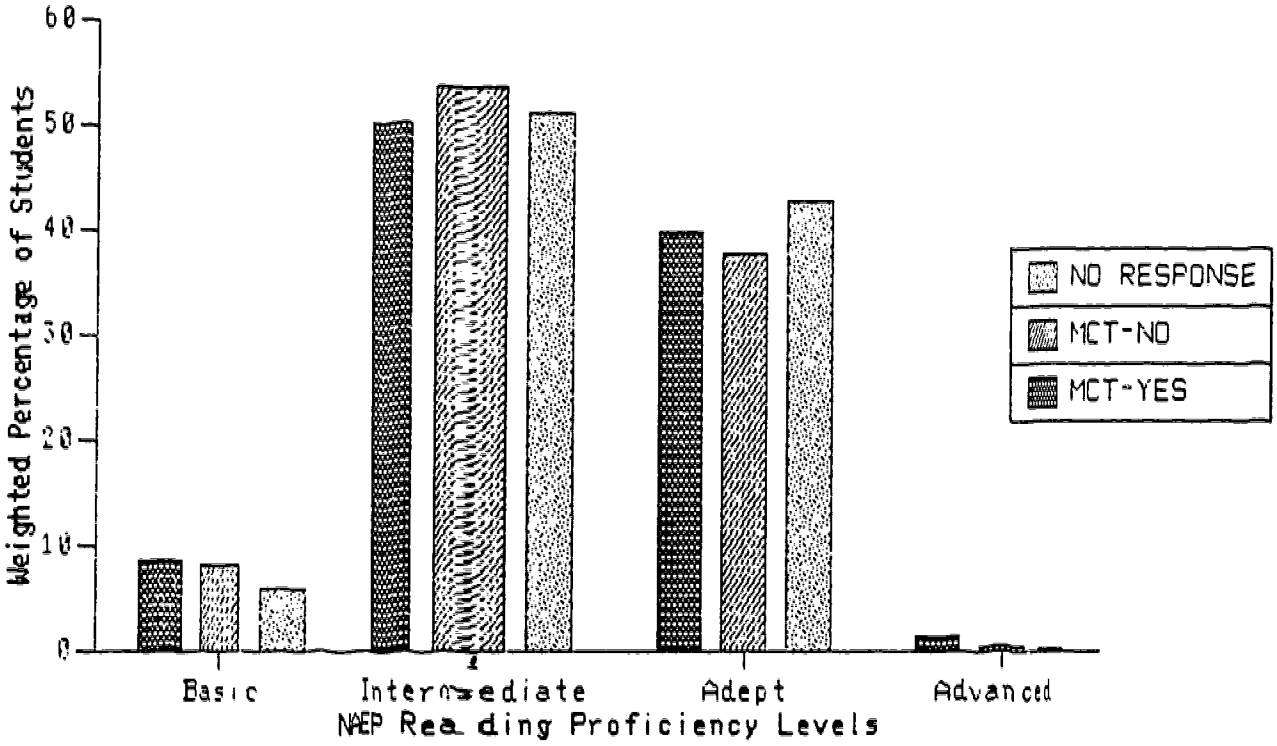


Figure 8
Proportion of NAEP 11th Grade White Students at or Below Each Proficiency Level by MCT School Response

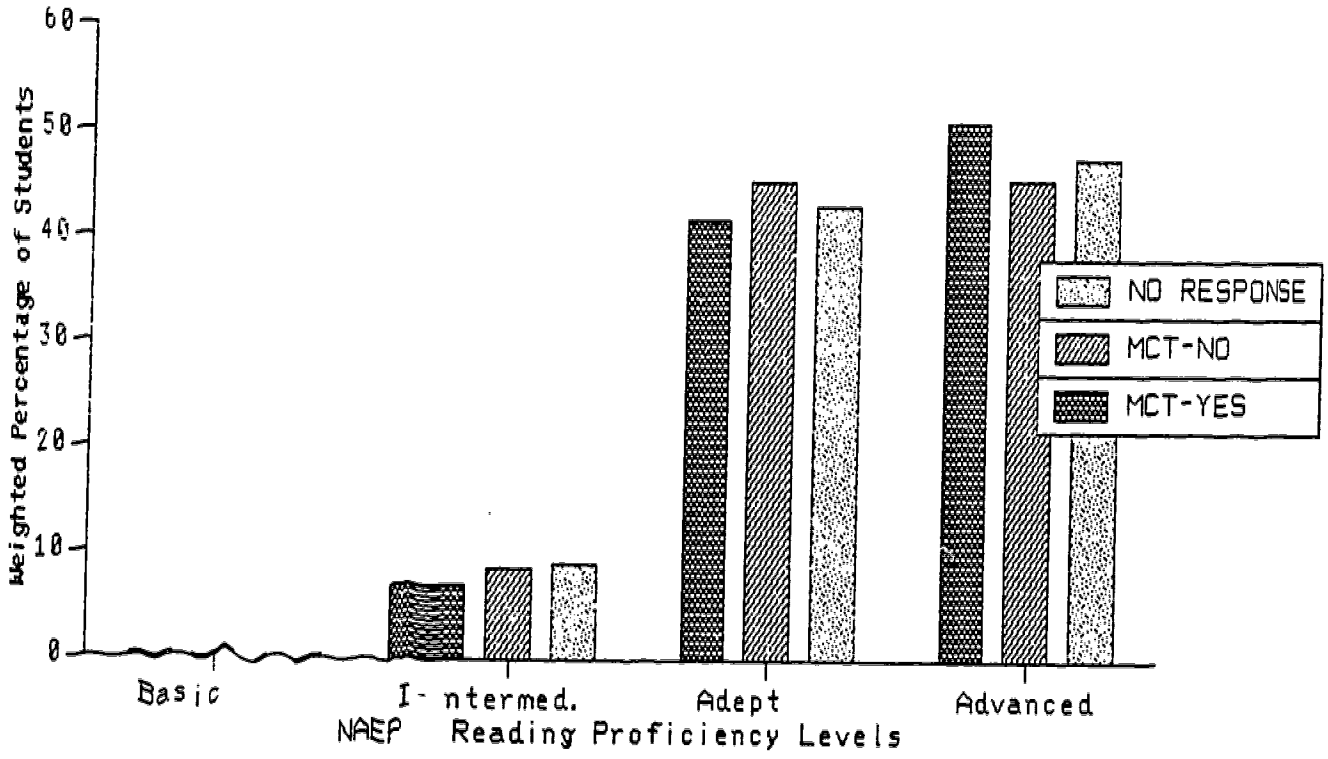


Figure 9
Proportion of NAEP 11th Grade Black Students at or Below
Each Proficiency Level by MCT School Response

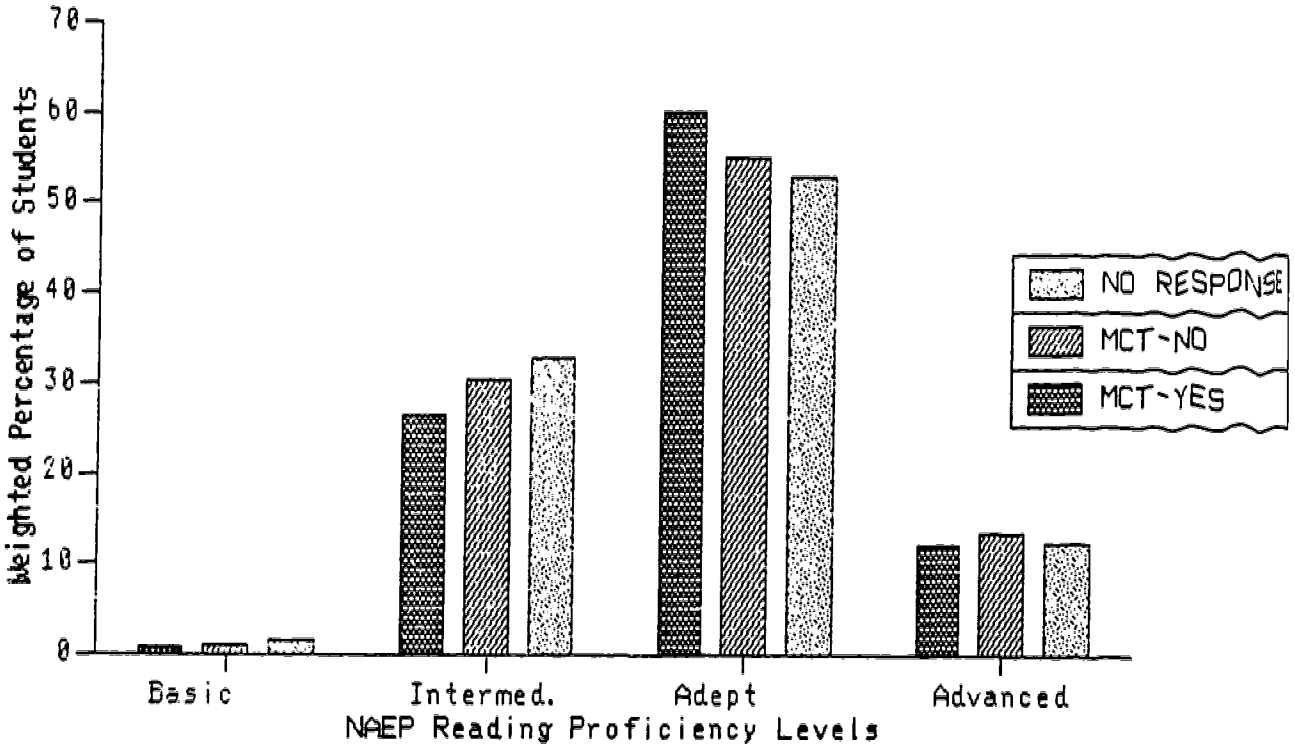
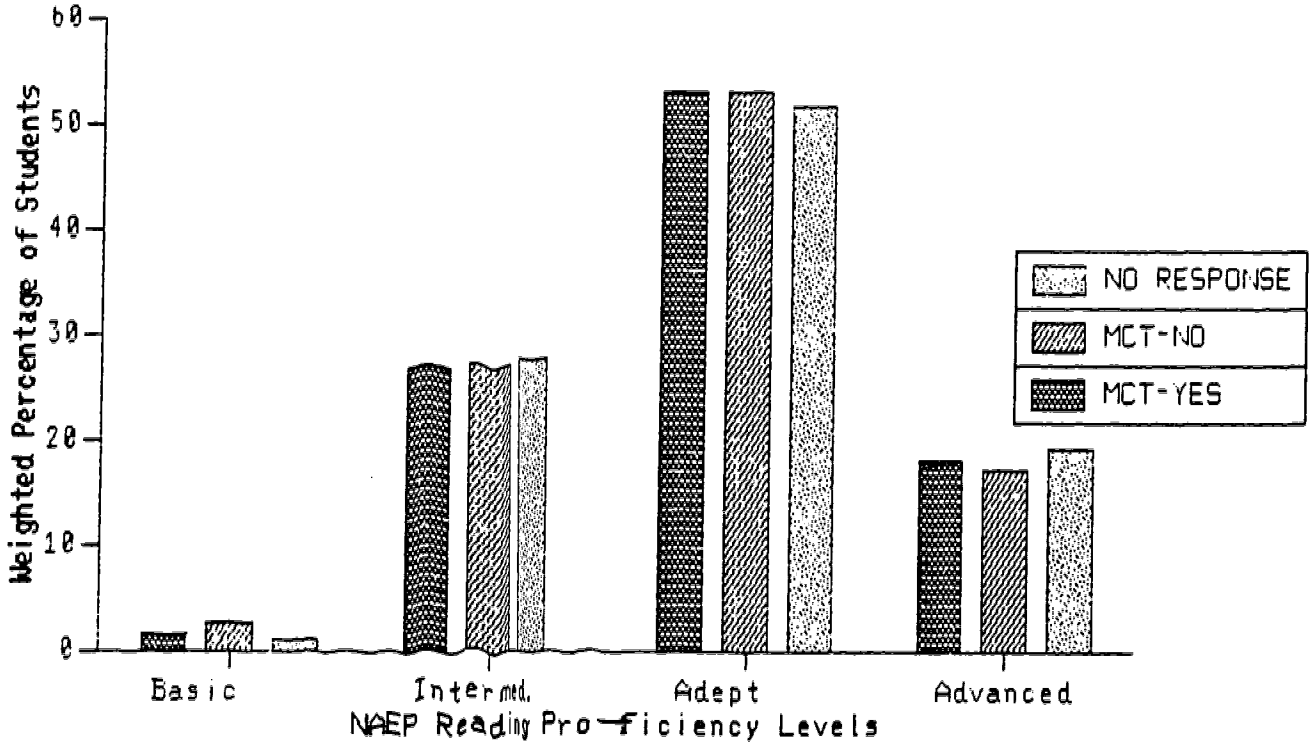


Figure 10
Proportion of NAEP 4th Grade Hispanic Students at or Below Each Proficiency Level by MCT School Response



APPENDIX A
NAEP PROFICIENCY LEVELS

Rudimentary

Performance at the rudimentary level suggests that readers have acquired the ability to carry out simple, discrete reading tasks; e.g., can follow brief written directions, select words, phrases or sentences to describe a picture. Performance at the basic level suggest the readers' ability to understand specific or sequentially related information; e.g., can locate and identify facts from simple informational paragraphs, stories, and can combine ideas and make inferences based on short, simple passages.

Basic

Performance at the basic level suggests the readers have learned basic comprehension skills and strategies and can locate and identify facts from simple informational paragraphs, stories, and news articles. In addition, they can combine ideas and make inferences based on specific or sequentially related information.

Intermediate

Performance at the intermediate level suggests the readers' ability to search for specific information, interrelate ideas, and make generalizations. These readers can search for, locaet, and organize the information they find in lengthy passages and can recognize paraphrases of what they have read. They can also make inferences and arrive at generalizations about main ideas and author's purpose from passages concerning literature, science, and social studies.

Adept

Performance at the adept level suggests the reader's ability to find, understand, summarize, and explain relatively complicated information. For example, these readers can understand complicated literary and informational passages, and can analyze and integrate less familiar material.

Advanced

Performance at the advanced level suggests the ability to synthesize and learn from specialized reading materials. For example these readers can extend and restructure the ideas presented in such texts as literary essays, scientific materials, historical and technical documents.

Taken from NAEP, Reading Report Card, 1985.

APPENDIX B

CODING OF TYPES OF STATE PROGRAMS

The basis for categorizing state-mandated programs derived initially from obtaining a consensus of information about characteristics of each state program. Information was obtained from published listings, ERIC reports, and published works on minimum competency testing. Published listings provided information on the status of state MCT programs, and typically listed options available to school districts. Options might include which grade level to test, the actual test used, or substitution of a local assessment program in lieu of a state testing program. For purposes of categorization, no distinctions were made between types of options.

However, on any one listing, two very different state MCT programs might appear to be similar when in reality they are very different. For example, on one listing, both Delaware and Florida are listed as having a state MCT with the state agency setting the performance standards, and attainment of standards required for high school graduation. In Delaware, the state educational agency provides the specific competencies to be achieved, and the local districts determine in what manner these competencies are to be assessed. Completion of state-wide competencies are required for high school graduation. A standardized test, however, is not necessarily a part of this program. There is in Delaware are a separate and distinct state-wide assessment program. In Florida, the state educational agency develops minimum student performance standards, testing instruments, and assesses those standards for pupil promotion and graduation. These are two very different state programs.

Different types of MCT programs which appear similar on published listings may result from the confusion between MCT and competency-based education, two different types of programs. Competency based education often includes minimum competency tests as one of its components. CBE attempts to set clearly defined objectives for all levels of education and has a strong focus on basic skills. The goals in CBE are generally more ambitious and less minimal than those specified in MCT. However, in many districts that use competency -based education, students must also pass a competency exam before graduation. Other districts require students to master a minimal core of competency based objectives (Lazarus, 1981). Differences on published listings might also result from other terminology used by state officials to describe these programs. Thus, published listings may be adequate for summarizing the various state programs; however, may reflect similarities between programs that are, in fact, quite different. Others have also identified discrepancies between various published listings (Marshall, 1986). For purposes of categorization in this study, no distinction was made between competency-based education and minimum competency testing. The working definition of MCT, used in classifying programs was the one used by Education Commission of the States. In general, MCT programs are those in which (a) there is a state mandate to test all students in one or more grade and (b) there is an effort to set predetermined minimum standards either statewide or locally.

The time period in which the lists and reports were published was also considered in the classification of a state-MCT program. For purposes of coding, the legislation or board mandate must have been in effect by April-May, 1984 (during the time of the NAEP data collection). Thus, those states which implemented a MCT program after this date would be included in one of the two classifications of state testing programs.

APPENDIX B-2

MINIMUM COMPETENCY TESTING PROGRAMS BY STATE

I. STATE-MANDATED MCT PROGRAMS- STATE CONTROLLED

State	Action Taken	Govn.Level Setting Standard	Elementary	Middle	High School
Alabama	1977	SEA/SBE	x	x	graduation requir.
Arizona[1]	1976,83	SBE/LEA	x		graduation requir.
Arkansas[2]	1979	SBE	x	x	-
Florida	1976,83	SBE/LEA	x	x	graduation requir.
Georgia	1976,81	SBE/SEA	x	x	graduation requir.
Hawaii[3]	1978	SEA	x		graduation requir.
Kentucky	1977,78	SEA	x	x	-
Kansas[4]	1978,81	SEA/SBE	x	x	-
Louisiana[5]	1976,77	SEA/SBE	x	x	graduation requir.
Maryland	1976,77	SBE/SEA	x		graduation requir.
Mississippi[6]	1982	SEA			graduation requir.
Missouri	1976,78	SEA	x		-
Nevada	1977,79	SBE	x		graduation requir.
New Jersey	1976,79	SBE/LEA	x	x	graduation requir.
New York	1978	SBE	x	x	graduation requir.
South Carol.[7]	1978,84	SBE	x		graduation requir.
Tennessee	1977,82	SBE/LEA	x	x	graduation requir.
Texas[8]	1979	SEA	x	x	graduation requir.
Virginia	1976,78	SEA/LEA	x		graduation requir.
Vermont	1977	SBE	x		graduation requir.
Rhode Island	1978	SBE/SEA	x	x	-
North Carolina	1977	SBE	x	x	graduation requir.
Pennsylvania[9]	1984	SEA	x	x	-

II.STATE MINIMUM COMPETENCY TESTING WITH LOCAL OPTION(S)

California	1976,83	LEA	x	x	graduation requir.
Colorado	1975	LEA	x		graduation requir.
Delaware	1976	SEA/LEA			graduation requir.
Idaho	1977	SBE/SEA	x		graduation requir.
Connecticut	1978	SBE/LEA	x	x	-
Indiana	1978	LEA	x	x	-
Massachusetts	1978	LEA			

APPENDIX B-3

State	Govn.Level Action Taken	Setting Standard	Elementary	Middle	High School
New Mexico	1976	SBE			-
New Hampshire	1977	SEA/LEA	x	x	-
Nebraska	1975	SEA/LEA	x		
Illinois	1978	LEA	At local option		
Ohio	1982	LEA	At local option		
Oregon	1976,80	SEA/LEA	At local option		
Utah	1977	SEA/LEA	At local option		graduation requir.
Wisonsin	1981,82	LEA	At local option		graduation requir.
Wyoming	1977,80	SEA/LEA	At local option		-

III STATE TESTING PROGRAM ONLY

Alaska
Maine
Minnesota
Michigan
Oklahoma
South Dakota
Washington
West Virginia

IV NO STATE TESTING PROGRAM

Iowa
Montana
North Dakota

Abbreviations and Symbols
LEG - State Legislature
SBE - State Board of Education
SEA - State Education Agency
LEA - Local Education Agencies (local school boards or school districts)

"x" indicates that a state-wide MCT mandate exists at elementary (grades 1 through 6), middle (grades 7-8) or high school (grades 9 through 12).

"graduation requirement" listed under high school indicates that some form of exit or competency exam is required prior to graduation. The exam could occur in either of grades 9, 10, 11 or 12.

APPENDIX B-4

NOTES to Table:

1 Legislation in 1983 calls for Arizona to develop a minimum course of study and criteria for high school graduation standards and for grade to grade promotion criteria. Local school districts are to implement standards.

2 In 1987, a minimum comptency test will be administered for 8th grade promotion.

3 For high school graduation requirements students have 3 options: paper-pencil test; performance test; or course. First time taken (grade 9) must be paper-pencil.

4 The Kansas Minimum Competency Assessment (MCA) was reestablished by 1984 legislative action (S.B. 473). The MCA will be in effect 1984-85 through 1988-89.

5 Louisiana will add 8th grade beginning with 1986-87 school year and will implement a graduation requirement.

6 State Board developed 11th grade functional literacy test necessary for graduation (December, 1982, effective, 1986).

7 The South Carolina Education Improvement Act of 1984 specifies that the 11th grade test being used to gather baseline data will be replaced in the 1985-86 school year with an exit exam in the 10th grade. All students graduating in 1990 or after must pass the exam (June 1984).

8 Texas-High school students must pass exit exam (July 1984, effective June 1986).

9 Will require reading and math test in grades 3,5, and 8; state -funded remedial program for those who fail state-wide test, June, 1984.

Information compiled in this listing was obtained from the following sources:

The Nation Responds: Recent Efforts to Improve Education, U. S. Dept of Education, U. S. Government Printing Office, Washington, D.C. May,1984.

Plisko, V. and J. D. Stern (Eds.) The Condition of Education, 1985 Edition, P. 68, Table 1.26 "States Using Minimum-Competency Testing, by Government Level Setting Standards, Grade Levels Assessed, and Expected Use of Standards: United States, U.S. Govn. Printing Office.

Education Week, "Changing Course A 50-state survey of reform measures, February 6, 1985, Pps.11-30.

Sutter, J. A. & Rice, E. V. Student Performance Standards and Testing Programs: Background information for legislators, Minnesota Senate, St. Paul. Senate Counsel and Research, March 1984 Eric Document Reproduction Service 252 530.

Pipho, Chris. State Activity: Minimal Competency Testing. Denver, Colorado: Education Commission of the States, November, 1981.

ECS Issuegram: Student Minimum Competency Testing. Denver, Colorado: Education Commission of the States, January, 1983.

Goertz, M. E. State Educational Standards: A 50-State Survey. Educational Testing Service, September, 1985.

APPENDIX C

DESCRIPTION OF NAEP SIZE & TYPE OF COMMUNITY VARIABLE

The size and type of community variable provides information about the communities in which the schools were located. The categories consisted of three "extreme" types of communities e.g., rural, disadvantaged urban and advantaged urban, and four "residual" community types based on population size. Schools included in the extreme rural, and disadvantaged or advantaged urban areas consist of the top 10 percent of schools in a rank-ordered listing of occupational profile of residents, size of the population, and type of community. The remaining schools were classified according to one of the four residual categories - main big city, urban fringe, medium city, and small place depending upon the size of the community in which they were located (NAEP Users' Guide, 1985).

Extreme Rural

This category was used for schools in rural areas where a high proportion of adults were farmers or farm workers and a low proportion were professional,managerial, or factory workers. At least some of the students in these schools were from open country or places with a population of less than 10,000.

Disadvantaged Urban

This category was used for schools in areas where a high proportion of the adult population was either not regularly employed or on welfare and a low proportion was employed in professional or managerial positions. The schools in this category were located in cities, or the urbanized area of cities, with a population greater than 200,000.

Advantaged Urban

This category was used for schools in areas where a high proportion of adults were employed in professional or managerial positions and a low proportion of factory or farm workers not regularly employed, or on welfare. The schools in this category were located in cities or the urbanized area of cities with populations greater than 200,000.

APPENDIX C-2

DESCRIPTION OF NAEP SIZE AND TYPE OF COMMUNITY VARIABLES

Main Big City

This category was used for schools located within the limits of cities with populations greater than 200,000 but not classified as advantaged or disadvantaged urban.

Urban Fringe

This category was used for schools located in an urbanized area, but outside the limits of cities with populations over 200,000 and not classified as advantaged or disadvantaged urban.

Medium City

This category was used for school located in cities with populations of between 25,000 and 200,000 which did not classify as fringe areas for big cities.

Small Place

This category was used for schools located in communities with populations of less than 25,000. These communities were not located in an urbanized area of big cities and could not be classified as "Extreme Rural".

Taken from NAEP User's Guide, 1985.

APPENDIX D

SCHOOL AND STUDENT-LEVEL CHARACTERISTICS WEIGHTED AVERAGES BY RACE/ETHNIC GROUP BY GRADE FOR NON-RESPONSE SCHOOLS

	WHITE		BLACK		HISPANIC	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
GRADE 4						
School-level Variables						
% White students	85	20	47	(38)	52	(37)
Orshansky %	12	(12)	20	(15)	21	(20)
% of students/free lunch	36	(31)	60	(32)	49	(35)
Instructional$ per pupil	52	(20)	55	(24)	53	(22)
Student-level variables						
Parents' Education	3.03	(.93)	2.86	(1.12)	2.78	(1.17)
Family Background a	6.17	(2.07)	5.55	(2.05)	5.47	(2.13)
Students' Academic Behaviors	3.38	(1.66)	3.34	(1.11)	3.40	(1.69)
Students' Age	9.28	(.50)	9.41	(.64)	9.36	(.62)
GRADE 8						
School-level Variables						
% White students	86	(17)	55	(34)	54	(38)
Orshansky %	11	(12)	21	(15)	17	(14)
% of students/free lunch	32	(29)	49	(30)	50	(31)
Instructional $ per pupil	54	(16)	60	(16)	54	(15)
Student-level variables						
Parents' Education	2.77	(1.05)	2.58	(1.07)	2.28	(1.15)
Family Background (a)	7.1.7	(1.59)	6.26	(1.81)	5.50	(2.17)
Students' Academic Behaviors	3.59	(1.68)	3.48	(1.71)	3.29	(1.72)
Students' Age	13.3	(.62)	13.7	(.90)	13.6	(.76)

APPENDIX D-2

SCHOOL AND STUDENT-LEVEL CHARACTERISTICS WEIGHTED AVERAGES BY RACE/ETHNIC GROUP BY GRADE FOR NON-RESPONSE SCHOOLS

	WHITE		BLACK		HISPANIC	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
GRADE 11						
School-level Variables						
% White students	92	(14)	77	(30)	51	(40)
Orshansky %	10	(9)	17	(14)	21	(20)
% of students/free lunch	18	(22)	44	(38)	48	(39)
Instructional $ per pupil	58	(13)	63	(14)	61	(12)
Student-level variables						
Parents' Education	2.78	(1.03)	2.57	(1.07)	2.19	(1.20)
Family Background (a)	7.37	(1.39)	6.67	(1.67)	5.91	(2.01)
Students' Academic Behaviors	4.12	(1.91)	4.12	(1.93)	3.94	(1.98)
Students' Age	17.1	(.50)	17.3	(.80)	17.3	(.80)

[a] Composite of parents' education plus possessions in the home.

APPENDIX E

UNADJUSTED READING PROFICIENCY BY GRADE BY RACE BY SCHOOL TYPE BY REMEDIAL PROGRAM IN READING

GRADE 4

White Students

MCT PROGRAM	REMEDIAL PROGRAM: YES	REMEDIAL PROGRAM: NO	
YES	221.8 (31.2)	221.5 (31.5)	221.7 (31.4)
NO	227.2 (30.3)	225.8 (30.6)	226.2 (30.6
	223.2 (31.3)	224.2 (30.9)	223.7 (28.0)

Black Students

MCT PROGRAM	REMEDIAL PROGRAM: YES	REMEDIAL PROGRAM: NO	
YES	193.2 (28.0)	202.3 (26.2)	194.3 (28.0)
NO	183.7 (28.0)	194.4 (27.2)	192.0 (27.9)
	192.7 (28.1)	197.5 (27.1)	193.8 (27.9)

Hispanic Students

MCT PROGRAM	REMEDIAL PROGRAM: YES	REMEDIAL PROGRAM: NO	
YES	198.9 (31.2)	196.8 (30.9)	197.8 (31.1)
NO	208.2 (26.9)	205.4 (32.2)	206.2 (30.7)
	200.7 (30.6)	200.0 (31.7)	200.3 (31.2)

APPENDIX E-2

GRADE 8

White Students

		REMEDIAL PROGRAM YES	REMEDIAL PROGRAM NO	
MCT PROGRAM	YES	268.2 (26.9)	265.0 (27.7)	267.3 (27.2)
	NO	264.9 (27.8)	258.2 (29.7)	259.8 (29.4)
		267.5 (27.1)	260.3 (29.3)	263.8 (28.5)

Black Students

		REMEDIAL PROGRAM YES	REMEDIAL PROGRAM NO	
MCT PROGRAM	YES	244.6 (26.7)	240.8 (28.1)	243.6 (27.1)
	NO	229.6 (26.2)	233.6 (29.1)	231.8 (27.9)
		240.9 (28.9)	236.7 (27.4)	239.4 (28.0)

Hispanic Students

		REMEDIAL PROGRAM YES	REMEDIAL PROGRAM NO	
MCT PROGRAM	YES	243.5 (29.2)	243. (28.9)	243.4 (29.0)
	NO	238.8 (28.1)	234.1 (29.4)	234.5 (29.4)
		243.2 (29.2)	238.5 (29.4)	240.6 (29.4)

APPENDIX E-3

GRADE 11

White Students

		REMEDIAL PROGRAM YES	REMEDIAL PROGRAM NO	
MCT PROGRAM	YES	298.6 (29.5)	295.3 (31.8)	298.1 (29.9)
	NO	292.2 (31.4)	292.1 (31.2)	292.1 (31.2)
		297.8 (29.8)	292.8 (31.4)	295.8 (30.5)

Black Students

		REMEDIAL PROGRAM YES	REMEDIAL PROGRAM NO	
MCT PROGRAM	YES	267.8 (28.2)	274.2 (27.2)	268.3 (28.1)
	NO	260.7 (32.6)	263.9 (29.7)	262.9 (30.7)
		267.2 (28.6)	267.2 (29.3)	267.2 (28.8)

Hispanic Students

		REMEDIAL PROGRAM YES	REMEDIAL PROGRAM NO	
MCT PROGRAM	YES	269.7 (32.4)	249.2 (27.3)	269.0 (32.4)
	NO	261.9 (31.3)	266.3 (34.0)	264.7 (33.1)
		269.1 (32.3)	262.7 (33.5)	268.5 (32.6)

APPENDIX F

DISTRIBUTION OF NAEP PROFICIENCY LEVELS BY RACE/ETHNIC GROUP AND SCHOOL TYPE

		Weighted percentage of students at or below level:				
	N	RUDIMENTARY	BASIC	INTERMEDIATE	ADEPT	ADVANCED
GRADE 4						
WHITE						
MCT-YES	4809	.5	26.3	53.5	19.4	.2
MCT-NO	5366	.9	26.5	51.9	20.7	
NO-RESPONSE	12210	.4	23.8	54.1	21.6	.1
BLACK						
MCT-YES	1567	5.0	55.6	37.6	1.9	
MCT-NO	493	12.6	55.4	30.6	1.4	
NO-RESPONSE	2495	6.1	55.4	35.2	3.2	
HISPANIC						
MCT-YES	914	3.4	53.6	35.6	7.1	
MCT-NO	683	7.8	50.4	35.2	6.6	
NO-RESPONSE	1982	4.3	45.7	44.6	5.4	
GRADE 8						
WHITE						
MCT-YES	5535	1.0	25.0	63.6	10.5	
MCT-NO	539	1.2	27.9	61.2	9.6	
NO-RESPONSE	12686	1.3	25.1	63.9	9.7	
BLACK						
MCT-YES	1312	4.7	51.5	42.4	1.4	
MCT-NO	641	8.0	57.2	34.4	.4	
NO-RESPONSE	2394	9.1	53.8	36.3	.7	
HISPANIC						
MCT-YES	1019	8.7	50.2	39.8	1.3	
MCT-NO	533	8.2	53.7	37.7	.4	
NO-RESPONSE	1347	5.8	51.1	42.7	.3	

APPENDIX F-2

DISTRIBUTION OF NAEP PROFICIENCY LEVELS BY RACE/ETHNIC GROUP AND SCHOOL TYPE

Weighted percentage of students at or below level:

	N	BASIC	INTERMEDIATE	ADEPT	ADVANCED
GRADE 11					
WHITE					
MCT-YES	8441	.1	51.1	7.1	41.7
MCT-NO	6143	.3	8.7	45.4	45.7
NO-RESPONSE	9829	.2	9.1	43.1	47.6
BLACK					
MCT-YES	2386	.9	26.6	60.3	12.2
MCT-NO	784	1.1	30.4	55.1	13.4
NO-RESPONSE	1672	1.6	32.9	53.0	12.5
HISPANIC					
MCT-YES	1641	1.6	27.1	53.2	18.1
MCT-NO	311	2.6	27.1	53.1	17.2
NO-RESPONSE	815	1.2	27.7	51.7	19.4

Sample sizes weighted and adjusted to reflect unweighted number of cases and divided by a design factor of 2.

APPENDIX G

PERCENTAGE OF STUDENTS IN STUDY 2 REGRESSION ANALYSES BY GRADE BY RACE/ETHNIC GROUP

	WHITE	BLACK	HISPANIC
Grade 4			
Study 2 subsample	73.7	14.9	11.4
Total NAEP sample[a]	70.5	15.2	11.3
Grade 8			
Study 2 subsample	74.7	14.3	11.0
Total NAEP sample	74.0	14.4	8.7
Grade 11			
Study 2 subsample	74.7	15.8	9.6
Total NAEP sample	74.3	14.9	7.9

[a] Percentage of Total NAEP grade sample based on all students including those in race group "other".

APPENDIX H

ZERO ORDER CORRELATION COEFFICIENTS MCT DUMMY CODE AND STUDENT READING PROFICIENCY

	GRADE 4	GRADE 8	GRADE 11
White	-.067	.151	.112
Black	.024	.256	.068
Hispanic	-.122	.033	.092

APPENDIX I

PERCENTAGE OF CASES FOR VARIABLES INCLUDED IN REGRESSION ANALYSES WITH MISSING DATA

	WHITE	BLACK	HISPANIC
Grade 4			
Students' Academic Behaviors	6.8	8.0	12.0
Family Background	-	-	.5
Remedial program	15.8	8.1	19.
% free lunch	7.4	6.8	10.6
Instructional $/pupil	.01	-	-
% of White students	-	-	-
Grade 8			
Students' Academic Behaviors	4.2	.2	8.7
Family Background	-	-	-
Remedial program	18.3	8.2	
% free lunch	4.5	.01	3.6
Instructional $/pupil	11.1	-	6.2
% of White students	2.2	.01	1.1
Grade 11			
Students' Academic Behaviors	.9	2.4	7.0
Family Background	-	-	-
Remedial program	17.5	19.1	13.6
% free lunch	7.9	10.0	4.3
Instructional $/pupil	9.3	2.2	6.5
% of White students	-	2.7	.01