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Studies of Handicapped Students: Volume 1: Whom do Teachers Identify as Handicapped

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STUDIES OF HANDICAPPED STUDENTS

Volume I Whom Do Teachers Identify As Handicapped?

Research Report
EPRC 4537-11

Prepared for:

OFFICE OF THE
ASSISTANT SECRETARY FOR EDUCATION
DEPARTMENT OF HEALTH, EDUCATION
AND WELFARE
WASHINGTON, D.C. 20202

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Educational Policy Research Center

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EXECUTIVE SUMMARY

This volume reports the first of two studies conducted by the Educational Policy Research Center (EPRC) of SRI for the Assistant Secretary for Education (ASE) on the handicapped school population. The volume presents data on patterns of socioeconomic and demographic characteristics of teacher-identified handicapped students. The purpose of the analysis was to determine whether significant differences in rates of identification of handicapping conditions are associated with family income, race,population size of place of residence, or geographic location. This study briefly reviews past studies; explores a new set of data to determine its usefulness in determining characteristics of the teacher-identified handicapped student population; and presents the results of the analysis of these new data and their implications for future policy purposes.

The second study, currently in progress, compares the findings of this volume, which are based on teacher evaluations, with findings based on clinical and psychological assessments.

Data Base

The baseline data used in this analysis were a series of unpublished cross-tabulations of information collected by the National Center for Health Statistics (NCHS) in its health examination surveys of children and youth. These surveys were conducted between 1963 and 1970 with a total sample of 14,185 randomly selected, noninstitutionalized 6 to 17 year olds, broken into 6 to 11 and 12 to 17 year old groups. NCHS found that 99.3% of the 6 to 11 age group and 96.0% of the 12 to 17 age group attended public, private, or parochial schools.

Multiple assessments were collected on each subject. Data sources included a medical examination by a pediatrician; psychological and ability

tests given by a psychologist; teacher assessment; parental assessment; and, in the case of the 12 to 17 year old population, personal assessment. In this volume, rates of identification are derived from teacher assessments--teacher reports of special-education student needs. Data on family income are based on responses from the subjects' parents.

Until this use of the NCHS data, there was no reliable baseline data from which to establish prevalence rates or examine possible shifts in either identification patterns or prevalence. Any such shifts would, of course, be important for both federal and state education policy.

During the mid-1980s, two additional major sources of reliable information on the characteristics and possible needs of the school-age handicapped will become available. The NCHS data from the 1960s will provide valuable reference points for analyzing findings.

- Data from a series of special questions relating to handicapping conditions that will be asked of households in the 1980 Census.
- Results of a NCHS survey planned for 1979.

Although the NCHS data has some limitations, they are relatively minor and far outweighed by the data's assets. This is particularly apparent in comparisons with the characteristics of other available data sources. For identifying student population characteristics across the dimensions of health and school performance, the NCHS survey data provide a reliable national data base because:

- The survey covered six major handicaps with uniform reporting methods.
- The data are based on multiple assessment of individual subjects.
- The data are based on a large, random, representative, national sample.
- Sophisticated statistical methodology provided standard errors of estimates.
- The data are standardized across geographic regions.

The data cover six handicapping conditions: problems of vision, hearing, orthopedics, mental retardation, emotional disturbance, and speech. It was not possible, in this limited analysis, to report on learning disabled students because there were ambiguities in both the classification and reporting of this condition in the NCHS data. However, problems of the learning disabled will be addressed in Volume II of this study.

An earlier report, EPRC Research Note 19, 3 January 1975, discussed problems of unreliable estimates of handicapping conditions, particularly mental handicaps. The assessment procedures for identifying mental retardation and emotional disturbance are generally far more subjective than those used for physical handicaps such as orthopedic, hearing, and vision problems. As a result, we consider it important to examine population estimates for mental and physical handicaps separately.

The category of speech handicaps also has unique characteristics and should therefore also be considered separately. As presented in Research Note 19, approximately 45% of the elementary school population identified as handicapped is categorized as requiring speech services. In addition, the number of speech handicaps, unlike that of either physical or most mental handicaps, decline significantly during the elementary years.

An analytical distinction is also made between the elementary and secondary grade levels. For our purposes, the 6 to 11 age group and the elementary school population are identical as are the 12 to 17 age group and the secondary school population. Far fewer students at the secondary than at the elementary level are identified as requiring special-education services for the handicapped. Part of this difference is due to declines in reported needs for speech therapy and services for emotional disturbance. Evidence of these changes is found not only in the NCHS data but also in the National Center for Educational Statistics' (NCES) 1970 study, Number of Pupils with Handicaps in Local Public Schools.

The summarized cross-tabulations obtained from NCHS were tested statistically for significant patterns and trends in the teacher identification of students requiring special-education services.

Conclusions and Policy Implications

There are six primary findings of this analysis:

- All three types of teacher-identified handicaps (physical, mental, and speech) are significantly concentrated in the low-income elementary school population.
- Among secondary school students, the incidence of teacher-identified mental and speech handicaps increases with diminishing family income; physical handicaps show much less of this tendency.
- Teachers identify both mental and speech handicaps at a significantly more frequent rate for black than for white elementary school children.
- For secondary school students, mental retardation is reported significantly more frequently for blacks than whites.
- For the demographic dimension of city size, the only significant finding is a rise in rates of teacher-identified emotional disturbance among 12 to 17 year olds with the increase of city size from rural to urban.
- Although there are regional differences in teacher-identified handicaps, they are somewhat puzzling and do not suggest a definite pattern.

A question with direct bearing on formulating policy and funding strategies is whether systematic identification patterns exist. Such patterns might indicate need to drop the current assumption that handicaps are distributed evenly between the elementary and secondary school populations and uniformly across socioeconomic and demographic variables, and to more carefully tailor targeting of funds for handicapped students.

It is not possible to conclude that the patterns of teacher-identified handicaps reported here represent true handicap prevalence rates. An objective of our second study which will be reported in Volume II, is to establish population profiles by evaluating the NCHS clinical assessments and developmental histories, and by comparing them with teacher evaluations. However, although there may be a change in rates, we do not expect that the underlying patterns described in this volume will change appreciably. In addition, the rates reported here represent reliable data on teachers' perceptions of special need, and on this basis are important. They provide significant new information on the characteristics of children identified by the schools as requiring special-education services. This information contradicts previous assumptions about handicapped students.

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INTRODUCTION

This volume presents patterns of socioeconomic status (SES) and demographic characteristics of noninstitutionalized students identified by teachers as requiring special-education services. We were particularly interested in determining whether significant differences exist in the distribution of teacher-identified handicaps across the following variables; age, race, family income, population size of place of residence, and geographic region.

Current funding strategies are based on the assumption that handicaps are distributed evenly between the elementary and secondary school populations and uniformly across SES and demographic variables. A question with direct bearing on formulating policy is whether systematic identification patterns exist that might suggest modifications of either federal guidelines or funding formulas.

Past attempts to investigate the characteristics of the handicapped school population have been frustrated by the absence of standardized data across geographic regions. This problem was partly a result of investigators relying on individual state reports of handicapping conditions. The great variations in state legislation, which differ both in language and the range of handicaps defined for state programs, preclude comparability among state reports. Therefore, studies in the past, based on aggregate data from state reports of handicapped children, have produced ambiguous results. This volume will review briefly past studies; explore a new set of data to determine its usefulness in determining characteristics of the teacher-identified handicapped student population; and present the results of the analysis of these new data and their implications for future policy purposes.

HISTORICAL AND CURRENT POPULAR ESTIMATES

Table 1 presents estimates of the percentage of handicapped children in the school-age population which have been used in the field of special-education for the past twenty years. Because these estimates have appeared to be the best sources available, they have acquired an aura of authenticity, although their authors have, in all cases, acknowledged weaknesses in reliability or standardization of measurement. Romaine Mackie, the author of the earliest widely used national figures, developed prevalence rates from "educated guesses" of education specialists. Operational definitions for classifying children into handicapped categories were not delineated, and Mackie carefully indicated the lack of methodological sophistication.

After its establishment in 1968, The Bureau of Education for the Handicapped (BEH), in cooperation with the National Center for Educational Statistics (NCES), attempted to correct these earlier ambiguous figures through a state-by-state survey. The survey covered the number and kinds of handicapped public school students needing special services and the number actually served. The NCES-BEH study was the first major attempt to survey the entire handicapped public school population within a somewhat rigorous framework, and it produced the best estimates available at the time. However, these data too were limited by poor reliability since they were collected by different methods in different states. Recently, NCES has revised its Public Accounting Manual for Local and State School Systems in order to eliminate future survey problems. The revision supplies detailed criteria for reporting handicapped populations.

Table 1

SELECTED ESTIMATED PREVALENCE RATES
OF THE SCHOOL-AGE NONINSTITUTIONALIZED HANDICAPPED

		Handicap (percent handicapped in total school populations)									
Source[†]	Year	Visual	Hearing	Speech	Ortho-pedic	Special* Health	Emotional Disturbance	Mental Retardation	Learning Disability	Multiple Handicapped	Total
Mackie	1954	0.20	1.50	2.0	1.50	1.50	2.0	2.00	n.a.	n.a.	10.70
Mackie	1963	0.90	0.58	3.5	1.00	1.00	2.0	2.30	n.a.	n.a.	10.47
BEH[‡]	1968	0.10	0.58	3.5	0.50	n.a.[§]	2.0	2.30	1.00	n.a.	9.98
Mackie	1969	0.10	0.60	3.5	0.75	0.75	2.0	2.30	n.a.	n.a.	10.00
Rossmiller	1970	0.05	0.10	3.6	0.21	n.a.	2.0	1.54	1.12	0.07	8.69
BEH	1970 1971	0.10	0.58	3.5	0.50	n.a.	2.0	2.30	1.00	0.06	10.04
Fleischmann	1973	0.10	0.58	3.5	0.50	n.a.	2.0	1.54	1.00	0.06	9.28
Taylor	1973	0.20	0.57	3.5	0.50	n.a.	2.0	3.03	2.50	0.06	12.38
BEH	1974	0.20	0.57	3.5	0.50	n.a.	2.0	3.00	2.50	0.06	12.35

*Since 1970 this classification has been included with orthopedic.
†All references appear in the bibliography.
‡BEH = Bureau of Education for the Handicapped.
§Not applicable.

The other frequently cited prevalence studies are those of Richard Rossmiller, Graeme Taylor, and the New York State Fleishmann Commission. Neither the Rossmiller nor Taylor figures are based on original data collection, but were derived from a combination of individual state studies and the NCES-BEH figures. Although the Fleischmann Commission supported an independent survey of New York State schools, the staff eventually pooled estimates from diverse sources to arrive at a compromise set of projections.

None of the authors of these studies have claimed that their estimates are precise. However, in the absence of other data, these sources have been used to extrapolate handicapping conditions for the preschool as well as the entire school-age population. Both federal and state policy have been based on these extrapolations.

A basic assumption in projecting handicaps using fixed prevalence rates has been that all handicaps are distributed evenly across age and racial groups, family income levels, and other socioeconomic dimensions. However, there is evidence that assumptions of uniform distribution are probably incorrect--although the causes of differential prevalence remain unclear. For example, there is little question that significant numbers of children from low-income families and nonwhite ethnic backgrounds have been erroneously assigned to classes for the mentally retarded and emotionally disturbed; there is also strong reason to believe that environmentally related conditions such as poor nutrition and greater exposure to lead poisoning may produce a higher incidence of certain handicaps among these groups (Baer, 1972; Goodman et al., 1956; Hurley, 1968; Needleman and Shapiro, 1974; Neer et al., 1973; Pueschel, 1974; Sachs, 1974; Sholtz et al., 1973; Wallace 1973).*

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*References appear in the bibliography.

Another assumption, which underlies the application of fixed prevalence rates across all age groups, is that handicaps, as they relate to the need for special educational services, are not ameliorated by either the schools or maturation. For speech, and possibly emotional disturbances, this assumption appears to be false, and it may be false for other handicaps as well. The NCES-BEH study of 1970, which differentiated elementary and secondary school needs for special services, reported that 6.1% of students at the elementary level were identified as requiring speech therapy, in comparison with only 1.1% of secondary school students. However, it is unclear whether speech problems are reduced through speech therapy offered by the schools or normal maturation processes. In either case, the need for such services declines smoothly and significantly through the school grades, as reported in our Research Note 19 (1975).

Recently, two studies have demonstrated the lack of standardized national data. In 1974, the Rand Corporation published a study of services for the handicapped school-age population, Improving Services to Handicapped Children. This study focused on delivery mechanisms and discussed prevalence only in terms of existing data. It concluded that no reliable data providing comparability across states existed.

Most recently, at the request of Congress, a report known as the nine states study was produced jointly by the Office of the Assistant Secretary for Planning and Evaluation and NCES. The purpose of the study was to survey selected states to determine the availability of information on both the number of children being served by special education classes and the associated costs. The study concluded that standard and complete information could not be obtained from the states, and therefore, at least for the near future, it was impossible to rely on state reporting for data.

USE OF THE NATIONAL HEALTH EXAMINATION SURVEY

A national data source that provides standardized national and regional data on the school-age population is the National Health Examination Survey of Children and Youth by the National Center for Health Statistics (NCHS). Until now, this source has been used only to examine student health characteristics. The survey, which was part of a congressionally mandated series of studies on the health of the nation, was a study of the 6 to 17 year old population. Between 1963 and 1970 school-related information as well as data on health characteristics were collected on each of a total sample of 14,185 randomly selected, noninstitutionalized individuals. This sample was selected in cooperation with the U.S. Bureau of Census so that it would be representative of the 6 to 17 year old continental U.S. population with respect to age; sex; race; and characteristics of the place of residence, including region of the country, and population size and growth.

Extensive multidisciplinary data were collected on each individual in the sample. Sources included a medical examination by a pediatrician; achievement and psychological tests given by a psychologist; teacher assessment of special educational needs; parental assessment of early childhood development; and, in the case of the 12 to 17 year old age group, personal assessments of health and development. This volume presents the teacher assessments of student need for special services for the handicapped and the relationship of patterns of these assessments to student SES and demographic variables.

The survey was conducted in two cycles, Cycles II and III. (Cycle I, conducted in the early 1960s, surveyed the adult population.) Between

1963 and 1965 information was gathered on the 6 to 11 age group, between 1966 and 1970 on the 12 to 17 age group. The response rates for both survey cycles were extremely high, with a 96% response from teachers assessing the first group and 92% response from teachers assessing the second group. Careful methodological controls were used to minimize biases and nonsampling errors.

Of the children aged 6 to 11 examined by NCHS, 99.3% were enrolled in a public, parochial, or private school with only 0.7% not attending any type of school. We do not wish to speculate on the causes of non-attendance until we analyze the original NCHS data tapes to establish the characteristics of children not in school. We will consider this issue in our second volume.

The results of the NCHS survey were reported in a series of publications which appear in the bibliography of this report. However, because cross-tabulations of individual variables were not reported by NCHS, the usefulness of the published data for delineating characteristics of the handicapped population is limited. In early 1975, SRI's Educational Policy Research Center (EPRC) recommended in its Research Note No. 19 that a detailed analysis of the NCHS data be made. On special request, NCHS made cross-tabulations of its original data available to EPRC. This volume represents the first phase of the analysis.

As described earlier, for this initial analysis we selected the NCHS teacher reports of need for special-education services to investigate relationships between patterns of identification and various student SES and demographic variables. A particular advantage of these data is that they are organized by handicap categories that correspond closely to the categories used in current identification practices in schools. Therefore the data can be related easily to existing state reports.

However, an important value of the NCHS data is its potential for comparing teacher-reported need for special-education services with the assessments of physicians and psychologists, as well as with student achievement in school. The comparison of these data in a detailed analysis is now underway and will be reported in Volume II.

A limitation of the NCHS data base is that its information is not current, since the surveys were conducted from 1963 to 1970. However, this fact does not necessarily diminish its usefulness in making generalizations. Most considerations related to handicapping conditions are related directly to physical conditions which do not exhibit dramatic changes in prevalence over time except under the most unusual circumstances. One example of such a change is the sharp decline in crippling conditions that resulted from the discovery and use of the Salk polio vaccine.

Until this use of the NCHS data, there was no reliable baseline data from which to establish prevalence rates or examine possible shifts in either identification patterns or prevalence. Any such shifts would, of course, be important for both federal and state education policy.

During the mid-1980s, two additional major sources of reliable information on the characteristics and possible needs of the school age handicapped will become available. The NCHS data will provide valuable reference points for analyzing these findings.

- Data from a series of special questions relating to handicapping conditions that will be asked of households in the 1980 Census.
- Results of an NCHS survey planned for 1979.

Therefore, while these data are old, their age must be balanced against their uniqueness. The NCHS data are unique in that they provide a reliable national data base that contains:

- Six major handicaps covered with uniform reporting methods.
- Data based on multiple assessments of individual subjects.
- Data based on a large, random, representative, national sample.
- Sophisticated statistical methodology which provdes standard errors of estimates for the projected rates.
- Data standardized across geographic regions.

A limitation of this present analysis is our inability to evaluate the extent of the learning disabled population. The NCHS category "slow" learner" and the data in it are too ambiguous to be automatically equated with the category of learning disabled. Until teacher reports can be compared to medical and psychological assessments, the characteristics of slow learner children cannot be identified. This problem will be addressed in Volume II.

Analytic Scope

In this volume the NCHS data is broken down by elementary and secondary education levels. For our purposes, the 6 to 11 age group and the elementary school population are identical, as are the 12 to 17 age group and the secondary school population. One important aspect of our earlier work, Research Note 19, is that it emphasized the importance of age group differences in teacher-reported need for special education services. These differences are shown in Table 2.

The data are also broken down into three categories of handicapping conditions:

- Physical handicaps
  - Vision
  - Hearing
  - Orthopedic
- Mental handicaps
  - Mental retardation
  - Emotional disturbance
- Speech handicaps.

Table 2

NCHS TEACHER-REPORTED RATES OF HANDICAPS
AMONG NONINSTITUTIONALIZED STUDENTS AGED 6 TO 17
(Percent)

Handicap	Grade Level	
	Elementary (1964)	Secondary (1968)
Physical		
Hearing	1.0%	0.3%
Vision	1.4	0.2
Orthopedic	0.3	0.2
Mental		
Mental retardation	1.2	1.3
Emotional disturbance	3.4	1.2
Speech	6.2	1.1
Total	13.5%	4.3%

Source: National Center for Health Statistics, 1975.

This three-way breakdown of handicaps reflects the continued national attention and concern over the misclassification of children in such handicap categories as mental retardation and emotional disturbance which are particularly subject to ambiguous interpretation and allow biases to operate in the placement process. As a result, classes for the mentally retarded and the emotionally disturbed often become dumping grounds for the nonconformist, behavioral problem, or bilingual child who lacks adequate English communications skills. (While these behavior and language problems can have an effect on a child 's school placement, they are not always associated with mental retardation or emotional disturbance.)

There appears to be far less confusion and disagreement in identifying children with physical conditions such as hearing, vision, and orthopedic handicaps, which can be defined and identified with more objective test measures. Estimates of these handicaps have also tended to show less fluctuation than those of mental handicaps.

Speech handicaps are considered separately because of their unique characteristics. The need for speech services declines steadily through the elementary and secondary grades. Almost half of all handicapped students at the elementary level are identified as requiring speech services. However, by the time these students enter secondary schools, the rate of identification has dropped by 5.1%, as shown in Table 2.

For these reasons we consider the breakdown by both age and handicap group to be important in the analysis of identification patterns.

General Statistical Considerations

The NCHS survey design and operation for each cycle was organized to minimize bias and variability of measurement techniques. The estimates of standard errors for the rates furnished by NCHS are primarily measures of sampling variability; these variations might occur by chance because only a sample of the population was surveyed. The standard error, as estimated for these tabulations and calculated by the authors for the physical and mental groups of handicaps, also reflects part of the variability arising in the measurement process. It does not include estimates of biases that might be in the data.

Each handicapping condition was considered for the following quantities in relation to age group and the variables of family income, race, region, and population size of place of residence:

(1) Sample totals of subjects for whom school data were obtained in each socioeconomic or demographic category.

(2) Sample totals of subjects in each category identified by teachers as needing a specific educational service.

(3) Population estimates, for the midpoint of each cycle, of the total number of subjects in each category for whom school data were available [obtained from sample totals in (1) by weighting].

(4) Population estimates, for the midpoint of each cycle, of the number of subjects in each category identified by teachers as needing a specific educational service [obtained from sample totals in (2) by weighting].

(5) Population estimates of rates per 100 subjects in each category needing specific educational services [quotient of (4) and (3)].

(6) Standard errors for rates per 100 subjects as given in (5).

From these tabulations for each age group, the authors constructed total rates and standard errors for the three groups of teacher-identified handicapping conditions.

The rates for each handicap group were considered the sum of the rates for the separate handicaps in that group. An individual identified as having two physical handicaps, for example, was counted twice. The resulting group rates, therefore, indicate the total number of identified handicaps per 100 students rather than the total number of individuals per 100 identified as having one or more handicap. Our future work with the NCHS Cycle II tape will allow us to determine the extent of this overlap. Preliminary analysis indicates that approximately 27% of the students have been recommended for one or more special resources by their teachers, including resources for the gifted. However, fewer than one percent of the total sample could be classified as having serious multiple handicaps.

The level of significance used most frequently in this volume is 5 in 100 ($p<0.05$); for indicated differences to be significant the chances must be less than 5 in 100 that they could result from sampling and

measurement variations alone. The corresponding level of confidence intervals is 95%. A summary of the analysis of NCHS teacher-reported need for special-education services at the elementary and secondary levels is presented in the following section. A more detailed analysis and discussion of the methodology used to evaluate these data is presented in Appendix A.

A fundamental consideration in this analysis of differences in teacher-identified population characteristics was the relevance of patterns and statistical trends to federal policies on school services for the handicapped.

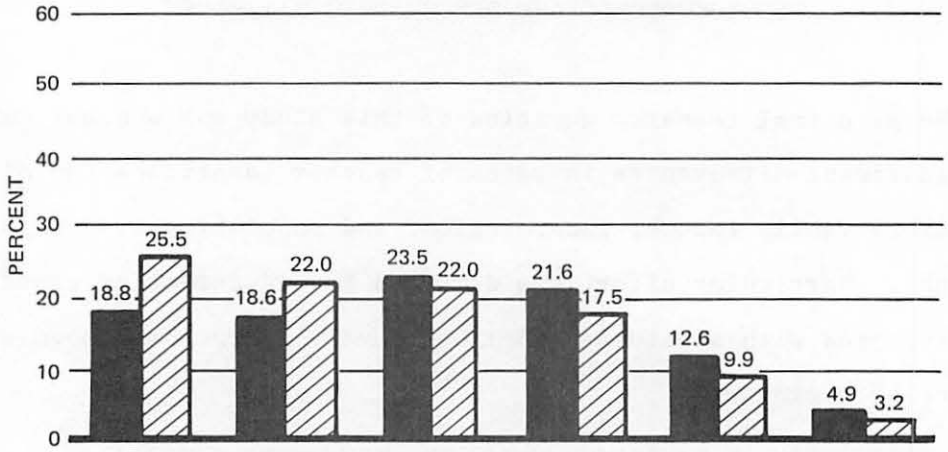
SOCIOECONOMIC AND DEMOGRAPHIC PATTERNS

The principal research question of this study was whether there were any significant differences in rates of teacher identification of handicaps across family income, race, region, and population size of place of residence. Particular effort was directed toward detecting trends across the categories with a natural ordering, family income, and population size of place of residence.

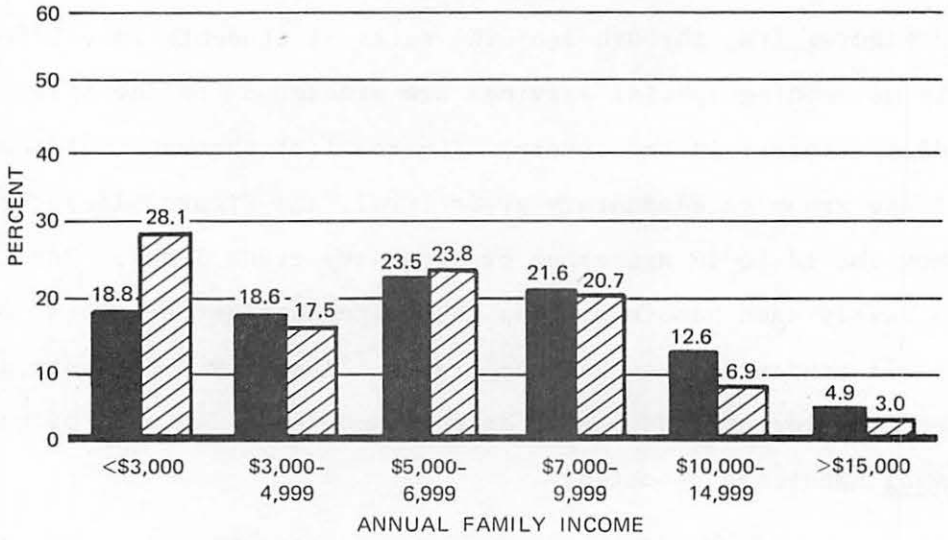
Family Income

In Figures 1(a) through 1(h) the rates of students identified by teachers as needing special services are presented for the three types of handicaps across income levels. Figures 1(a) through 1(d) show the 6 to 11 age group or elementary grade level, and Figures 1(e) through 1(h) show the 12 to 17 age group or secondary grade level. For these two age levels each handicap group is plotted against the total population of all students in each income range. Appendix B presents data on the concentration of students at each income level for each of the six individual handicaps reported.

As shown by these figures, there is a noticeable skew toward the low-income groups for all three handicap categories. In every case, except for vision and orthopedic handicaps in the 12 to 17 age group, these differences in identified need for special services are statistically significant. Students from low-income families are reported to have a much greater need for special services than children from families



(a) ALL TEACHER-IDENTIFIED HANDICAPPED STUDENTS AND ALL STUDENTS, AGED 6 TO 11

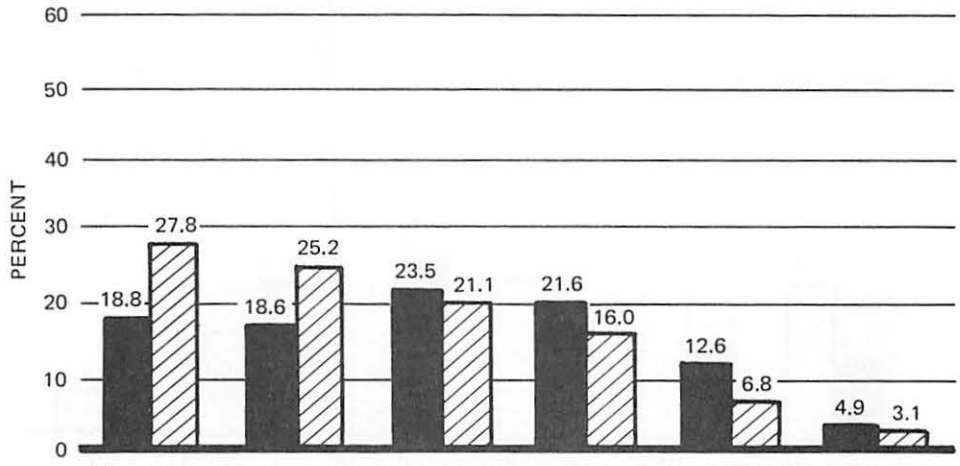


(b) TEACHER-IDENTIFIED PHYSICALLY HANDICAPPED STUDENTS AND ALL STUDENTS, AGED 6 TO 11

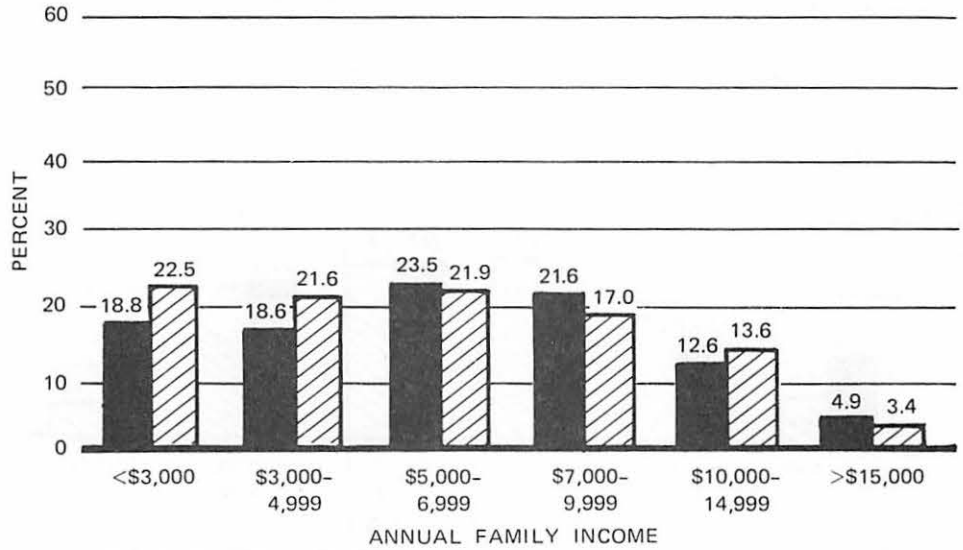
Total Student Population Aged 6-11

Student Population, Aged 6-11, Identified as Handicapped

FIGURE 1 DISTRIBUTION, BY FAMILY INCOME, OF TEACHER-IDENTIFIED HANDICAPPED STUDENTS (PERCENTAGE OF POPULATION GROUP, 1964)



(c) TEACHER-IDENTIFIED MENTALLY HANDICAPPED STUDENTS AND ALL STUDENTS, AGED 6 TO 11

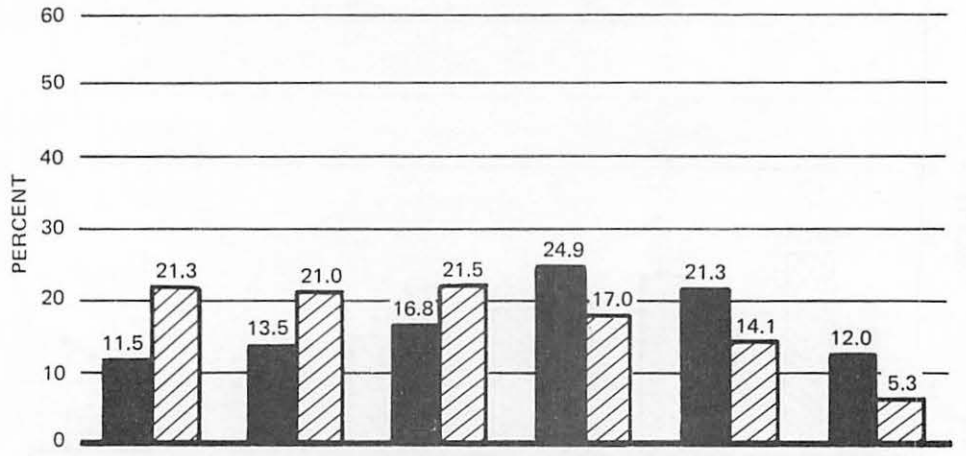


(d) TEACHER-IDENTIFIED SPEECH HANDICAPPED STUDENTS AND ALL STUDENTS, AGED 6 TO 11

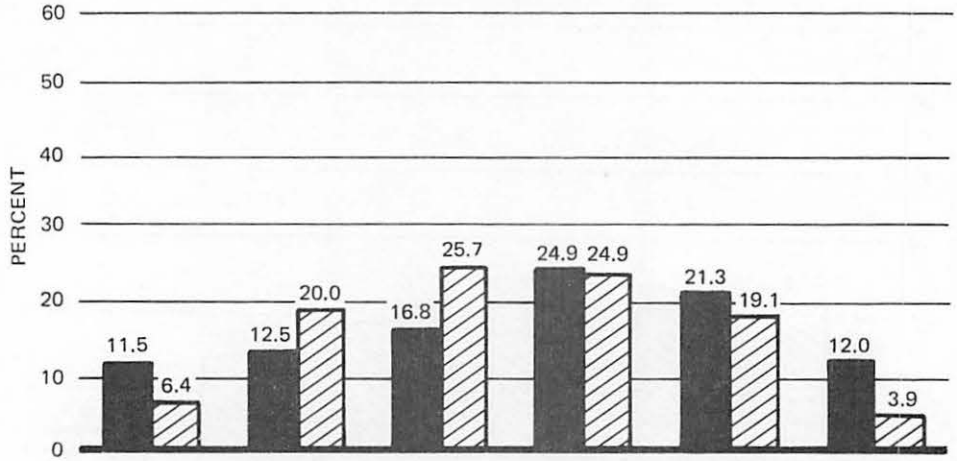
Total Student Population Aged 6-11

Student Population, Aged 6-11, Identified as Handicapped

FIGURE 1 DISTRIBUTION, BY FAMILY INCOME, OF TEACHER-IDENTIFIED HANDICAPPED STUDENTS (PERCENTAGE OF POPULATION GROUP, 1964) (Continued)



(e) ALL TEACHER-IDENTIFIED HANDICAPPED STUDENTS AND ALL STUDENTS, AGED 12 TO 17

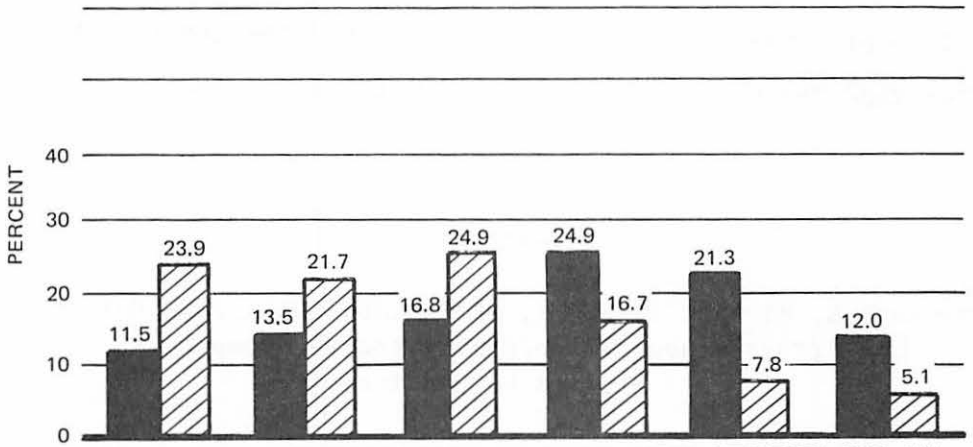


(f) TEACHER-IDENTIFIED PHYSICALLY HANDICAPPED STUDENTS AND ALL STUDENTS, AGED 12 TO 17

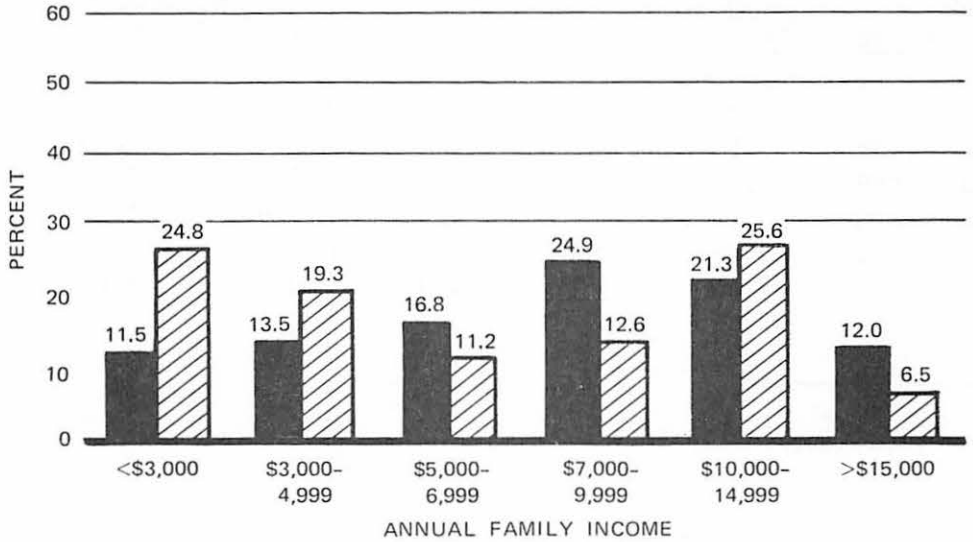
Total Student Population Aged 12-17

Student Population, Aged 12-17, Identified as Handicapped

FIGURE 1 DISTRIBUTION, BY FAMILY INCOME, OF TEACHER-IDENTIFIED HANDICAPPED STUDENTS (PERCENTAGE OF POPULATION GROUP, 1964) (Continued)



(g) TEACHER-IDENTIFIED MENTALLY HANDICAPPED STUDENTS AND ALL STUDENTS, AGED 12 TO 17



(h) TEACHER-IDENTIFIED SPEECH HANDICAPPED STUDENTS AND ALL STUDENTS, AGED 12 TO 17

Total Student Population Aged 12-17

Student Population, Aged 12-17, Identified as Handicapped

FIGURE 1 DISTRIBUTION, BY FAMILY INCOME, OF TEACHER-IDENTIFIED HANDICAPPED STUDENTS (PERCENTAGE OF POPULATION GROUP, 1964) (Concluded)

in higher income categories; the difference between the groups is much greater than would be normally expected as a result of chance fluctuations in the survey.

Table 3 presents these rates, dramatically illustrating the decline in teacher-reported need with increases in family income.

Table 3

DISTRIBUTION, BY FAMILY INCOME, OF TEACHER-IDENTIFIED HANDICAPS
(Percentage of Age/Family Income Group,
Identified by Handicap)

Annual Family Income	Handicap					
	6-11 Age Group, 1964			12-17 Age Group, 1968		
	Physical	Mental	Speech	Physical	Mental	Speech
≦$ 3,000	4.17%	7.02%	7.49%	0.38%	5.23%	2.36%
3,000-4,999	2.63	6.41	7.23	1.01	4.03	1.56
5,000-6,999	2.82	4.24	5.81	1.04	3.72	0.73
7,000-9,999	2.68	3.51	4.92	0.68	1.69	0.55
10,000-14,999	1.53	2.55	6.76	0.61	0.92	1.31
≧ 15,000	1.71	2.99	4.33	0.22	1.06	0.59

Source: Data from NCHS, 1975

Multiple factors, both social and environmental, might account for these differences in teacher-identified needs for special services. For example, it is known that a higher incidence of poor nutrition and lead poisoning exists among children from low-income than from middle- and high-income families. Either of these conditions can cause mild to severe brain damage, resulting in mental retardation. There are also at least two additional, more elusive factors behind the higher rates reported for the low-income population. First, as revealed in recent controlled

studies, when all factors except family income are held constant, persons in lower socioeconomic positions are far more likely to be identified by diagnostic experts as mentally retarded than those in middle and higher income groups (Anderson and Clark, 1974; Pueschel, 1974; Kotok, 1972). A second possibility is a similar unintended bias among teachers and other school personnel in identifying students as handicapped. Students who do not conform to expected and sometimes narrow behavior and achievement norms may be misidentified as requiring special services for the mentally handicapped. Thus, the higher rates of need reported by teachers for low-income groups may result in part both from substantive environmental factors which actually produce a higher incidence of handicaps and from misclassification.

The differences found in these data can be assessed from two viewpoints: in terms of their statistical significance, and in terms of their impact on policy. While statistical tests indicate a high probability that these patterns in identified handicaps would be found if the survey were repeated, their magnitude, and therefore their policy significance, may be somewhat exaggerated by misclassification.

Race

On the basis of the summary data supplied by NCHS, the only racial or ethnic distinction that could be made in this analysis was between black and white students. Although the data included a category labeled "Other," the sample size for each handicap was far too small to provide significant comparisons.

The distribution of teacher-identified handicapped students by race is presented in the same way as the distribution by family income. Figure 2(a) shows the proportions of students aged 6 to 11 in each handicap group and in the total age group population that are black and white; Figure 2(b) presents these data for students aged 12 to 17. For these

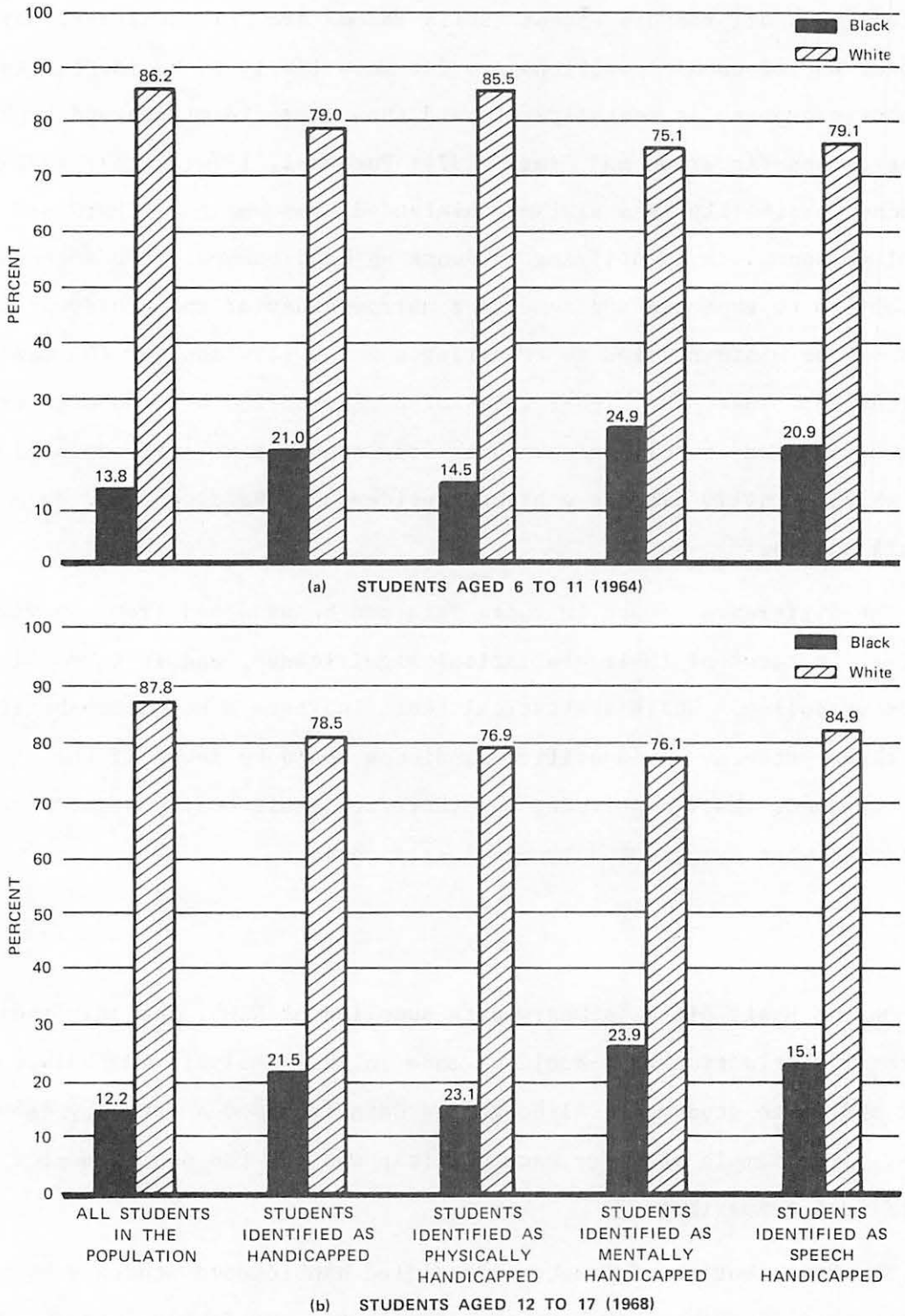


FIGURE 2 PERCENTAGE, BY RACE, IN THE TOTAL POPULATION COMPARED TO PERCENTAGE, BY RACE, OF TEACHER-IDENTIFIED HANDICAPPED STUDENTS (PERCENTAGE OF TOTAL AGE GROUP)

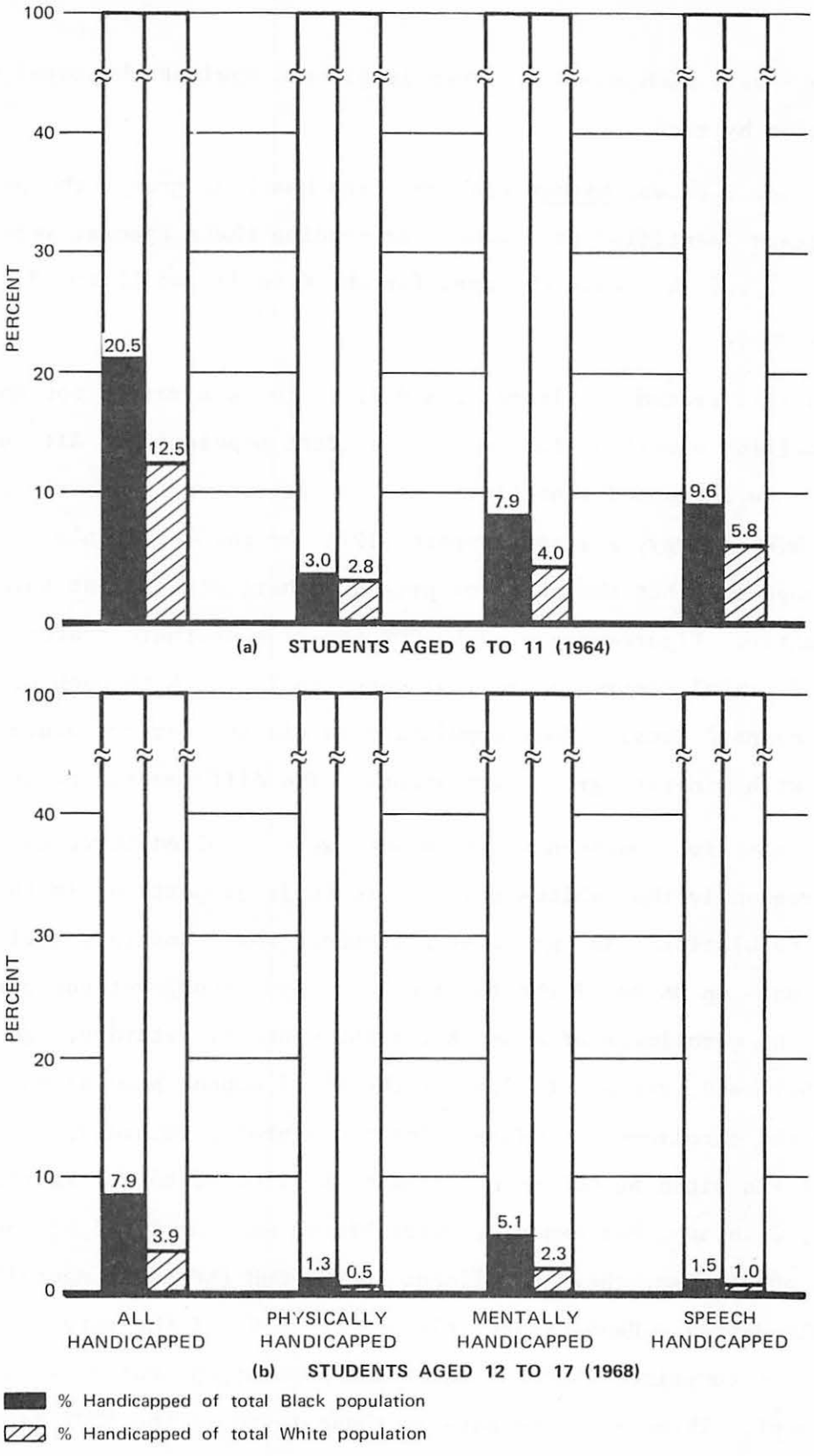


FIGURE 3 PROPORTION TEACHER-IDENTIFIED HANDICAPPED IN EACH RACE GROUP (PERCENTAGE OF TOTAL RACE GROUP)

two age levels each handicap group is plotted against the total student population by race.

Figure 3 shows, within each race and handicap group, the percentage of students identified by teachers as needing these special services. Again, (a) and (b) shows the data for the 6 to 11 and 12 to 17 age groups respectively.

As illustrated by Figures 2 and 3, there is a marked concentration of identified handicaps in the black student population. Although there has been an increased sensitivity to identification issues since the time of the NCHS survey, a recent report (1975) by the Children's Defense Fund (CDF) suggests that the patterns presented here still exist throughout the country. Figures reported by CDF for five southern states and other selected school districts are reproduced in Tables 4 through 6. The tables compare total school population in classes for the mentally retarded with minority group enrollments. The differences are dramatic.

In the five southern states blacks were enrolled three to five times more frequently than whites relative to their proportions in the total school population. The greatest difference was found in Georgia, where blacks make up 36.8% of the total school population, yet constitute almost 75% of the enrollment of classes for the mentally retarded. Whites, on the other hand, represent 62.9% of the total school population but only 28% of the enrollment in classes for the mentally retarded. These racial disparities cited by CDF do not seem to be limited to the South. In Denver, Colorado, for example, where blacks make up 17.8% of the total school population, their enrollment in EMR-EMH (Educable Mentally Retarded-Educable Mentally Handicapped) classes is 33.4% of the total. The Spanish population comprises 24.1% of the total population, but 38.3% EMR-EMH enrollment. These rates compare to those found in the NCHS data for black students identified as needing services for the mentally retarded. They

Table 4

STUDENTS ENROLLED IN EDUCABLE MENTALLY RETARDED (EMR) CLASSES, BY RACE, IN FIVE SOUTHERN STATES, 1973

State	Total Student Enrollment				Enrollment in EMR Classes				EMR Class Enrollment (percentage of total enrollment)			
	White	Black	Other	Total	White	Black	Other	Total	White	Black	Other	Total
Alabama	478,568 (66.0)*	245,588 (33.9)	1,209 (0.2)	725,365	6,985 (41.6)	9,807 (58.4)	7 (0.04)	16,799	1.5	4.0	0.6	2.3
Arkansas	142,704 (59.9)	94,889 (39.8)	615 (0.3)	238,208	1,381 (28.6)	3,443 (71.3)	6 (0.1)	4,830	1.0	3.6	1.0	2.0
Georgia	591,194 (62.9)	345,508 (36.8)	3,190 (0.3)	939,892	6,498 (28.0)	16,672 (71.8)	36 (0.2)	23,206	1.1	4.8	1.1	2.4
Mississippi	210,352 (48.2)	224,952 (51.6)	868 (0.2)	436,172	1,740 (23.1)	5,798 (76.9)	5 (0.1)	7,694	0.8	2.6	0.6	1.8
South Carolina	312,651 (57.7)	228,002 (42.0)	1,620 (0.3)	542,273	3,964 (25.5)	11,571 (74.4)	20 (0.1)	15,555	1.3	5.1	1.2	2.9

*Percentage of total enrollment given in parentheses.

Source: Data from Children's Defense Fund, Washington Research Project, Incorporated, 1975

Table 5

STUDENTS ENROLLED IN EDUCABLE MENTALLY RETARDED (EMR)
AND EDUCABLE MENTALLY HANDICAPPED (EMH) CLASSES,
BY RACE, IN FIVE SCHOOL DISTRICTS, FALL 1973

State/District: School District	Total Student Enrollment						Enrollment in EMR/EMH Classes				
	White	Black	Spanish Surname	American Indian	Asian	Total	White	Black	Spanish Surname	Other	Total
District of Columbia*	4,333 (3.2)†	129,248 (95.7)	837 (0.6)	20 (0.0)	641 (0.5)	135,079	0	87	0	0	87
Colorado: Denver	49,892 (56.9)	15,584 (17.8)	21,104 (24.1)	371 (0.4)	669 (0.8)	87,620	453 (27.8)	545 (33.4)	624 (38.3)	9 (0.5)	1,631
Alabama: Montomery	19,217 (52.9)	17,030 (46.9)	19 (0.1)	4 (0.0)	23 (0.1)	36,293	191 (19.1)	809 (80.7)	0 (0.0)	2 (0.2)	1,002
South Carolina: Richland County (No. 1)	14,028 (41.0)	20,112 (58.8)	26 (0.1)	4 (0.0)	24 (0.1)	34,194	168 (23.3)	553 (76.7)	0 (0.0)	0 (0.0)	721
Georgia: Bibb County	14,576 (48.8)	15,244 (51.1)	7 (0.0)	3 (0.0)	10 (0.0)	29,840	192 (28.3)	486 (71.7)	0 (0.0)	0 (0.0)	678
Massachusetts: Springfield	19,218 (64.9)	7,521 (25.4)	2,805 (9.5)	19 (0.1)	65 (0.2)	29,628	138 (40.6)	128 (37.6)	74 (21.8)	0 (0.0)	340

*No percentage of EMR/EMH enrollment available; most children identified as needing special help are reported in one category.

†Percentage of total enrollment given in parentheses.

Source: Data from Children's Defense Fund, Washington Research Project, Incorporated, 1975

Table 6

STUDENTS ENROLLED IN EDUCABLE MENTALLY RETARDED/EDUCABLE MENTALLY HANDICAPPED (EMR/EMH) CLASSES, BY RACE, IN FIVE SCHOOL DISTRICTS, FALL 1973
(Percentage of Total Enrollment of Each Group)

State/District: School District	Enrollment			
	White	Black	Spanish	Total
District of Columbia*				
Colorado:				
Denver	0.9%	3.5%	2.9%	1.9%
Alabama:				
Montgomery	1.0	4.8		2.8
South Carolina:				
Richland County (No. 1)	1.2	2.7		2.1
Georgia:				
Bibb County	1.3	3.2		2.3
Massachusetts:				
Springfield	0.7	1.7	2.6	1.1

*No percentage of EMR/EMH enrollment available; most children needing special help are reported in one category.

Source: Data from Children's Defense Fund, Washington Research Project, Incorporated, 1975

were identified over three-and-one-half times more frequently than their white classmates.

It is not currently possible to determine the extent to which such differences either reflect misclassification or are associated with environmental factors. This is a question, however, of considerable

importance and will be considered in our future work. An analysis performed by comparing NCHS multi-assessment data with teacher identifications will be reported in Volume II.

Geographic Region

The distribution of identified handicaps across geographic areas, while exhibiting some regional variations, does not suggest any obvious statistical trends or policy relevant patterns. Because no uniform differences were found, the statistically significant comparisons are not presented here but are shown in Appendix B, Figure B-1.

Population Size of Place of Residence

Figure 4 presents the only highly significant trend in the distribution of identified handicaps by population size of place of residence. In the 12 to 17 age group, the rates of teacher-identified emotional disturbance rise clearly with increasing city size. In our subsequent analysis of the complete NCHS data, we may be able to suggest explanations for this variation.

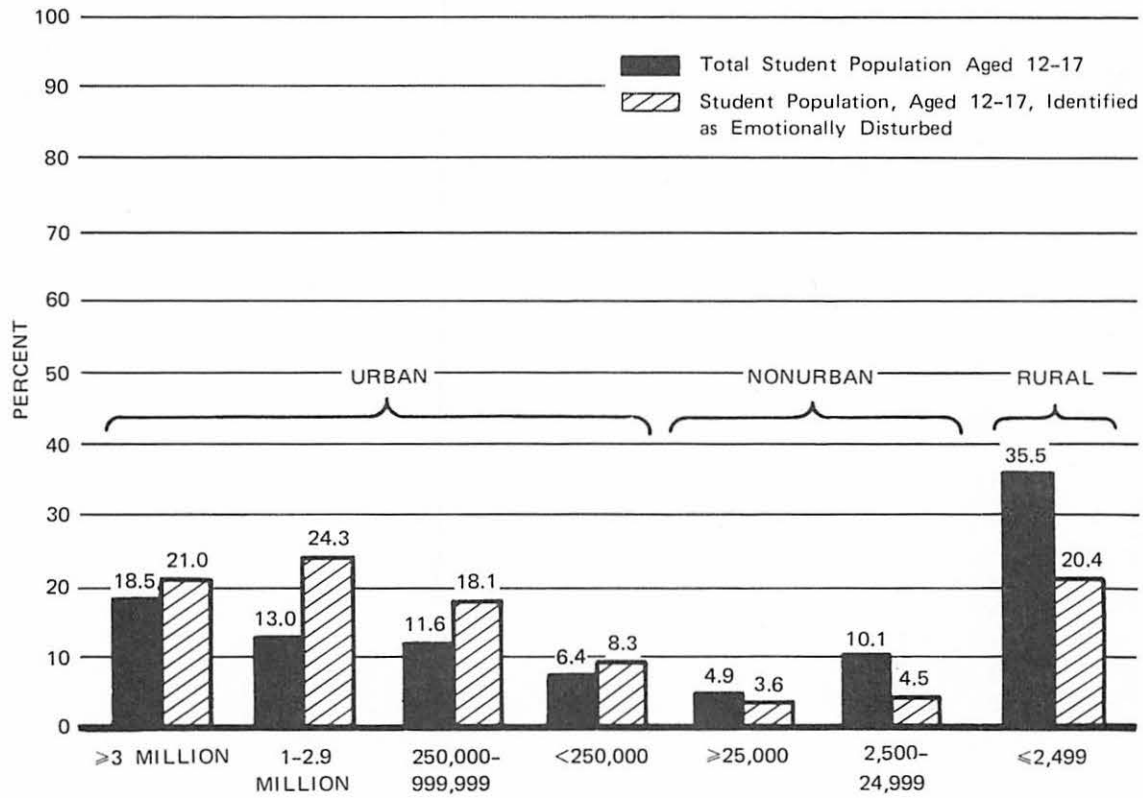


FIGURE 4 DISTRIBUTION, BY POPULATION SIZE OF PLACE OF RESIDENCE, OF TEACHER-IDENTIFIED EMOTIONALLY DISTURBED STUDENTS, AGED 12 TO 17 (PERCENTAGE OF POPULATION GROUP, 1968)

CONCLUSIONS

There are six primary findings of this analysis:

- All three types of teacher-identified handicaps (physical, mental, and speech) are significantly concentrated in the low-income elementary school population.
- Among secondary school students, the incidence of teacher-identified mental and speech handicaps increases with diminishing family income; physical handicaps show much less of this tendency.
- Teachers identify both mental and speech handicaps at a significantly more frequent rate for black than white elementary school children.
- For secondary school students, the only teacher-identified handicap reported significantly more frequently for blacks than whites is mental retardation.
- For the demographic dimension of city size, the only significant finding is a rise in rates of teacher-identified emotional disturbance among 12 to 17 year olds with the increase of city size from rural to urban.
- Although there are regional differences in teacher-identified handicaps, they are somewhat puzzling and do not suggest a definite pattern.

The definitions and population characteristics based on teacher-identification of special need developed in this volume are a first step in providing information which could lead to more effective targeting of federal handicap funds and to the development of more appropriate federal guidelines for implementation. Until state reporting of handicapped populations is both more accurate and nationally comparable, there will be a crucial need for an alternative method to project estimated handicap prevalence rates for each state. Such estimates are needed not only for

establishing policy and developing alternative support and service approaches, but also for program implementation, enforcement, and monitoring.

A question with direct bearing on formulating policy and funding strategies is whether systematic identification patterns exist. Such patterns might indicate need to drop the current assumption that handicaps are distributed evenly between the elementary and secondary school populations and uniformly across socioeconomic and demographic variables, and to more carefully tailor fund targeting for handicapped students.

It is not possible to conclude that the patterns of teacher-identified handicaps reported here represent true handicap prevalence rates. An objective of our second study, which will be reported in Volume II, is to establish a population profile by evaluating the NCHS clinical assessments and developmental histories, and by comparing teacher evaluations with them. However, although there may be a change in prevalence rates, we do not expect that the underlying patterns described in this volume will change appreciably. In addition, the rates reported here represent reliable data on teachers' perceptions of special need, and on this basis are important. They provide significant new information on the characteristics of children identified by the schools as requiring special education services. This information contradicts previous assumptions about handicapped students.

Appendix A

METHODOLOGY

Appendix A

METHODOLOGY

Data Source

The data source for the analysis of handicapped populations was a set of unpublished tabulations of results of Cycles II and III of the Health Examination Survey conducted by the National Center for Health Statistics (NCHS). At EPRC's request NCHS made cross-tabulations of original data from its multistage, stratified probability samples of clusters of households in land-based segments of the United States (NCHS, May 1974, p. 42).* Graphs based on these tabulations appear in Appendix B. Cycle II, conducted from July 1963 through December 1965, examined 7,417 noninstitutionalized children 6 to 11 years of age (NCHS, February 1972, p. 71), while Cycle III, conducted from March 1966 through March 1970, examined 6,768 noninstitutionalized married and single youth 12 to 17 years of age (NCHS, May 1974, p. 43). Each probability sample contained approximately 1,000 individuals in each age cohort in 25 different states. The samples were selected in cooperation with the Bureau of the Census so that weights could be used to inflate the data collected and characterize the larger universe (the continental U.S. population of which the sample subjects are representative). The adjusted final sample estimates of population agreed exactly with independent controls prepared by the Bureau of the Census for the noninstitutional population of the United States as of the midpoint of each NCHS survey by race and sex for each single year of age (6 to 11 for Cycle II, 12 to 17 for Cycle III; NCHS,

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*References appear at the end of Appendix A.

May 1974, p. 43). A comprehensive description of the survey plan, sample design, and examination content of each cycle has been published (NCHS, October 1967; NCHS, September 1969).

The survey data examined in this study were based on responses from self-administered questionnaires (Figures A-1 and A-2) from teachers or others with sufficient knowledge to give an adequate rating of the individuals being examined. Public, parochial, and private schools were included in the survey. The responses of interest were ratings by teachers (or other school personnel where necessary) of individual subjects' needs for special-education services for handicaps of hearing, vision, speech, orthopedics, mental retardation, and emotional disturbance.

Only those criteria appearing in the questionnaires (Figures A-1 and A-2) were provided to respondents for classifying handicap problems or needs for services. In subsequent work on NCHS data, the validity and reliability of these ratings will be checked by comparing them with the medical and psychological findings also collected by NCHS on each subject.

Questions of reliability and nonresponse in the ratings data from teachers (or other school personnel), as well as more information on survey design, are discussed in the NCHS references listed at the end of this Appendix. Careful controls appear to have minimized biases and nonsampling errors. A response rate of 96% was achieved in Cycle II and 92% in Cycle III. Only 0.7% of the examinees in Cycle II (47 of the 7,119 children) did not attend school and thus were not rated by teachers (NCHS, February 1972, p. 2). This statistic is of some independent interest in light of recent controversy over the exclusion of children from public education. The largest potential source of nonsampling errors is a 13% nonresponse rate for youths 16 to 17 years of age, but no obvious effects of unreporting were observed (NCHS, May 1974, p. 45), and the bias over the 12 to 17 year old group is likely to be quite small.

FIGURE A-1 ELEMENTARY SCHOOL QUESTIONNAIRE

DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE

HES-243

National Center for Health Statistics
Health Examination Survey

SUPPLEMENTAL INFORMATION FROM SCHOOL

The child whose name appears below is one of the sample of children being studied in the Health Examination Survey. Please complete this form on the basis of school records and/or information the child's teacher or other school official may have. Please return it in the enclosed franked envelope. This child's parent or guardian has given us written authorization to obtain information from the school.

School Number ☐☐☐☐☐ Sample Child Number ☐☐☐☐

Name of child: _____
(Last Name) (First Name) (Middle Name)

Home address (for identification) _____

1. Birth date: _____
(Month) (Day) (Year)

2. Present grade placement of this child _____

NOTE: If this grade placement is qualified in any way, please so indicate. (e.g., "Fourth generally, but placed with third grade for _____ (specify") _____

3. Have any grades been skipped or double promotions given? ☐ Yes ☐ No

4. Have any grades been repeated for any reason? ☐ Yes ☐ No

5. If "Yes" above, give reason: ☐ academic failure ☐ social immaturity
☐ excessive absenteeism
☐ other (specify) _____

6. Has this child been absent from school an unusual number of times or for an unusually long period in the most recent 6 months for which you have attendance records: ☐ Yes ☐ No ☐ Don't know ☐ Not applicable

7. If "Yes" above, what is the main reason for the absence?
☐ Illness of child ☐ Illness in family
☐ Other (specify) _____
☐ Unknown ☐ Not applicable

(Page 1)

8. If the following special resources were available, check those you would recommend for this child:

   a. ☐ Special provision for hard of hearing.

   b. ☐ Special provision for "sight saving".

   c. ☐ Speech therapy.

   d. ☐ Special provision for orthopedically handicapped.

   e. ☐ Special provision for gifted children.

   f. ☐ Special provision for "slow learners".

   g. ☐ Class for mentally retarded.

   h. ☐ Special provision for emotionally disturbed.

   i. ☐ Other (specify) _____.

   j. ☐ None of above.

9. If you have checked any of the above items "a" thru "i", are the particular resources checked available for this child?
   ☐ Yes (If several checked, specify which available: _____)
   ☐ No ☐ Not applicable

10. If "Yes" above, are those resources being used by the child? ☐ Yes ☐ No
    If "Yes" in item 9, but "No" in 10, what is the reason? _____
    _____.

11. Which one of these statements most accurately describes this child?

    ☐ A. His adjustment is at times a concern. You think of him as a problem or future problem.

    ☐ B. Unusual in his ability to cope with normal situations. At least occasionally have thought of him as "unusually well adjusted."

    ☐ C. You rarely think of him in terms of his behavior. He is not described by A or B.

12. As you know, the ability to pay attention to a task and to sustain attention (concentrate) changes with age, although children of the same age differ. Check the item which best describes the child in the classroom situation.

    ☐ A. Pays attention as well as most children his age.

    ☐ B. Characteristically is more attentive than others his age.

    ☐ C. Characteristically is less attentive than others his age.

    ☐ D. No basis for judging which of above fits this child.

13. In the classroom situation which one of these statements most nearly describes this child?

☐ A. Almost constantly moving, inappropriately talks out loud, drops things, leaves his seat when he should not, finds reasons to be "on-the-move".

☐ B. Slightly more restless than most children his age. But usually is not a problem in the classroom.

☐ C. Shows average amount of restlessness if fatigued, bored, etc. Motor activity level is as expected for his age.

☐ D. Remains quiet long after the average child has become restless. Sometimes seems too controlled for his age.

☐ E. No basis for judging which of above fits this child.

14. Below are a list of statements which may or may not describe this child. If the statement is descriptive of him/her, place a check mark (✓) in front of the statement. If it does not describe this child, leave the space blank. (You may check several items).

☐ A. Other children frequently accuse him of fighting.

☐ B. "Accidentally" trips, shoves or hits other children. Is too "rough" with other children.

☐ C. Frequently comes to your attention because he has been injured.

☐ D. Agressive behavior frequently makes disciplinary action necessary.

☐ E. Children frequently complain that he uses bad words.

☐ F. Parents of other children call to complain about his behavior.

☐ G. No method of discipline seems to work with him.

☐ H. No basis for judging about this child in these areas.

☐ I. None of above statements describe this child.

15. How frequently is any specific disciplinary action required for this child?

☐ A. Frequently ☐ B. Occasionally

☐ C. Never ☐ D. No basis for judging which of above fits this child.

16. When children"choose sides" is this child usually

☐ A. Among the first few to be chosen.

☐ B. Neither among the first nor the last ones chosen.

☐ C. Almost always among the last ones chosen.

☐ D. Relationship to group so changeable you can't predict order in which he would likely be chosen.

☐ E. No basis for judging which of above fits this child.

17. When a leader is chosen by the group, is this child

- ☐ A. Chosen more frequently than the average child.
- ☐ B. Chosen about as often as the majority of the children.
- ☐ C. Almost never chosen.
- ☐ D. No basis for judging which of above fits this child.

18. With respect to intellectual ability, would you judge this child to be:

- ☐ A. About average for his age (neither in the top - about one-fourth, nor the bottom - about one-fourth)
- ☐ B. Clearly above average for his/her age (In about the top fourth).
- ☐ C. Clearly below average for his/her age (In about the bottom fourth).
- ☐ D. No basis for judging this child.

19. With respect to academic performance, would you judge this child to be:

- ☐ A. About average for his/her age (neither in the top - about one-fourth, nor the bottom - about one-fourth).
- ☐ B. Clearly above average for his/her age (In about the top fourth).
- ☐ C. Clearly below average for his/her age (In about the bottom fourth).
- ☐ D. No basis for judging this child.

20. How long have you (the person providing the above information) known this child?

- ☐ Less than one month.
- ☐ More than one but less than six months.
- ☐ More than six months but less than one year.
- ☐ More than one year.

21. In what capacity have you known this child?

- ☐ Teacher in classroom.
- ☐ Teacher in special area (specify) _____
- ☐ School principal or assistant
- ☐ Other. (specify) _____

22. Name of respondent providing information on this child

_____

_____
(School)

23. Date completed _____

FIGURE A-2 SECONDARY SCHOOL QUESTIONNAIRE

All information which would permit identification of an individual or of an establishment will be held confidential, will be used only by persons engaged in and for the purpose of the survey and will be protected against disclosure in accordance with the provisions of 42 CFR Part 1.

PHS-4733-5 (PAGE 1)
REV. 9-66

DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
NATIONAL CENTER FOR HEALTH STATISTICS
HEALTH EXAMINATION SURVEY

Form Approved:
Budget Bureau No. 68-R1700

SUPPLEMENTAL INFORMATION FROM SCHOOL

The student whose name appears below is one of the sample of students being studied in the Health Examination Survey. This student's parent or guardian has given us written authorization to obtain information from the school. Please complete this form on the basis of school records and/or information the student's teacher or other school official may have. A pre-addressed envelope, requiring no postage, is furnished for your convenience in returning this form.

NAME OF YOUTH *(Last)* *(First)* *(Middle)*

SAMPLE NUMBER

HOME ADDRESS
(For identification) _____

1. BIRTH DATE _____ *(Month)* *(Day)* *(Year)*

2. WHAT IS THE PRESENT GRADE PLACEMENT OF THIS STUDENT? _____ grade.

3. HAVE ANY GRADES BEEN SKIPPED OR DOUBLE PROMOTIONS BEEN GIVEN?
- 2 ☐ NO
- 3 ☐ DON'T KNOW
- 1 ☐ YES → IF YES, Which grades were skipped? _____ _____ _____

4. HAVE ANY GRADES BEEN REPEATED FOR ANY REASON?
- 2 ☐ NO
- 3 ☐ DON'T KNOW
- 1 ☐ YES → IF YES, Which grades were repeated? _____ _____ _____

5. IF GRADES WERE REPEATED, WHAT WAS THE MAIN REASON?
(Check only one)
- 1 ☐ EXCESSIVE ABSENTEEISM *(excused)*
- 2 ☐ TRUANCY
- 3 ☐ MOVED INTO MORE DIFFICULT SCHOOL SYSTEM
- 4 ☐ SOCIAL IMMATURITY
- 5 ☐ ACADEMIC FAILURE
- 6 ☐ OTHER *(explain)* _____

6. HAS THIS STUDENT BEEN ABSENT FROM SCHOOL AN UNUSUAL NO. OF DAYS DURING THE MOST RECENTLY COMPLETED SCHOOL YEAR?
- 2 ☐ NO
- 3 ☐ DON'T KNOW
- 1 ☐ YES → IF YES, WHAT IS THE MAIN REASON FOR THE ABSENCES? *(Check only one)*
  - 1 ☐ Student's illness
  - 2 ☐ Illness in student's family
  - 3 ☐ Due to work *(either away from home or at home for reasons other than family illness)*
  - 4 ☐ Truancy
  - 5 ☐ Other *(explain)* _____

7. HOW FREQUENTLY IS ANY SPECIFIC DISCIPLINARY ACTION REQUIRED FOR THIS STUDENT?

1 ☐ FREQUENTLY

2 ☐ OCCASIONALLY

3 ☐ NEVER

4 ☐ NO BASIS FOR JUDGING WHICH OF THE ABOVE FITS THIS STUDENT

8. ARE SPECIAL RESOURCES NEEDED OR CURRENTLY BEING USED FOR THIS STUDENT?

2 ☐ NO **(SKIP TO QUESTION 9)**

1 ☐ YES ⟶ IF YES, complete the following only for those special resources needed or currently being used by this youth:

SPECIAL RESOURCE	RESOURCE NEEDED (Check one)			REASON FOR NON-USE (Check primary reason)			
	BEING USED	NOT AVAILABLE	AVAILABLE BUT NOT USED	OVER-CROWDED	STUDENT OBJECTS	PARENTS OBJECT	OTHER (specify)
a. For the gifted							
b. For the mentally retarded							
c. For "slow learners" not classed as mentally retarded							
d. For emotionally disturbed							
e. For orthopedically handicapped							
f. Special facilities for the "hard of hearing"							
g. Special facilities for the visually handicapped							
h. Speech therapy							
i. Remedial reading							
j. English for students from non-english speaking environments							
k. Remedial training in special subject area(s)							
l. Other resources needed (specify)							

9. IN TERMS OF ADJUSTMENT, WHICH OF THE FOLLOWING BEST DESCRIBES THIS STUDENT?

1 ☐ SEEMS WELL ADJUSTED.

2 ☐ SEEMS SOMEWHAT MALADJUSTED.

3 ☐ SEEMS SERIOUSLY MALADJUSTED.

4 ☐ NO BASIS FOR JUDGING WHICH OF THE ABOVE FITS THIS STUDENT.

10. IN TERMS OF INTELLECTUAL ABILITY, WHICH OF THE FOLLOWING BEST DESCRIBES THIS STUDENT?

1 ☐ ABOVE AVERAGE

2 ☐ AVERAGE

3 ☐ BELOW AVERAGE

4 ☐ DON'T KNOW STUDENT WELL ENOUGH TO JUDGE.

11. IN TERMS OF ACADEMIC ACHIEVEMENT, IS THIS STUDENT:

1 ☐ IN THE UPPER THIRD OF HIS CLASS

2 ☐ IN THE MIDDLE THIRD OF HIS CLASS

3 ☐ IN THE LOWER THIRD OF HIS CLASS

4 ☐ DON'T KNOW → **IF DON'T KNOW,** *Specify reason* _____

12. IN TERMS OF POPULARITY WITH OTHER STUDENTS, IS THIS STUDENT:

1 ☐ ABOVE AVERAGE IN POPULARITY

2 ☐ ABOUT AVERAGE IN POPULARITY

3 ☐ BELOW AVERAGE IN POPULARITY

4 ☐ DON'T KNOW

13. HOW LONG HAVE YOU KNOWN THIS STUDENT?

1 ☐ LESS THAN ONE SEMESTER

2 ☐ MORE THAN ONE SEMESTER BUT LESS THAN ONE YEAR

3 ☐ MORE THAN ONE YEAR BUT LESS THAN TWO YEARS.

4 ☐ MORE THAN TWO YEARS

SIGNATURE OF PERSON COMPLETING THIS FORM

OFFICIAL TITLE	DATE FORM COMPLETED

Data Processing*

NCHS provided cross-tabulations and population estimates for Cycle II and Cycle III data (Roberts, NCHS, private communication, December 17, 1974). The following quantities were provided for each teacher-identified handicapping condition by age and sex, broken down separately by the variables of family income, race, region, and population size of place of residence:

(1) Sample totals of subjects for whom school data were obtained in each socioeconomic or demographic category.

(2) Sample totals of subjects in each category identified by teachers as needing a specific educational service.

(3) Population estimates, for the midpoint of each cycle, of the total number of subjects in each category for whom school data were available [obtained from sample totals in (1) by weighting].

(4) Population estimates, for the midpoint of each cycle, of the number of subjects in each category identified by teachers as needing a specific educational service [obtained from sample totals in (2) by weighting].

(5) Population estimates of rates per 100 subjects in each category needing specific educational services [quotient of (4) and (3)].

(6) Standard errors for rates per 100 subjects as given in (5).

From these tabulations for each age group, the authors constructed total rates and standard errors for three groups of teacher-identified handicapping conditions--physical, mental, and speech. The first two are sets of conditions. Physical handicaps consist of hearing, vision, and orthopedic problems. Mental handicaps consist of mental retardation and emotional disturbance. The rationale for these groupings is discussed in the main text.

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*The authors are grateful to Jean Roberts, Chief, Medical Statistics Branch Division of Health Examination Statistics, National Center for Health Statistics for her cooperation in supervising computer tabulations at NCHS.

The rate for each handicap group was considered the sum of the rates for the separate handicaps in that group. An individual reported to have two physical handicaps, for example, was counted twice. The resulting group rates, therefore, indicate the total number of handicaps per 100 students rather than the total number of individuals per 100 reported to have one or more handicap. The standard errors (SE) for these group rates equal the square root of the sum of the squares of the standard errors of the individual handicap rates included.

The principal research question was whether teacher reported rates differed significantly across family income, race, region, and population size of place of residence. Particular effort was directed toward detecting trends across the categories with a natural ordering--family income and population size of place of residence. The method of approach to these tasks is described below.

General Statistical Considerations

Low rates of identified handicaps found in our earlier examinations of NCHS data (Craig and McEachron, 1975) indicated it would be necessary to consolidate age-sex categories in each cycle to obtain meaningful estimates across various subpopulations. This is not considered a liability to the policy relevance of the analysis. Delivery of educational services is usually not differentiated by sex and is only generally dependent on age. Delivery is generally by educational level: elementary schools (modal age range 6 to 11 years, both sexes) and secondary schools (modal age range 12 to 17 years, both sexes). The shifts in age distribution (proportions of the 6 to 17 population at each year of age) of each cycle would affect the consolidated results if each survey were repeated, but the effects would be small in comparison to the sampling variability. Therefore, changes in age distribution within the 6 to 11 and 12 to 17 ranges were ignored. However, the absolute numbers of individuals needing

special-education services [tabulations (4)] at the estimated rates would change far more substantially. As a result, the statistical analysis focused on the percentages of children (aged 6 to 11) and youths (aged 12 to 17) identified as needing specialized educational service rather than on absolute numbers.

The NCHS survey design and operation for each cycle was organized to minimize bias and variability of measurement techniques. The estimates of standard errors for the rates in tabulation (6) furnished by NCHS are primarily measures of sampling variability; these variations might occur by chance because only a sample of the population was surveyed. The standard error, as estimated for these tabulations and calculated by the authors for the physical and mental groups of handicaps, also reflects part of the variability arising in the measurement process. It does not include estimates of biases that might be in the data.

The level of significance used most frequently in this report is 5 in 100 ("$p < 0.05$"). Thus for results to be significant the chances must be less than 5 in 100 that they could arise from sampling and measurement variations alone.

Confidence Intervals for Individual Identified-Handicap Rates

A confidence interval for a sample rate in this report is an interval with a length and location that specifies the chance that, if the NCHS survey were repeated, the rate would lie within that interval. For example, if the random sampling and measurement variability reflected in the standard errors are approximately normally distributed, the chances are about 95 in 100 that a second survey would obtain a rate within plus or minus 1.96 standard errors of the estimated rate of the original survey. There would be only one chance in 40 that the second rate would lie above this interval, and one chance in 40 that the second rate would lie below the interval. Therefore, a single 95% confidence interval with equal

chances that a second survey's estimate would lie above or below the interval would appear as a line segment centered on the estimated rate and extending 1.96 standard errors to either side.

The sampling and measurement variabilities reflected in the NCHS estimates of standard error are approximately normally distributed when five or more subjects in a subsample are identified as having a particular handicap (Hoel, 1971, p. 82). Since small rates in small subsamples occur frequently in the NCHS data, this condition is often violated. More accurate methods of determining confidence intervals could be developed from these data on the basis of the binominal distribution using procedures employed in the statistical tests described later. The calculation of confidence intervals is intended for illustration only, however, and therefore the normal approximation was used throughout.

Approximate confidence intervals for the rates of each handicapping condition identified for both age groups were constructed separately across the four socioeconomic and demographic dimensions. These are presented in Appendix B. A rule of thumb for the accuracy of such a confidence interval is that it not extend below zero; a rate below zero is impossible by definition, and therefore the normal approximation that suggests it must be in error. The correct confidence interval when this condition is violated is no longer symmetrical about the estimated rate but shifts upward (away from the zero rate boundary). In Figure A-3, the normal approximation for the single 95% confidence interval (the solid vertical line with bars on each end) extends below the zero percent boundary. The correct confidence interval, as interpolated from the Poisson distributions to yield a continuous approximation, extends considerably higher. The reader should keep this phenomenon in mind when examining the approximate intervals in Appendix B for small estimated rates.

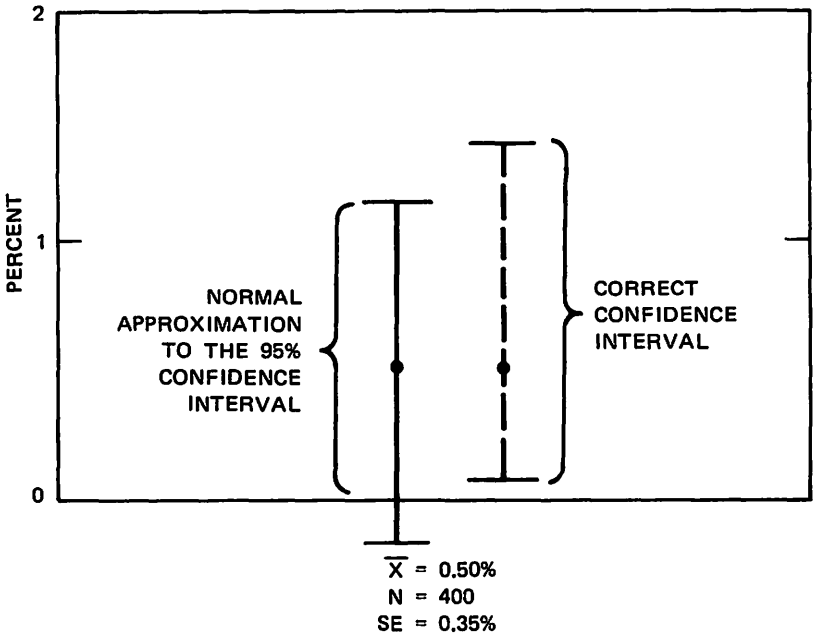

FIGURE A-3 AN EXAMPLE OF THE EFFECTS OF A SMALL SAMPLE ON CONFIDENCE INTERVALS OF ESTIMATED RATES

In actually computing the confidence intervals in Appendix B, the conceptual unit for which a 95% level of confidence was desired was not each individual independent rate but the collection of rates (one per category) appearing in each figure. If the confidence level for each individual rate were 95% and a figure contained k of these rates (k categories) which are statistically independent, there would be a $(0.95)^k$ chance that none of the k rates estimated from a second survey would lie outside its individual 95% confidence interval. For k = 6 categories, $(0.95)^k = 0.735$, which is much below the 0.95 value desired. A good approximation to confidence intervals having the desired property of 95% confidence for each figure as a whole can be obtained by drawing each individual interval with a level of confidence given by 1 - (.05/k). The chance that none of the k rates estimated from a second survey would lie outside intervals with this level of confidence is $[1 - (.05/k)]^k$, which ranges from 0.950 when k = 1 to 0.9512 when k is arbitrarily large. The confidence intervals plotted in Appendix B are joint confidence intervals

based on this approximation (Dunn, 1961). There is at least a 95% chance for each figure in Appendix B that all the rates estimated from a second survey would fall inside the confidence intervals shown (bearing in mind their approximate character as shown in Figure A-3).

The confidence intervals of Appendix B indicate sampling and measurement variability in data but are not suitable for assessing the statistical significance of differences. Such assessments require the construction of specific statistical tests, as described in the following section.

Statistical Tests on Individual Identified-Handicap Rates

The statistical tests for this report were performed to detect handicaps in each age range for which the differences in teacher-reported rates across socioeconomic and demographic categories are due to true variations in teacher ratings rather than sampling and measurement variability inherent in the NCHS survey. Of particular interest to policy formulation and funding strategies is the possibility of systematic statistical patterns indicating that more carefully tailored approaches should replace the current strategies, which are based on the assumption that handicaps are distributed uniformly through the elementary and secondary school-age population.

Ideally, in investigating this policy question the effects of each of the four socioeconomic dimensions should be separated. The NCHS summary data used for this report did not permit this partitioning of variance (Newton and Spurrell, 1967, 1968) because only marginal totals for each dimension were given. However, our current work with the Cycle II data tape will permit this analysis for the elementary school population. In this first volume, the variation in rates is examined along each dimension without controlling for the remaining three (the marginal distributions along each dimension).

Specification of Hypotheses

Selection of the types of hypotheses to be tested concerning variation in identified group rates along a given dimension was a function of whether that dimension possessed a natural ordering by size. Racial and regional categories possess no natural ordering. For these dimensions the null hypothesis of equal rates was tested against the alternative hypothesis that the rates in various categories were not all equal, regardless of which categories had the higher rates.

A natural ordering by size does exist along the dimensions of family income and population size of place of residence. For these dimensions a narrower alternative hypothesis was drawn: a trend or simple ordering of rates exists along the dimension when its categories are ordered by size. Since there was no basis for choosing a functional form for trends either by family income or by population size of place of residence, we applied the following simple orders:

$$r_1 \geq r_2 \geq \ldots \geq r_n \qquad (1a)$$

or

$$r_1 \leq r_2 \leq \ldots \leq r_n \quad . \qquad (1b)$$

Here r_i is the rate for the subset of the population falling in the i^{th} category; the index i is in order of increasing category of size; and not all rates in (1a) or (1b) are equal.

It remained only to determine for each dimension whether the trend against which to test would be increasing or decreasing as size increased. The trend for family income was taken to be decreasing rates with increases in income [form (1a)], whereas the trend for population size of place of residence was considered unspecified [either form (1a) or form (1b), a two-sided trend hypotheses].

Construction of a Test Against Unequal Rates Without Trend

Rates correspond statistically to proportions. Thus the problem of testing the null hypothesis of equality among rates in k categories of a dimension against the alternative hypotheses of unequal rates corresponds to the classical problem of determining the statistical significance of the differences among k proportions (Hoel, 1971, pp. 237-240). However, the classical test (chi-square) assumes simple random sampling with the size of the sample in each category known, and this condition was not met in the complex design and estimation of sampling and measurement variance in the NCHS survey. On the other hand, the NCHS material does provide estimates of the proportion and the standard error (NCHS, April 1966). To apply the classical chi-square test of homogeneity among k proportions, it was necessary to determine, category by category, the sample size that would have produced the proportion and standard error obtained from NCHS data with simple random sampling (SRS). This SRS-equivalent sample size was obtained by inverting the asymptotic formula for the standard error of a proportion with known large sample size under SRS (Hogg and Craig, 1970, p. 187):

$$SE = \sqrt{\frac{p(1 - p)}{\tilde{n}}} \tag{2}$$

where SE is the standard error, p is the proportion, and $\tilde{n}$ is the SRS sample size. Inversion of (2) yields:

$$\tilde{n} = \frac{p(1 - p)}{(SE)^2} \tag{3}$$

for the equivalent SRS sample size. The equivalent number of occurrences of identified handicapping conditions in a sample size n is

$$\tilde{x} = p\,\tilde{n} \quad . \tag{4}$$

The numbers $\tilde{n}$ and $\tilde{x}$ derived from NCHS data according to equations (3) and (4) were used in the classical chi-square test to determine the statistical significance of differences among the identified physical, mental, and speech rates along the dimensions of region (k = 4 categories) and race (k = 2 categories). (Zero rates for one regional category for reported vision and orthopedic handicaps in the 12 to 17 age group were treated using the method described in the next section.) The test for two categories corresponds to the ordinary two-tail test of differences in proportions. The category of "other" was omitted because it was too small for inclusion. These values of $\tilde{n}$ and $\tilde{x}$ had noninteger values, which were retained in this form in the computation of the chi-square statistic rather than rounded to integer values. This procedure increased the accuracy of the test (in terms of size) for small values of $\tilde{x}$. The results are reported in Appendix B. The test is accurate as long as the following condition holds for each category i (Hoel, 1971, pp. 229-230):

$$\tilde{p}_e \tilde{n}_i \geqq 5 \quad \text{where} \quad \tilde{p}_e \stackrel{d}{=} \frac{\sum_{j=1}^{k} x_j}{\sum_{j=1}^{k} n_j} \quad . \tag{5}$$

Here $\tilde{p}_e$ is the estimated rate under the null hypothesis, while $\tilde{p}_e \tilde{n}_i$ is the expected number in a sample of size $\tilde{n}$ under the null hypothesis. Where condition (5) was violated along the regional dimension, adjacent categories were combined by adding the values of $\tilde{n}$ and the values of $\tilde{x}$ until the condition was satisfied (Hoel, 1971, p. 230). For race, no combination of categories was possible; where condition (5) was violated the data were considered too limited to yield significant results.

Construction of a Test Against Unequal Rates with Trend

To test the null hypothesis of equal rates against the alternative hypothesis of a sample ordering or trend as shown in relations (1a) and (1b), a modification of the classical chi-square test which was developed by Bartholemew (Bartholemew, 1959, pp. 36-48; Bartholemew, 1959, pp. 328-335) and analyzed further by Barlow, Bartholemew, Bremner, and Brunk (Barlow et al., 1972) was employed. The most accessible account of this test is given in Fleiss (Fleiss, 1973, pp. 100-102).

The Bartholemew chi-square test for one- or two-sided simple orders was applied for each age range and identified handicap to the rates arrayed by categories of family income and population size of place of residence. Formulas (3) and (4) were used to compute $\tilde{n}$ and $\tilde{x}$ for each category with a nonzero sample rate. All racial and ten of twelve regional breakdowns had nonzero rates reported in every category for every handicap; in contrast, several of the income and population size of place of residence categories across the handicaps had no cases reported in the sample, and thus no proportions or estimate standard errors. In such a case several equivalent SRS sample sizes for the category were imputed, ranging from 0.5 to 1.5 times the actual sample size [tabulation (1)], to allow a check on the sensitivity of the conclusions of the test to the missing data. The nonzero imputed equivalent sizes were chosen to bracket the range of values of $\tilde{n}$ versus actual sample size observed in nearby categories with similar total numbers of subjects in actual sample totals. Results were considered significant when the test indicated significance for the imputed size bearing the same proportion to the actual size as occurred in adjacent categories having positive rates. These results are summarized in Tables B-1 through B-4 of Appendix B.

Critical values for the Bartholemew chi-square test for one-sided or two-sided simple orders (1a) and (1b) have been tabulated only for

three and four categories (Barlow et al., 1972, pp. 359-362). To permit use of these tables or the two-category test of proportions for the data by family income (k = 6 categories) or population size of place of residence (k = 8 categories), a combination of adjacent categories by addition of $\tilde{n}$ values and $\tilde{x}$ values was carried out. Categories to be combined were selected on the basis of a sequential application of three criteria. Each of these criteria is independent of the rates of teacher-identified handicap among the different categories, as required for statistical validity (Hoel, 1971, p. 230).

The first criterion was satisfaction of condition (5) for the accuracy of the normal approximation under the null hypothesis. (In several instances this step left only two categories for a test of proportions.) If this criterion could not be satisfied by at least two separate categories (for example, vision and orthopedic handicaps along the population size of place of residence dimension), the data was considered too limited to yield significant trends. If several configurations survived this screening, those retained for further examination preserved the greater detail or number of separate categories at the low-income end of the family income scale and at each end of the population size of place of residence scale. The final selection for family income was the configuration with the most equal number of categories in each joint category or, if choice still remained, the configuration that achieved the most even distribution of $\tilde{p}_e \tilde{n}$ as defined in Equation (5) across the joint categories. Final choice for population size of place of residence was made on the basis of minimum consolidation of categories across the urban-nonurban boundary. Tables B-1, B-2, and B-4 of Appendix B include, respectively, the final consolidated categories for family income and population size of place of residence, and for region where necessary to satisfy conditions (5).

The examples in Table A-1 illustrate the selection procedure. In the first example [presented in Table A-1(a)], the effective null hypothesis rate $\tilde{p}_e$ is computed from Equation (5) to be $\tilde{p}_e = 0.0127$ (1.27%). The criterion (5) is $\tilde{p}_e \tilde{n}_i \geqq 5$, which can be cast in the form $\tilde{n}_i \geqq 5/\tilde{p}_e = 393.77$. Each category satisfies this first criterion. The second criterion, preserving maximum detail at the low-income end of the scale, indicates that categories 3 and 4 and categories 5 and 6 should be combined. The resulting configuration of four categories and joint rates for application of the Bartholemew chi-square test is as follows:

Income Range	<$3,000	$3,000-4,999	$5,000-9,999	≧$10,000
Revised Category No. (j)	1	2	3	4
Joint $\approx{n}_j$	626.33	873.17	2,784.55	1,367.52
Joint $\approx{x}_j$	13.97	13.01	33.13	11.66
Joint Rate $\approx{r}_j$	2.23%	1.49%	1.19%	0.85%

In the second example [presented in Table A-1(b)], category 1 contains no entries; for this example half the actual sample size was chosen as the most reasonable estimate for $\tilde{n}_i$ based on adjacent category 2. This value is enclosed in brackets in Table A-1. The null hypothesis rate $\tilde{p}_e$ is 0.25%, yielding the criterion $\tilde{n}_i \geqq 2{,}016$. Only category 3 meets this test. Since categories 1 and 2 combined do not, they must be combined with adjacent category 3. The test cannot be met by categories 4 through 6; combining adjacent categories to meet the test results in a single joint category (4) + (5) + (6). Thus in this example the criterion (5) produces only two categories (and therefore a one-tail two-category test), as shown in the tabulation following Table A-1.

Table A-1

EXAMPLES OF CONSOLIDATION OF CATEGORIES IN TESTING FOR TRENDS

(a) Vision Handicaps in 6 to 11 Age Group, by Family Income

	<$3,000	$3,000-4,999	$5,000-6,999	$7,000-9,999	$10,000-14,999	≧$15,000
Category number (i)	1	2	3	4	5	6
Actual sample size	1,143	1,211	1,580	1,405	790	319
Rate (r_i)	2.23%	1.49%	1.11%	1.26%	1.18%	0.38%
Standard error (SE_i)	0.59%	0.41%	0.29%	0.29%	0.38%	0.26%
Effective size ($\tilde{n}_i$)	626.33	873.17	1,305.21	1,479.34	807.53	559.99
Effective frequency ($\tilde{x}_i$)	13.97	13.01	14.49	18.64	9.53	2.13

(b) Vision Handicaps in 12 to 17 Age Group, by Family Income

	<$3,000	$3,000-4,999	$5,000-6,999	$7,000-9.999	$10,000-14,999	≧$15,000
Category number (i)	1	2	3	4	5	6
Actual sample size	694	821	1,006	1,458	1,212	629
Rate (r_i)	0	0.47%	0.38%	0.18%	0.21%	0.09%
Standard error (SE_i)	0	0.35%	0.13%	0.11%	0.21%	0.09%
Effective size ($\tilde{n}_i$)	[347]*	381.87	2,239.98	1,484.93	475.19	1,110.11
Effective frequency ($\tilde{x}_i$)	0	1.80	8.51	2.67	1.00	1.00

*Inserted as effective sample size for zero observed rate (see text).

Income Range	<$7,000	≧$7,000
Revised Category No. (j)	1	2
Joint $\approx n_j$	2,968.85	3,070.23
Joint $\approx x_j$	10.31	4.67
Joint Rate $\approx r_j$	0.35%	0.15%

The Bartholemew test for three or four ordered categories satisfying (5), or the one-tailed test used in the last example, was applied to these adjusted data for the null hypothesis of equal rates and the alternative hypothesis of decreasing rate with increasing income for the dimension of family income. The two-sided version of these tests was employed for the population size of place of residence dimension and its unspecified trend with increasing population. Since rural dollar incomes tend to be lower than urban incomes, these two hypotheses are interdependent for data tabulated on each dimension alone (tabulations of marginals). This illustrates the need for case-by-case data allowing control on each of these variables to disentangle the effects. We are now analyzing NCHS's original data tape of survey Cycle II and the results will be reported in Volume II.

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Appendix B

DETAILED TABLES AND FIGURES

Table B-1

BARTHOLEMEW CHI-SQUARE TEST FOR TREND
OF DECREASING RATES WITH INCREASING FAMILY INCOME

(a) 6 to 11 Age Group

Handicap	Consolidated Categories of Family Income (dollars per year)	χ^2 Corrected for Trend Inversion	Bartholemew Significance Level
Hearing	<$ 5,000 5,000 - 6,999 7,000 - 9,999 ≧10,000	4.62	0.05
Vision	<3,000 3,000 - 4,999 5,000 - 9,999 ≧10,000	6.99	0.025
Orthopedic	<5,000 ≧5,000	2.99*	0.05*
Mental retardation	<3,000 3,000 - 6,999 7,000 - 9,999 ≧10,000	17.92	<<0.005
Emotional disturbance	<3,000 3,000 - 4,999 5,000 - 9,999 ≧10,000	11.92	<<0.005
Speech	<3,000 3,000 - 4,999 5,000 - 9,999 ≧10,000	5.08	0.05

*Criterion that expected frequencies to be at least five leads to only two categories, for which the square of the Z value and the significance level for a one-tailed test of differences in proportions is given.

Table B-1 (Concluded)

BARTHOLEMEW CHI-SQUARE TEST FOR TREND
OF DECREASING RATES WITH INCREASING FAMILY INCOME

(b) 12 to 17 Age Group

Handicap	Consolidated Categories of Family Income (dollars per year)	χ^2 Corrected for Trend Inversion	Bartholemew Significance Level
Hearing	< $ 7,000 ≧7,000	2.75*	0.05*
Sight	<7,000 ≧7,000	2.37*	0.06*
Orthopedic	<7,000 ≧7,000	0.24*	ns*†
Mental retardation	<3,000 3,000 - 4,999 5,000 - 9,999 ≧10,000	43.02	<<0.005
Emotional disturbance	<3,000 3,000 - 4,999 5,000 - 9,999 ≧10,000	11.92	<0.005
Speech	<3,000 3,000 - 4,999 5,000 - 9,999 ≧10,000	12.65	<0.005

*Criterion that expected frequencies be at least five leads to only two categories, for which the square of the Z value and the significance level for a one-tailed test of differences in proportions is given.

†ns = not significant.

Table B-2

BARTHOLEMEW CHI-SQUARE TWO-WAY TEST
FOR TREND, BY POPULATION SIZE OF PLACE OF RESIDENCE

(a) 6 to 11 Age Group

Handicap	Consolidated Categories for Population Size of Place of Residence	Trend Direction with Increasing Population Size of Place of Residence	χ^2 Corrected for Trend Inversions	Two-Tailed Bartholemew Significance Level
Hearing	Rural Other Nonurban	Increasing	1.59	ns*
	Urban ≦2.99 million Urban ≧3 million	Decreasing	0.18	ns
Vision	Rural Other Nonurban	Increasing	0.56	ns
	Urban ≦2.99 million Urban ≧3 million plus	Decreasing	0†	ns
Orthopedic	Rural Other Nonurban and Urban ≦2.99 million	Increasing	0†	ns
	Urban ≧3 million	Decreasing	0.03	ns
Mental retardation	Rural Other Nonurban	Increasing	0†	ns
	Urban ≦2.99 million Urban ≧3 million	Decreasing	1.54	ns
Emotional disturbance	Rural Other Nonurban	Increasing	0†	ns
	Urban ≦2.99 million Urban ≧3 million	Decreasing	2.96	ns
Speech	Rural Other Nonurban	Increasing	3.47	ns
	Urban ≦2.99 million Urban ≧3 million	Decreasing	0†	ns

*ns = not significant.

†Due to corrections for trend inversion (hypothesized ordering not obtained).

Table B-2 (Concluded)

BARTHOLEMEW CHI-SQUARE TWO-WAY TEST
FOR TREND BY POPULATION SIZE OF PLACE OF RESIDENCE

(b) 12 to 17 Age Group

Handicap	Consolidated Categories for Size of Place of Residence	Trend Direction with Increasing Population Size of Place of Residence	χ^2 Corrected for Trend Inversion	Two-Tailed Bartholemew Significance Level
Hearing	Rural plus Other, Other Nonurban to 35% of 10-25 thousand Urban plus remainder of Other, Nonurban	Increasing	2.19*	ns*†
		Decreasing	0‡	ns‡
Vision	§	na**	na	na
Orthopedic	§	na	na	na
Mental retardation	Rural Other Nonurban Urban ≦2.99 million Urban ≧3 million	Increasing	1.67	ns
		Decreasing	0.42	ns
Emotional disturbance	Rural Other Nonurban Urban ≦2.99 million Urban ≧3 million	Increasing	15.5	<0.01
		Decreasing	0‡	ns
Speech	Rural Other Nonurban Urban ≦2.99 million Urban ≧3 million	Increasing	0.55	ns
		Decreasing	0‡	ns

*Criterion that expected frequencies be at least five leads to only two combined categories, for which the square of the Z value and the significance level for a one-tail test of difference in proportions is given.

†ns = not significant.

‡Due to corrections for trend inversion (hypothesized ordering not obtained).

§Could not obtain two combined categories having expected frequency of at least five.

**na = not applicable.

Table B-3

PEARSON CHI-SQUARE TEST
FOR DIFFERENCES IN IDENTIFIED RATES, BY RACE

Handicap	6-11 Age Group χ^2	6-11 Age Group Significance Level	12-17 Age Group χ^2	12-17 Age Group Significance Level
Hearing	0.24	ns*	+	na
Vision	0.88	ns	+	na
Orthopedic	+	na‡	+	na
Mental retardation	27.03	<<0.001	22.36	<<0.001
Emotional disturbance	9.36	0.005	0.21	ns
Speech	4.77	0.05	0.61	ns

Note: The chi-square test for two categories (one degree of freedom) is equivalent to a two-tail test of differences in proportions.

*ns = not significant.

+Criterion that expected frequencies to be at least five is not fulfilled for the black subsample.

‡na = not applicable.

Table B-4

PEARSON CHI-SQUARE TEST FOR DIFFERENCES
IN IDENTIFIED RATES, BY REGION

Handicap	6-11 Age Group				12-17 Age Group			
	Regional Category	χ^2	Significance Level	Ordering of Regions	Regional Category	χ^2	Significance Level	Ordering of Regions
Hearing	N, MW, S, W*	10.15	0.02	MW > N > S > W	†	na‡	na	na
Vision	N, MW, S, W	13.96	<0.01	S > N > MW > W	N + MW, S + W§	8.40	<0.01	N + MW > S + W
Orthopedic	N, S, MW + W§	3.72	ns**	na	†	na	na	na
Mental retardation	N, MW, S, W	0.77	ns	na	N, MW, S, W	2.69	ns	na
Emotional disturbance	N, MW, S, W	4.58	ns	na	N, MW, S, W	1.08	ns	na
Speech	N, MW, S, W	0.35	ns	na	N, MW, S, W	6.60	0.10	S > MW > N > W

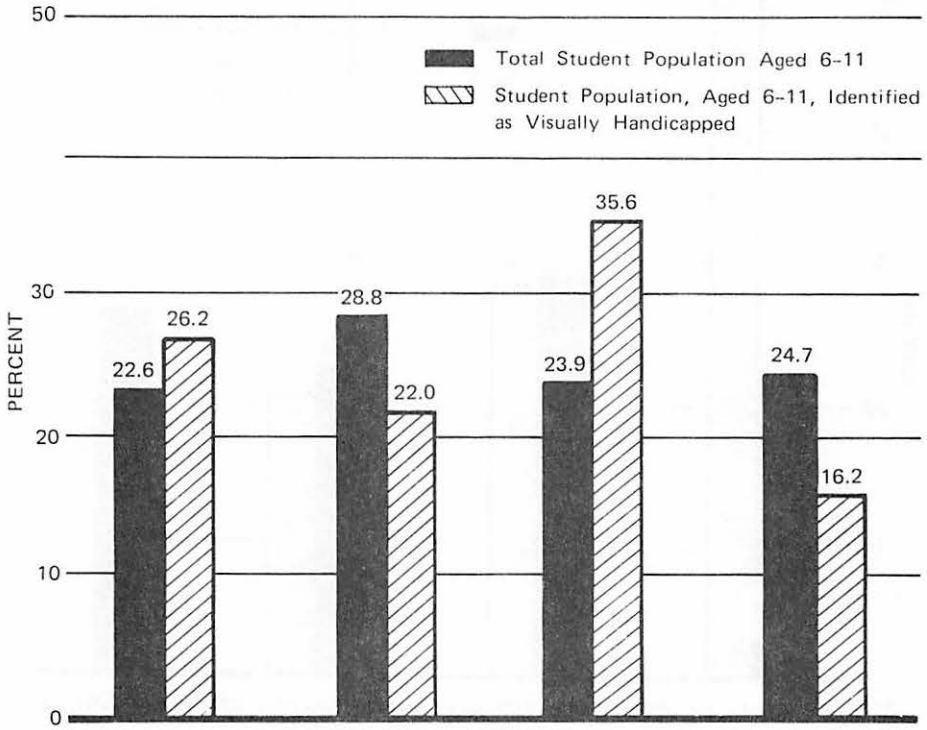
*N: North; MW: Midwest; S: South; W: West.

†No combination of categories could meet the criterion that expected frequencies be at least five.

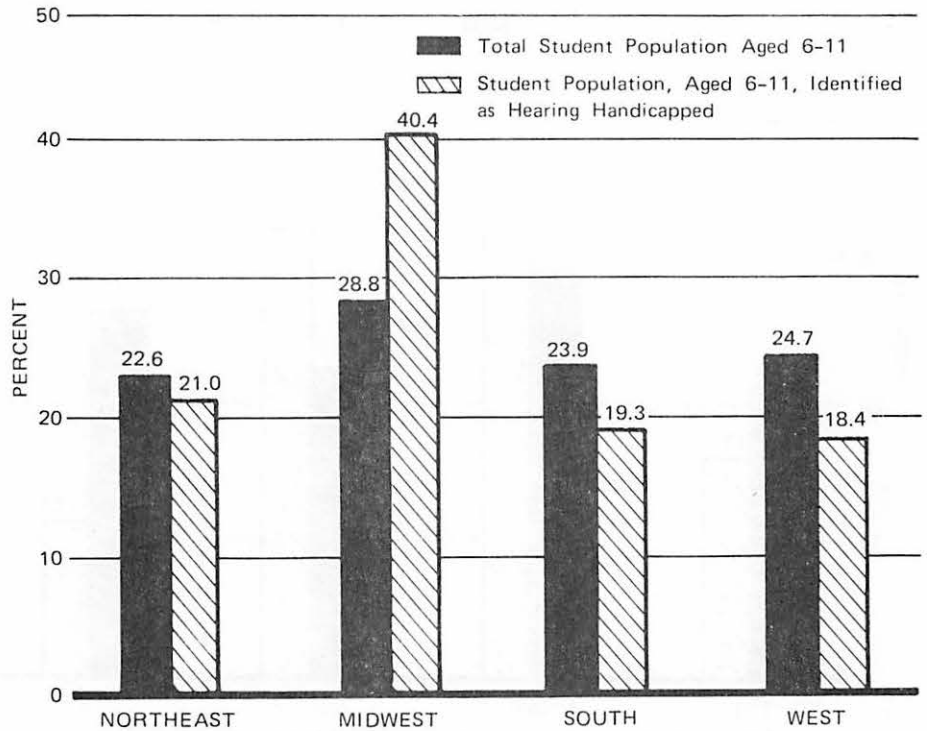
‡na = not applicable.

§Categories consolidated to meet expected frequency criterion.

**ns = not significant.

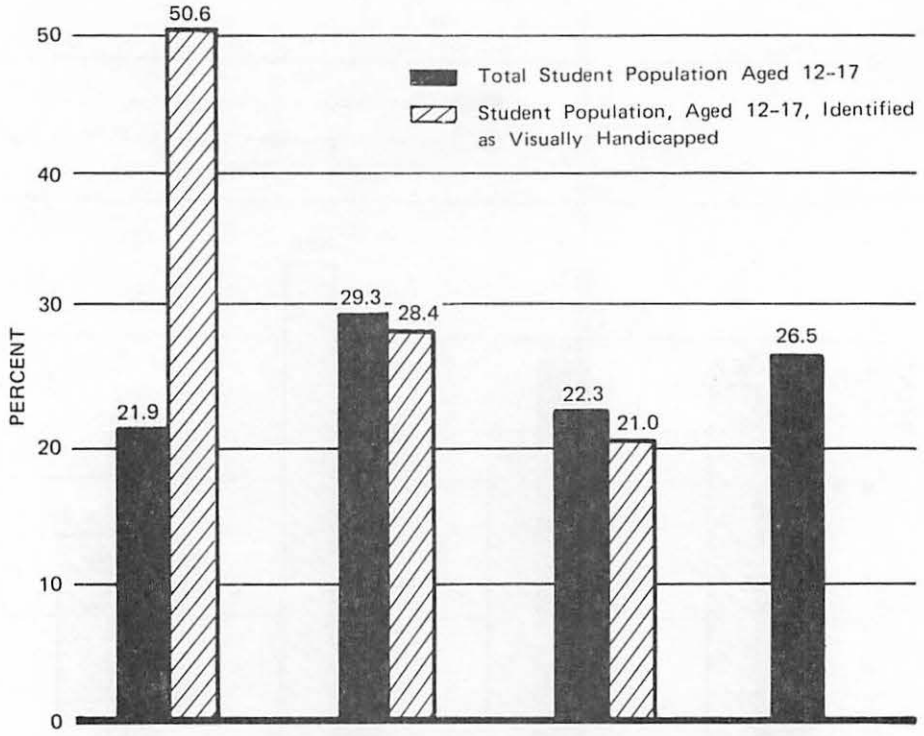


(a) TEACHER-IDENTIFIED VISUALLY HANDICAPPED STUDENTS AND ALL STUDENTS, AGED 6 TO 11

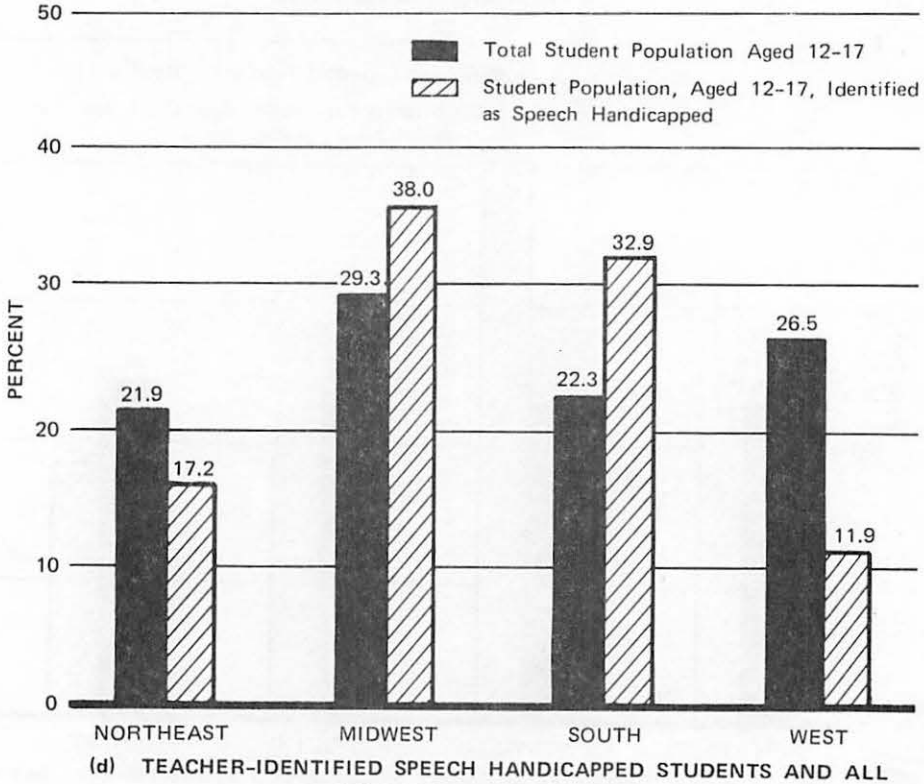


(b) TEACHER-IDENTIFIED HEARING HANDICAPPED STUDENTS AND ALL STUDENTS, AGED 6 TO 11

FIGURE B-1 DISTRIBUTION, BY GEOGRAPHIC REGION, OF TEACHER-IDENTIFIED HANDICAPPED STUDENTS (PERCENTAGE OF POPULATION GROUP, 1964)

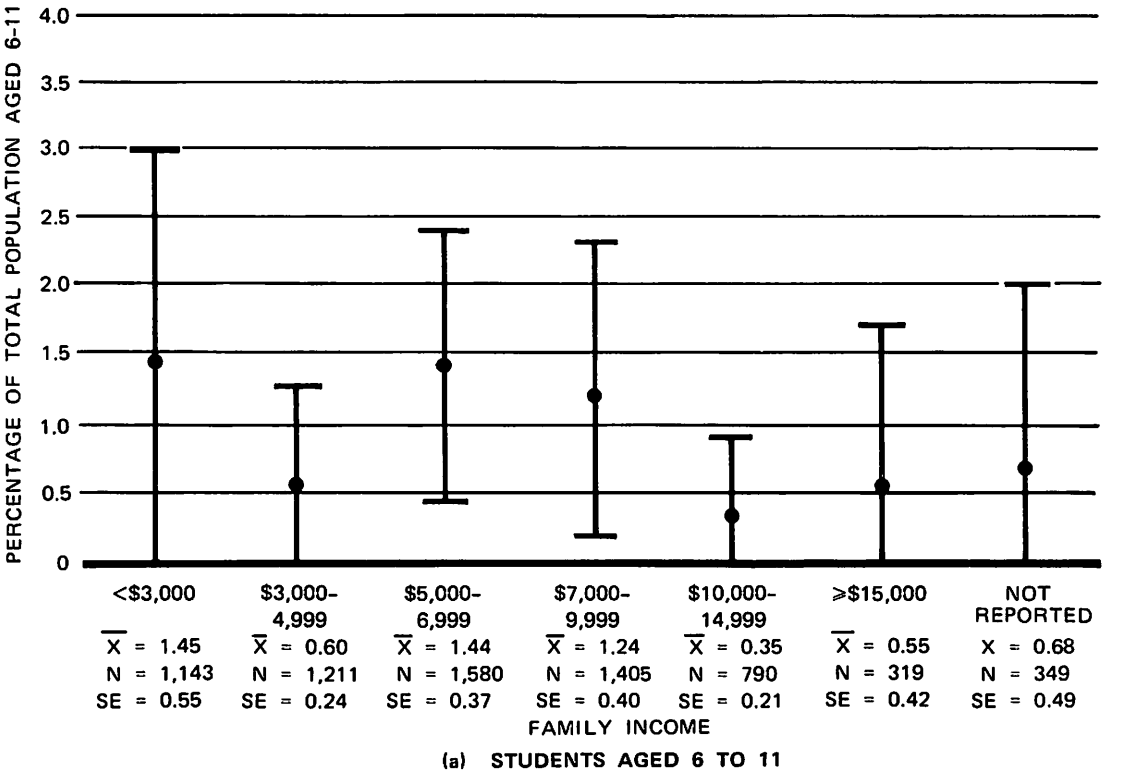


(c) TEACHER-IDENTIFIED VISUALLY HANDICAPPED STUDENTS AND ALL STUDENTS, AGED 12 TO 17

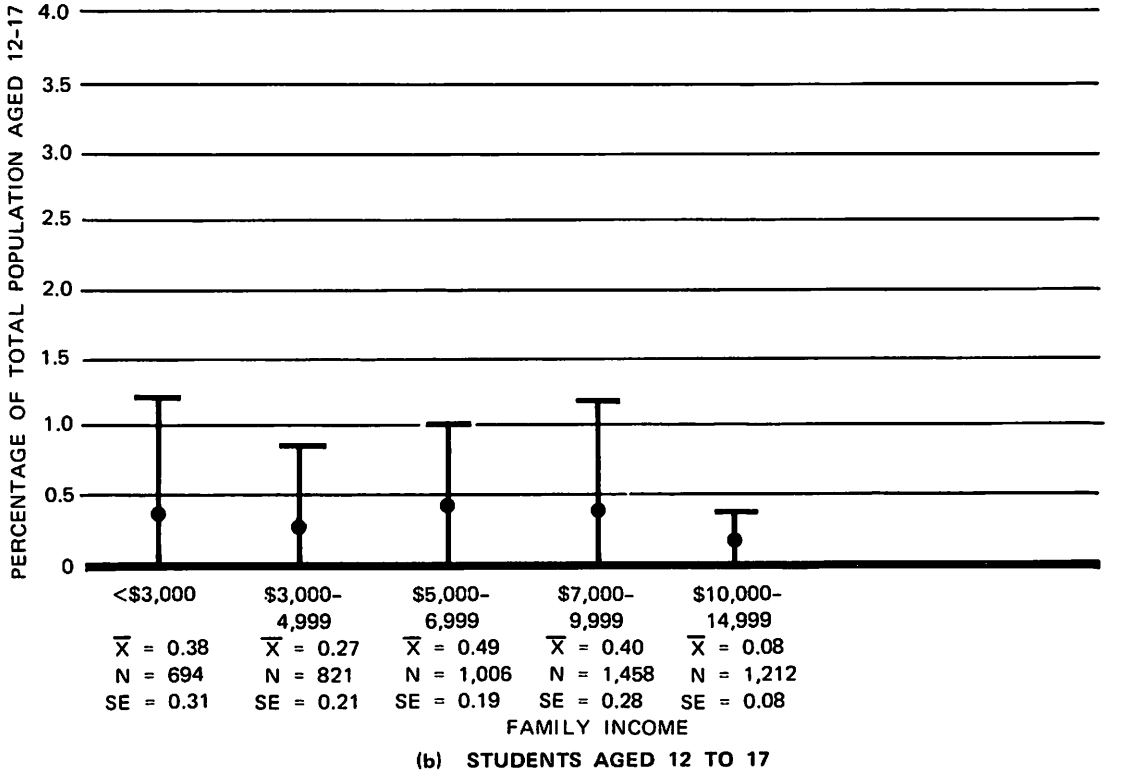


(d) TEACHER-IDENTIFIED SPEECH HANDICAPPED STUDENTS AND ALL STUDENTS, AGED 12 TO 17

FIGURE B-1 DISTRIBUTION, BY GEOGRAPHIC REGION, OF TEACHER-IDENTIFIED HANDICAPPED STUDENTS (PERCENTAGE OF POPULATION GROUP, 1964) (Concluded)



(a) STUDENTS AGED 6 TO 11



(b) STUDENTS AGED 12 TO 17

FIGURE B-2 TEACHER-IDENTIFIED HEARING HANDICAPPED, BY FAMILY INCOME: JOINT 95% CONFIDENCE INTERVALS

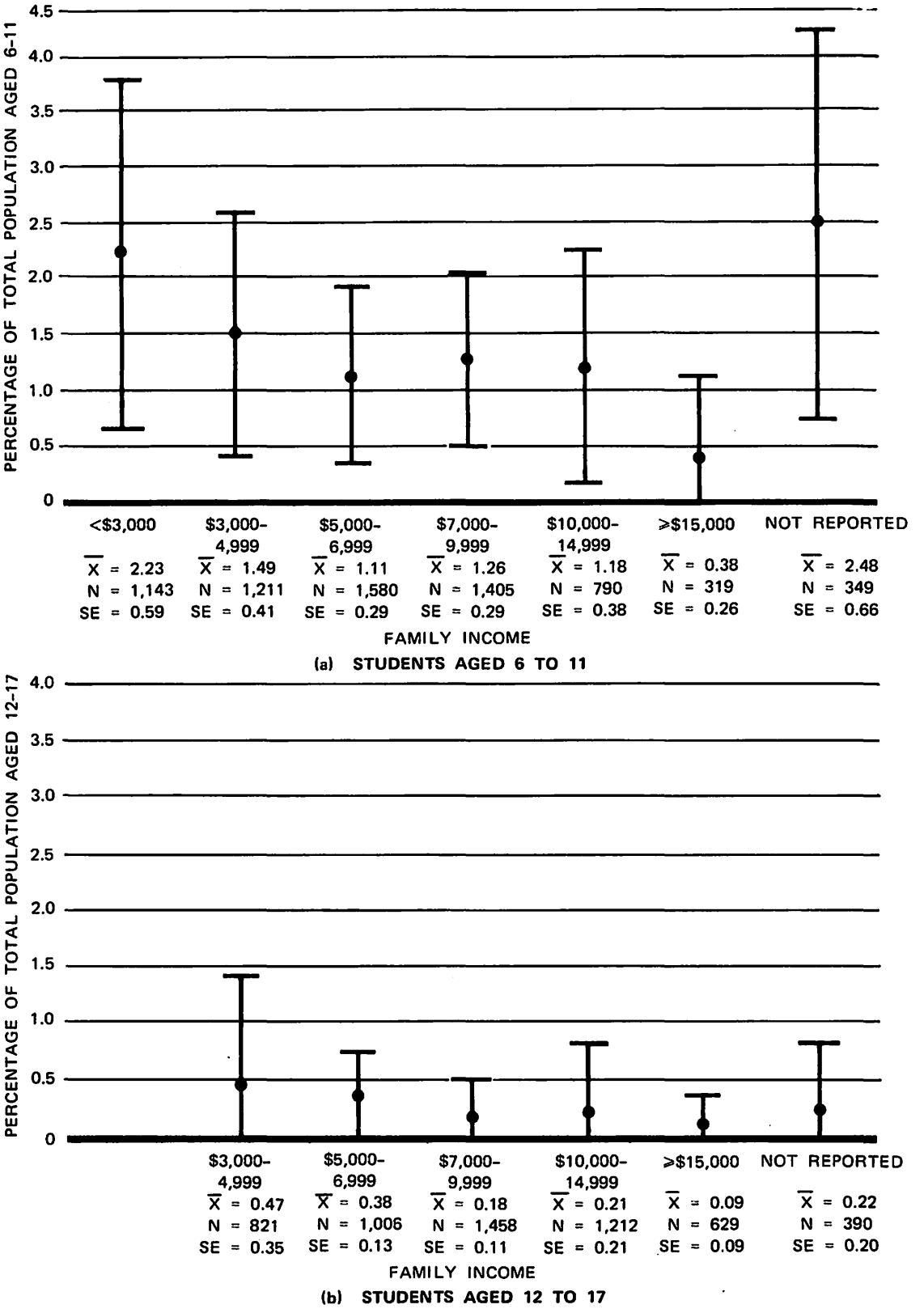
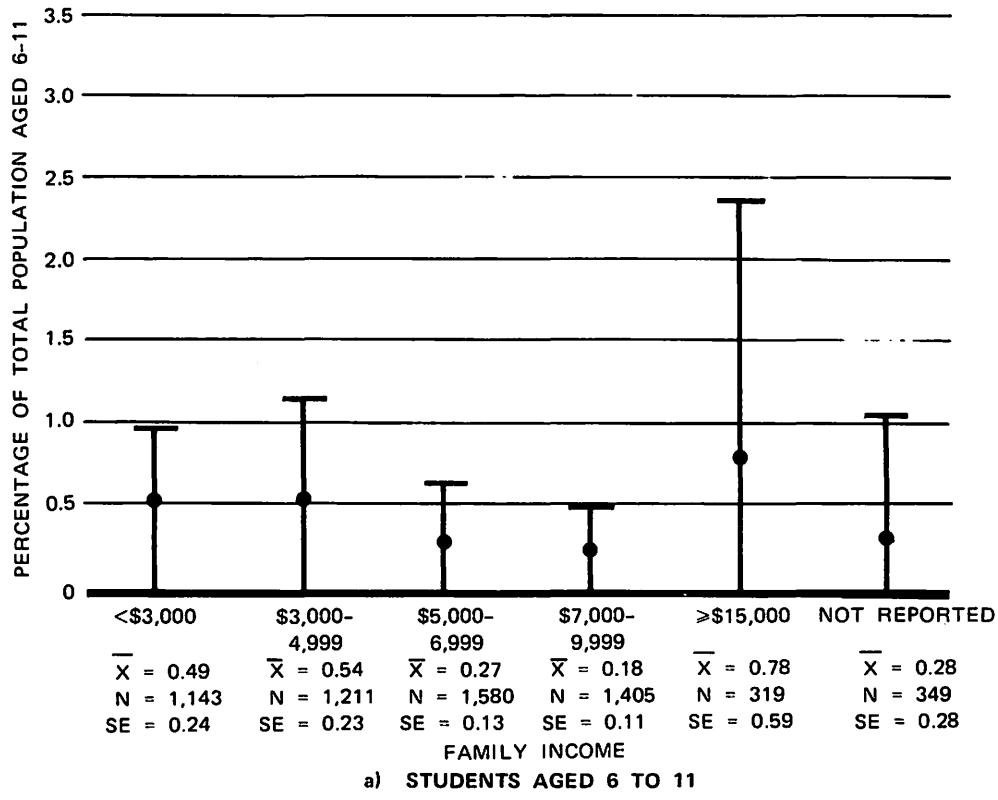
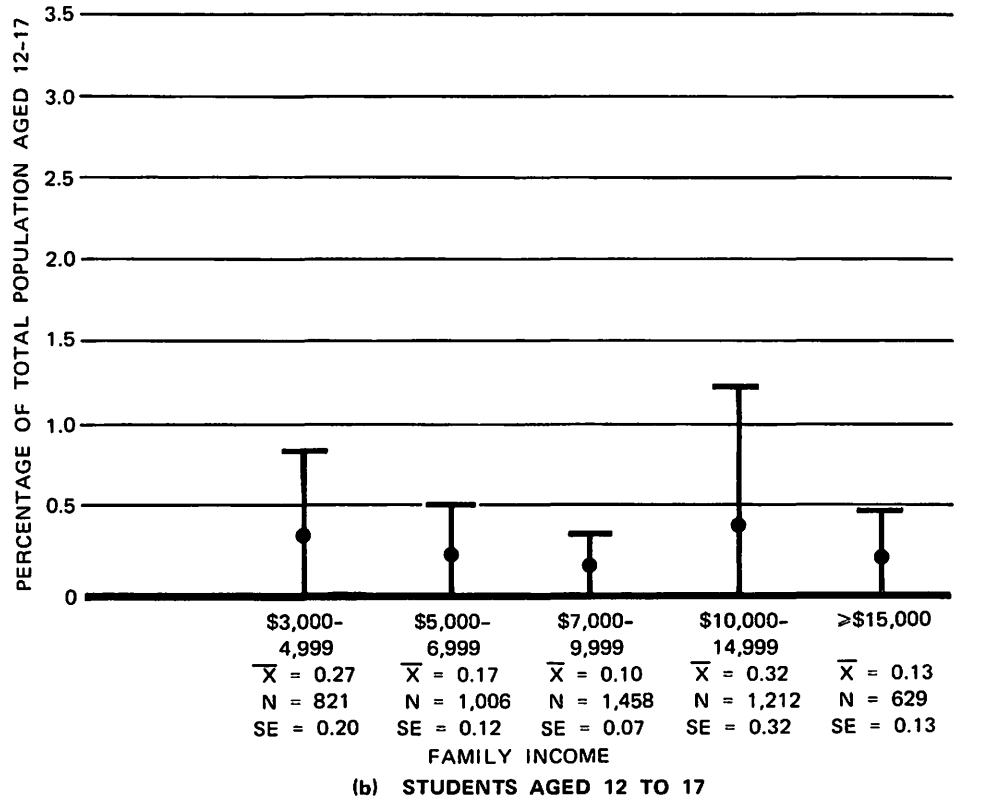


FIGURE B-3 TEACHER IDENTIFIED SIGHT HANDICAPPED, BY FAMILY INCOME: JOINT 95% CONFIDENCE INTERVALS



a) STUDENTS AGED 6 TO 11



(b) STUDENTS AGED 12 TO 17

FIGURE B-4 TEACHER-IDENTIFIED ORTHOPEDICALLY HANDICAPPED, BY FAMILY INCOME: 95% JOINT CONFIDENCE INTERVALS

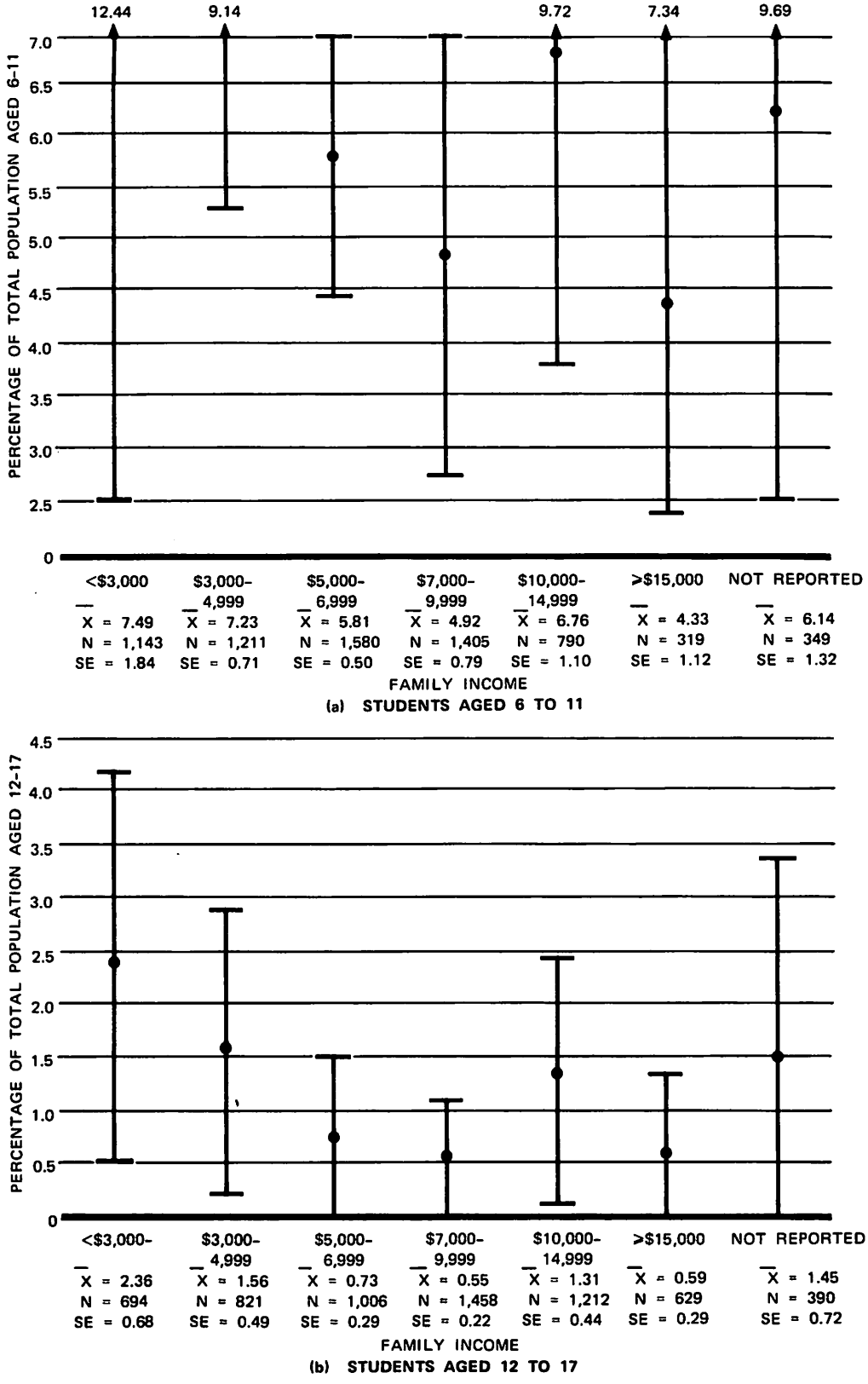


FIGURE B-5 TEACHER-IDENTIFIED SPEECH HANDICAPPED, BY FAMILY INCOME: 95% JOINT CONFIDENCE INTERVALS

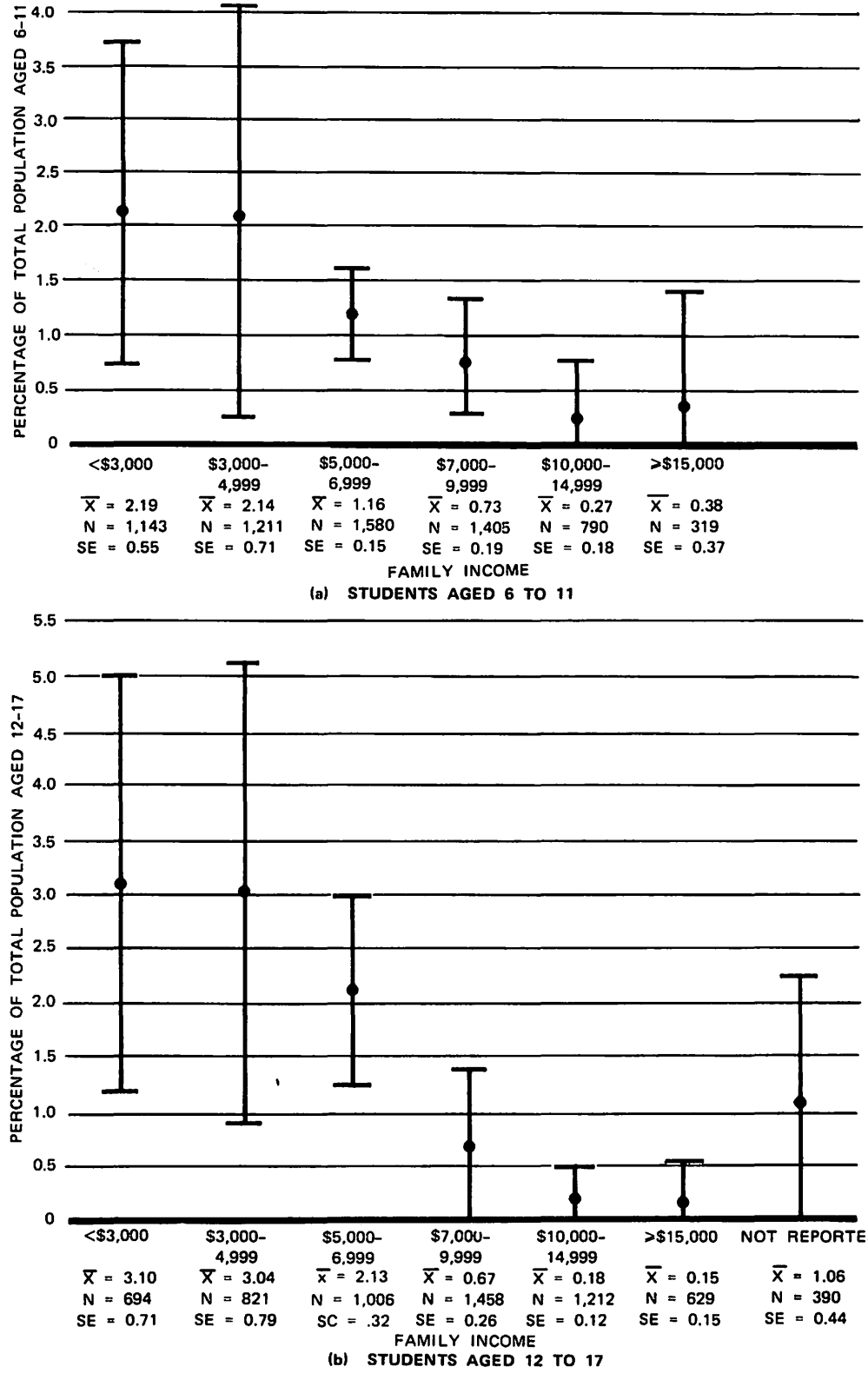


FIGURE B-6 TEACHER-IDENTIFIED MENTALLY RETARDED, BY FAMILY INCOME: 95% JOINT CONFIDENCE INTERVALS

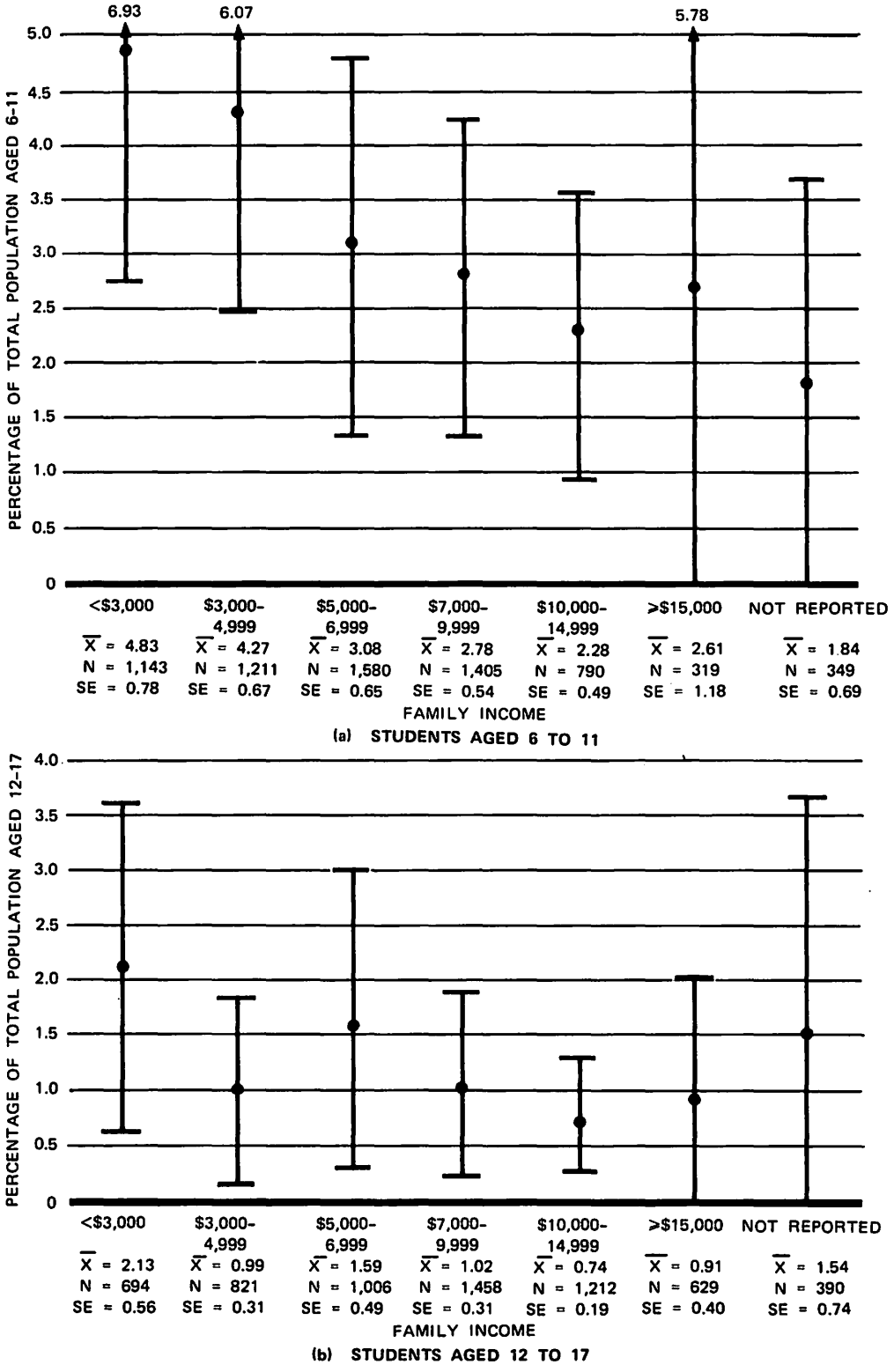


FIGURE B-7 TEACHER-IDENTIFIED EMOTIONALLY DISTURBED, BY FAMILY INCOME: JOINT 95% CONFIDENCE INTERVALS

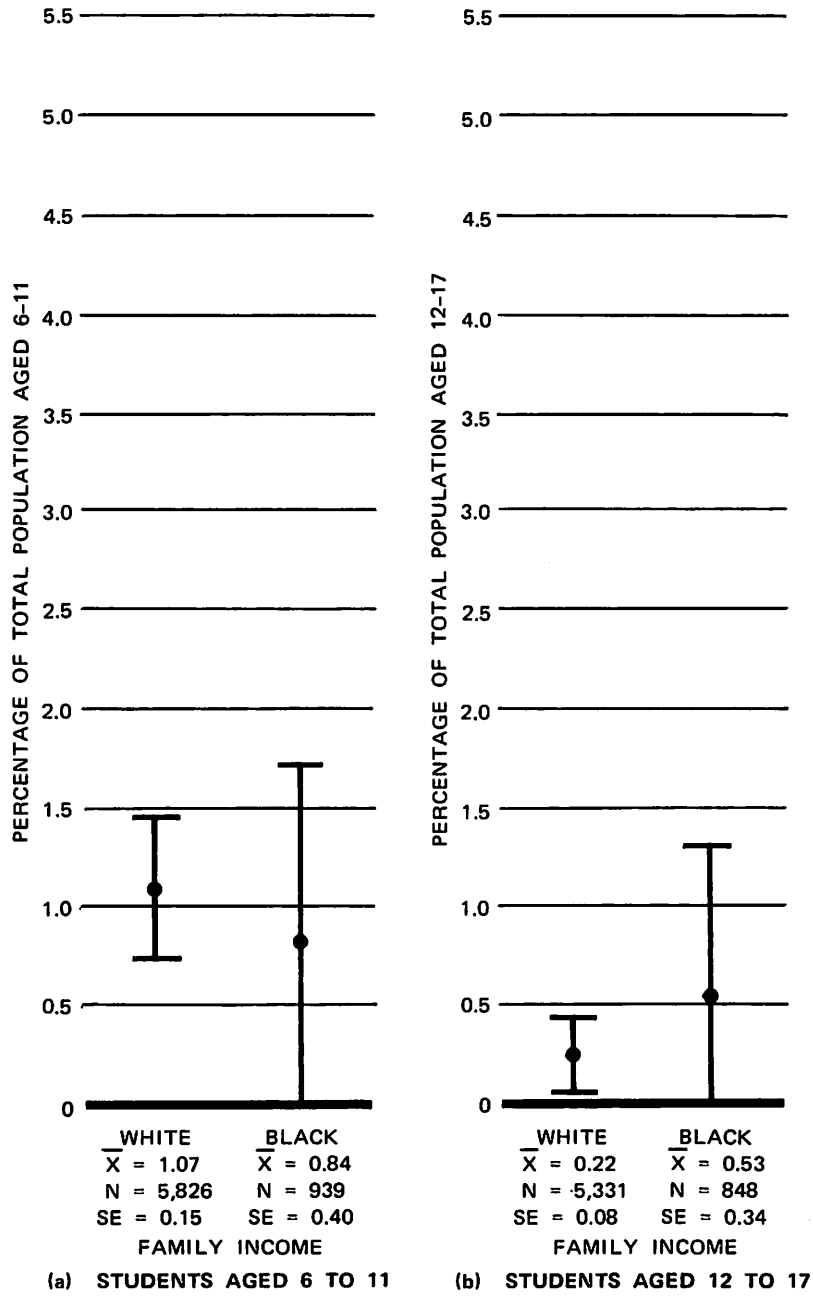


FIGURE B-8 TEACHER-IDENTIFIED HEARING HANDICAPPED, BY RACE: JOINT 95% CONFIDENCE INTERVALS

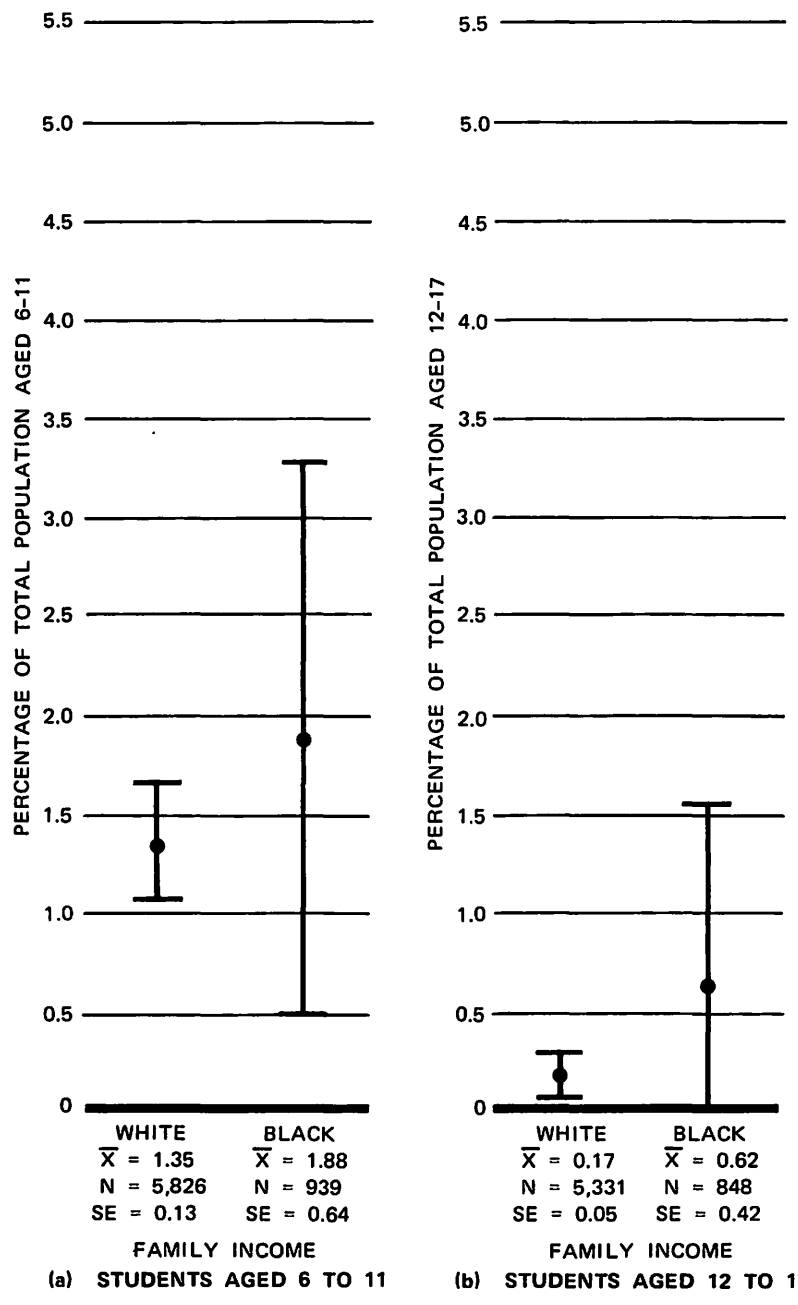


FIGURE B-9 TEACHER-IDENTIFIED SIGHT HANDICAPPED, BY RACE: JOINT 95% CONFIDENCE INTERVALS

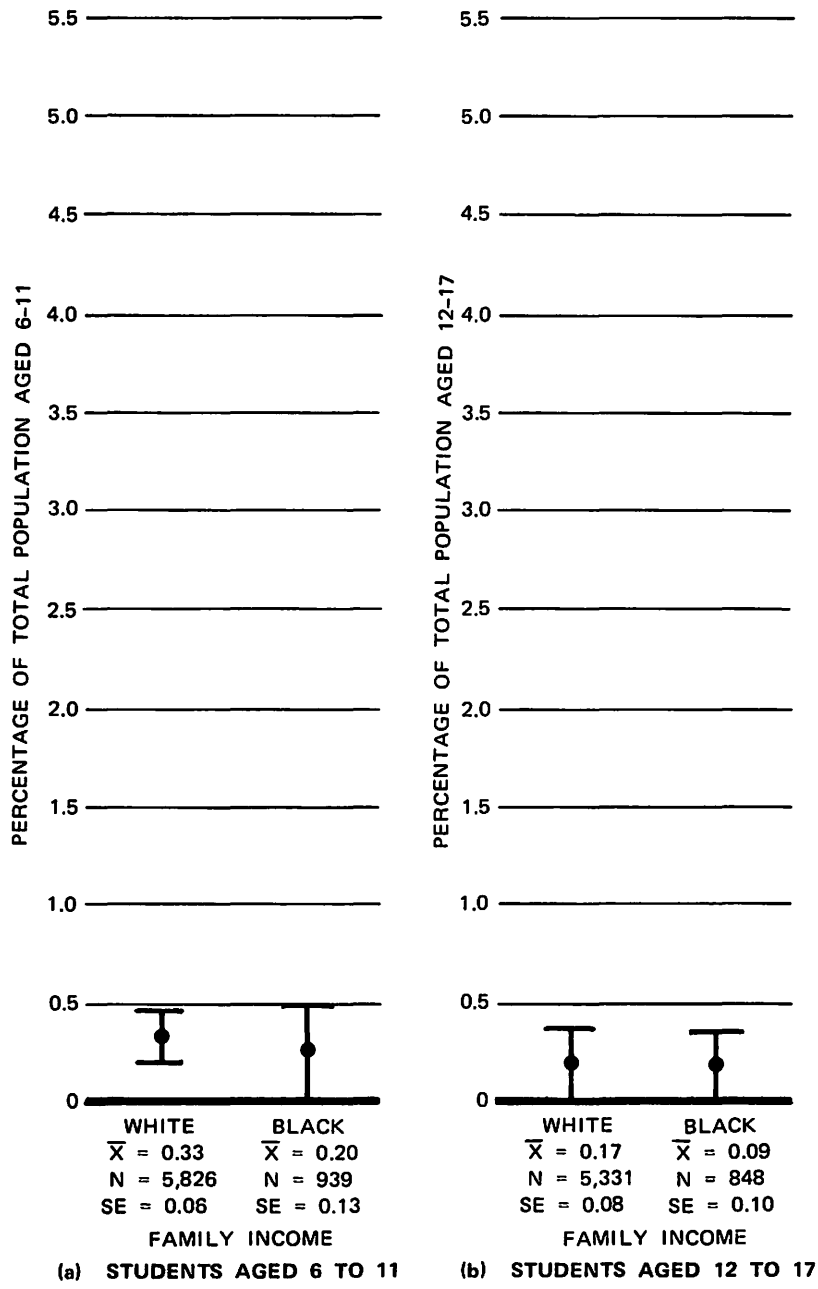


FIGURE B-10 TEACHER-IDENTIFIED ORTHOPEDICALLY HANDICAPPED, BY RACE: JOINT 95% CONFIDENCE INTERVALS

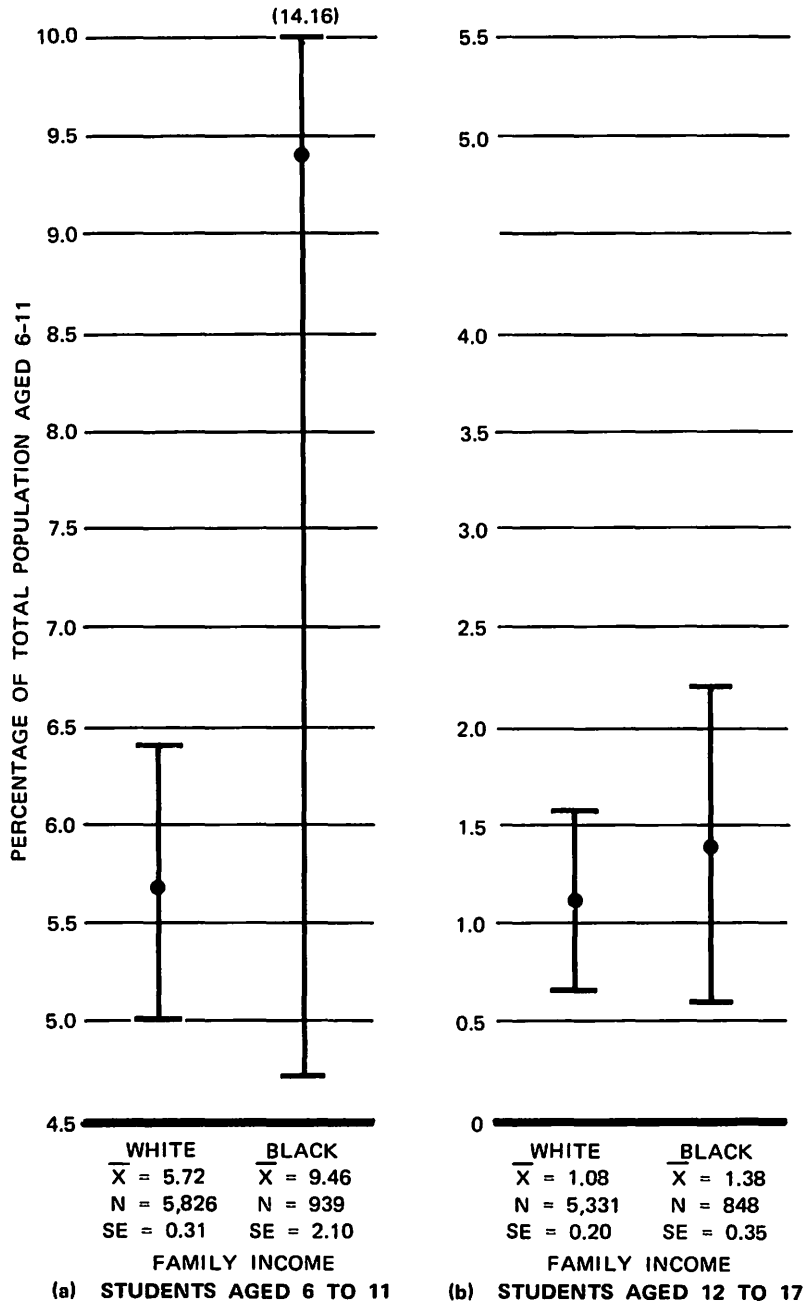


FIGURE B-11 TEACHER-IDENTIFIED SPEECH HANDICAPPED, BY RACE: JOINT 95% CONFIDENCE INTERVALS

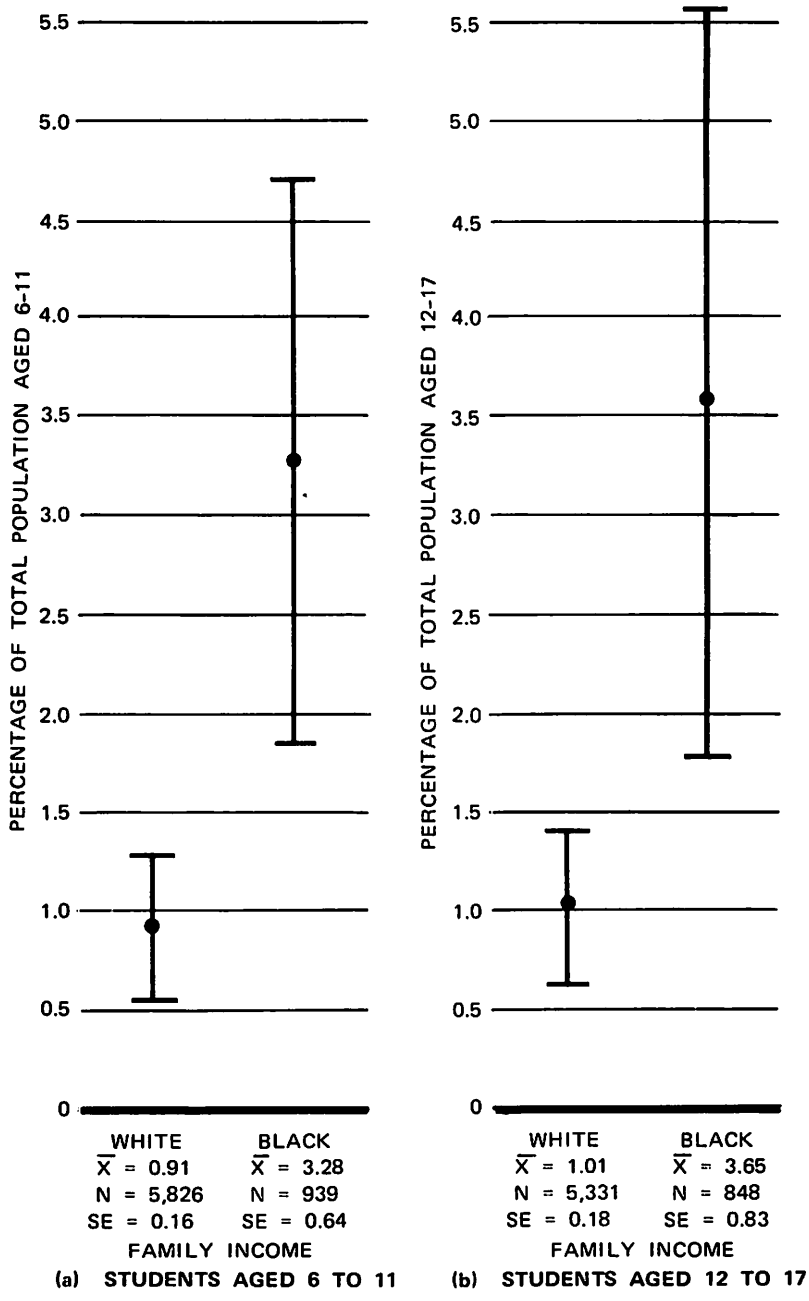


FIGURE B-12 TEACHER-IDENTIFIED MENTALLY RETARDED, BY RACE: JOINT 95% CONFIDENCE INTERVALS

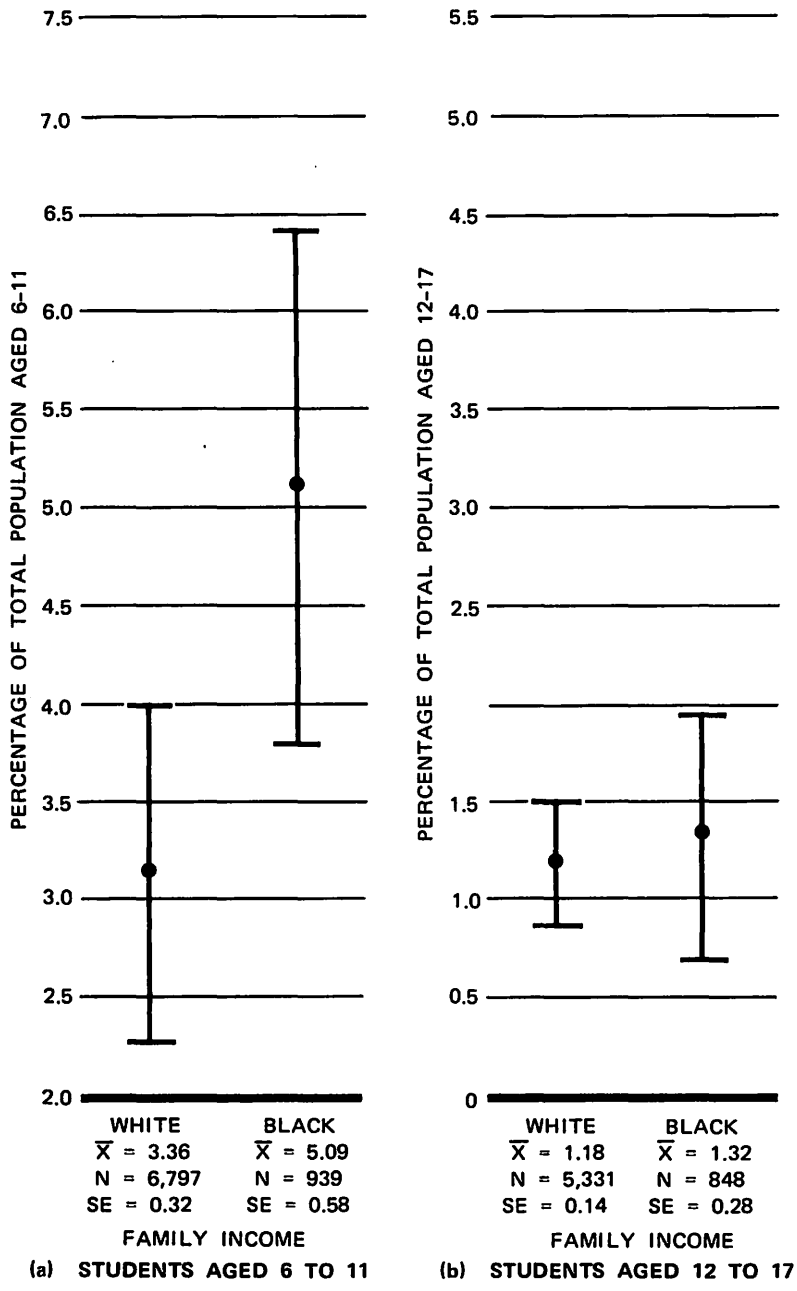


FIGURE B-13 TEACHER-IDENTIFIED EMOTIONALLY DISTURBED, BY RACE: JOINT 95% CONFIDENCE INTERVALS

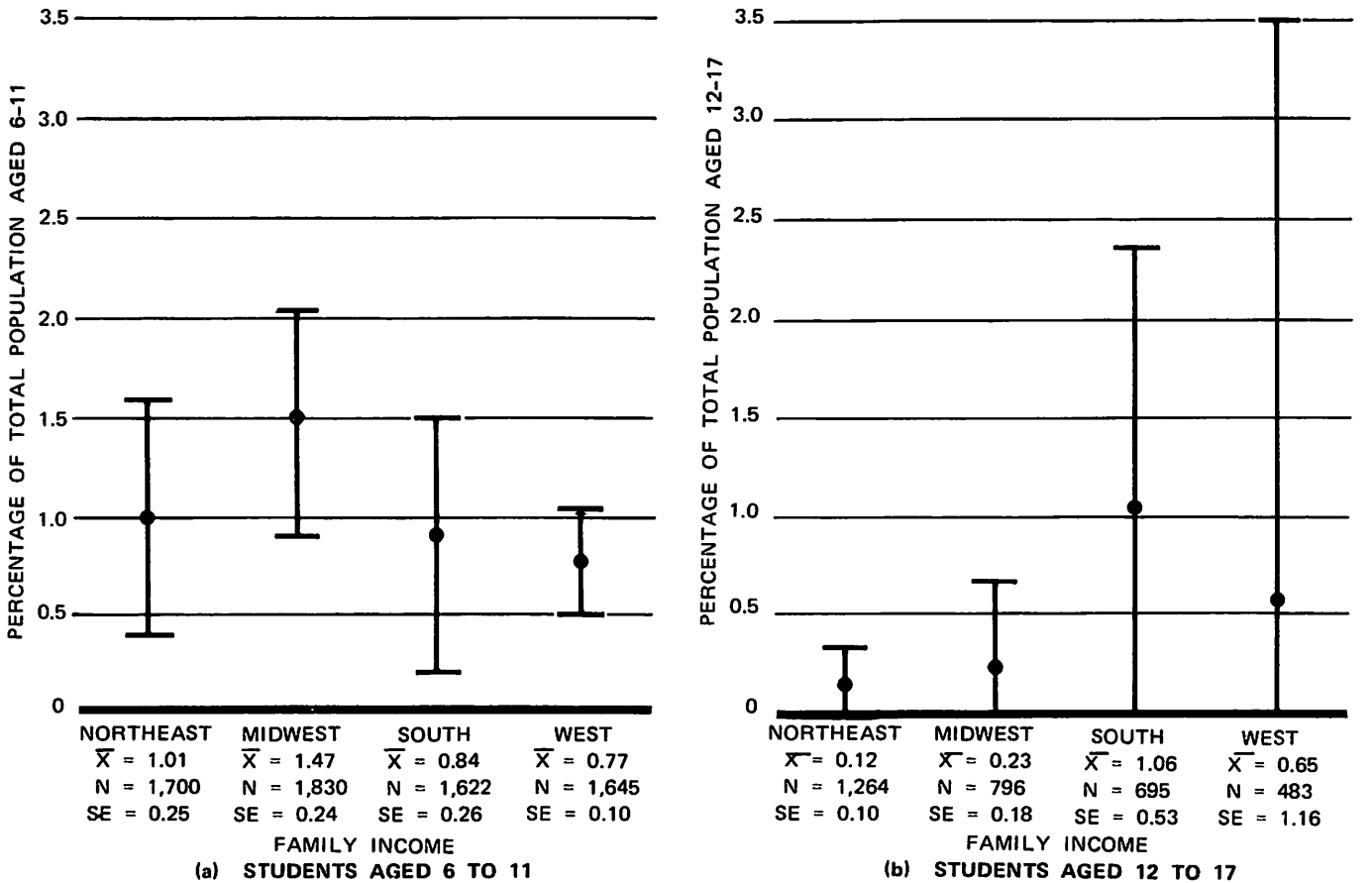


FIGURE B-14 TEACHER-IDENTIFIED HEARING HANDICAPPED, BY REGION: JOINT 95% CONFIDENCE INTERVALS

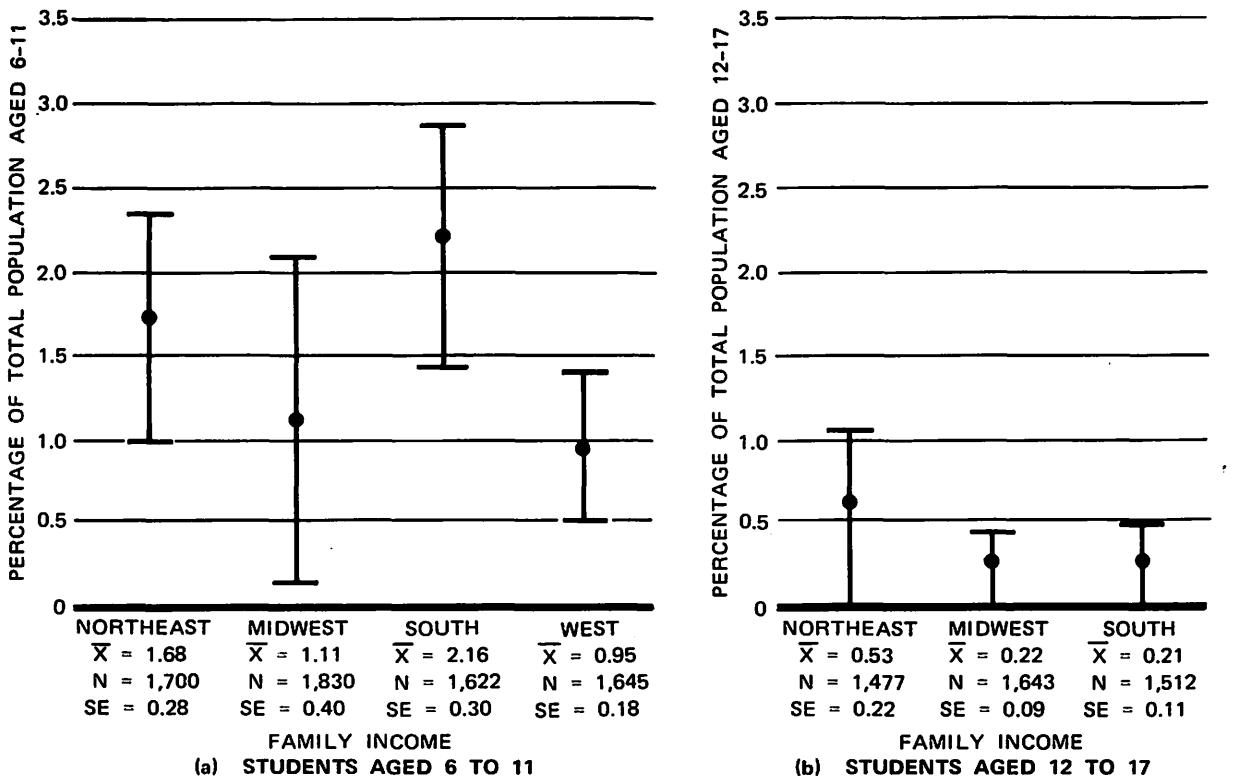


FIGURE B-15 TEACHER-IDENTIFIED SIGHT HANDICAPPED, BY REGION: JOINT 95% CONFIDENCE INTERVALS

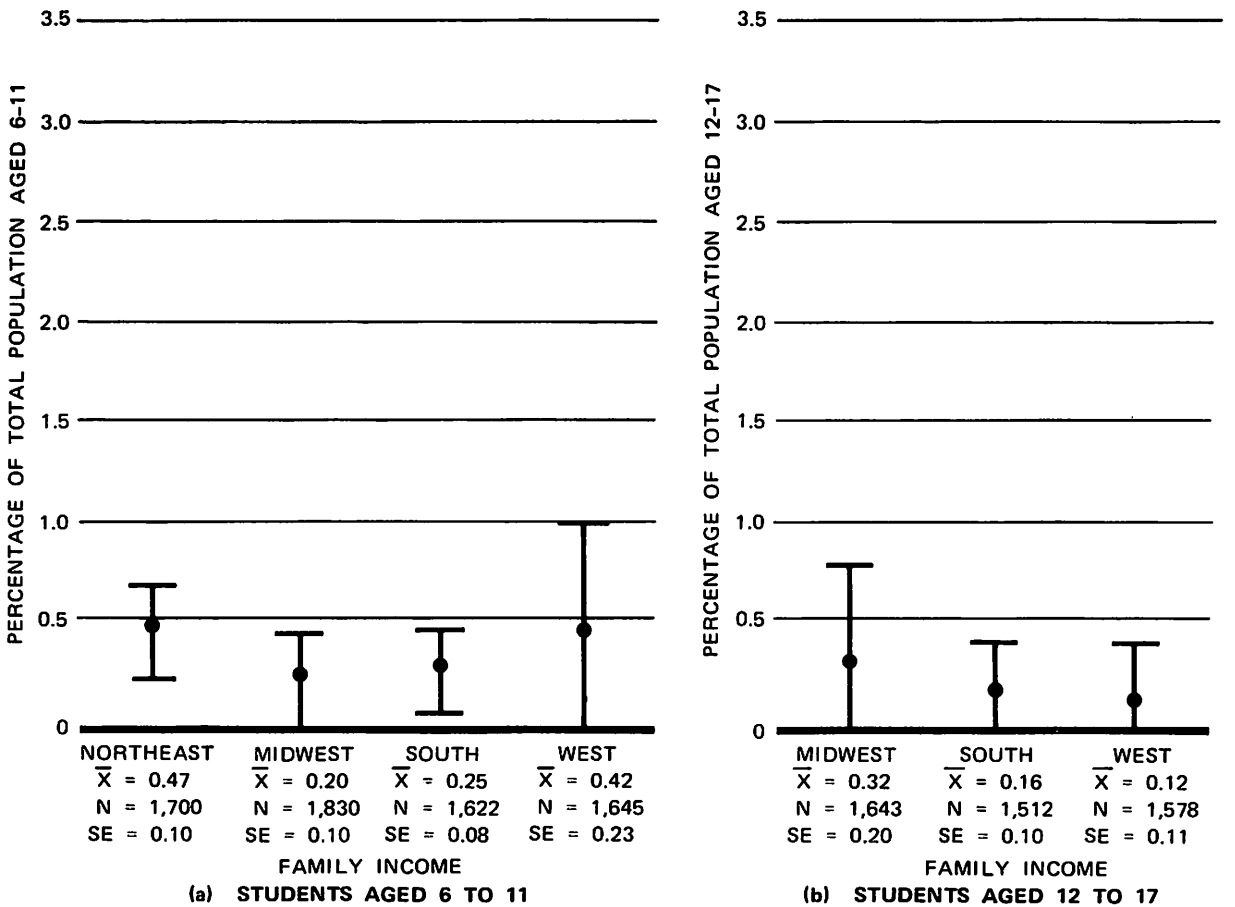


FIGURE B-16 TEACHER-IDENTIFIED ORTHOPEDICALLY HANDICAPPED, BY REGION: JOINT 95% CONFIDENCE INTERVALS

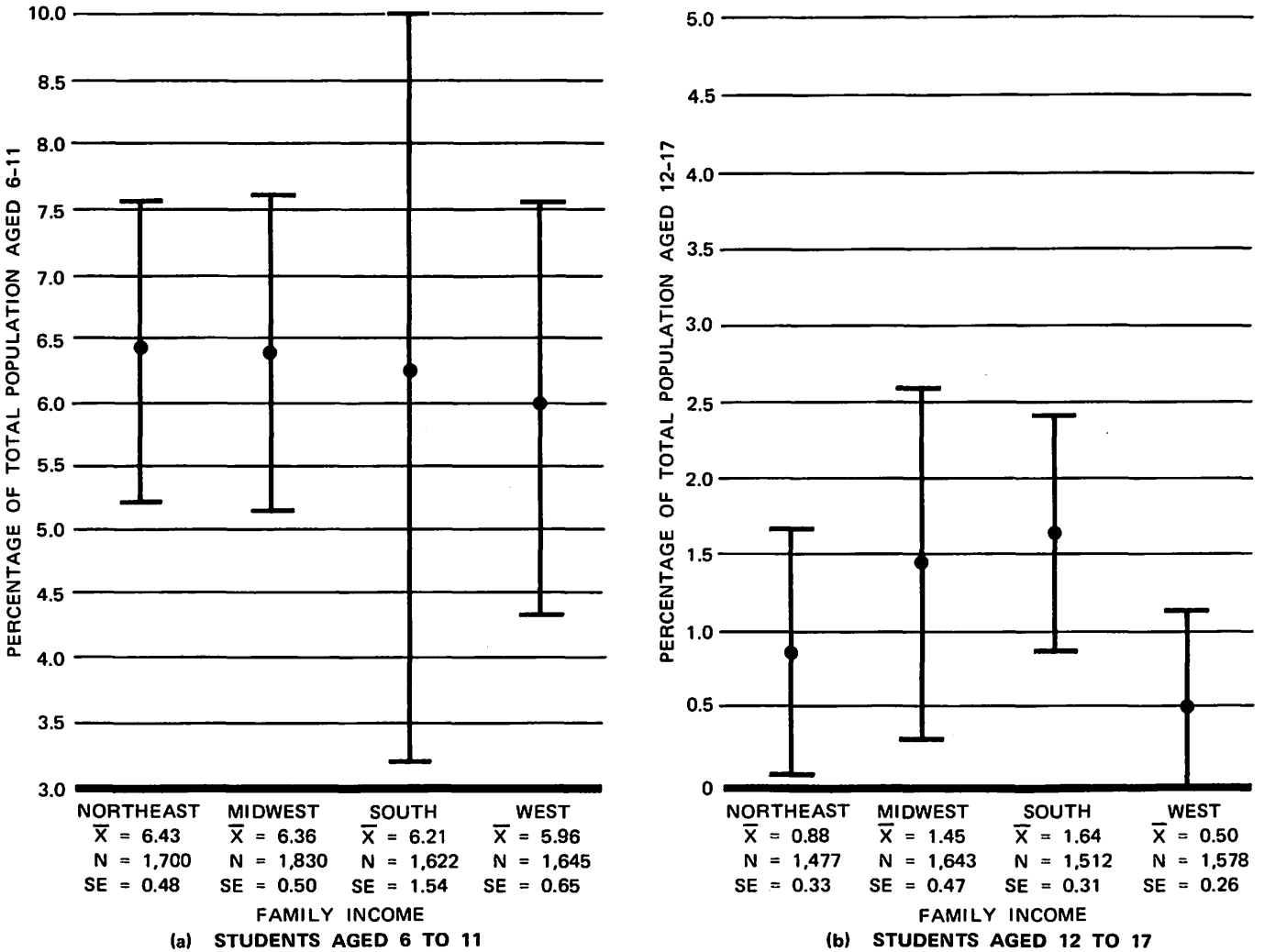


FIGURE B-17 TEACHER-IDENTIFIED SPEECH HANDICAPPED, BY REGION: JOINT 95% CONFIDENCE INTERVALS

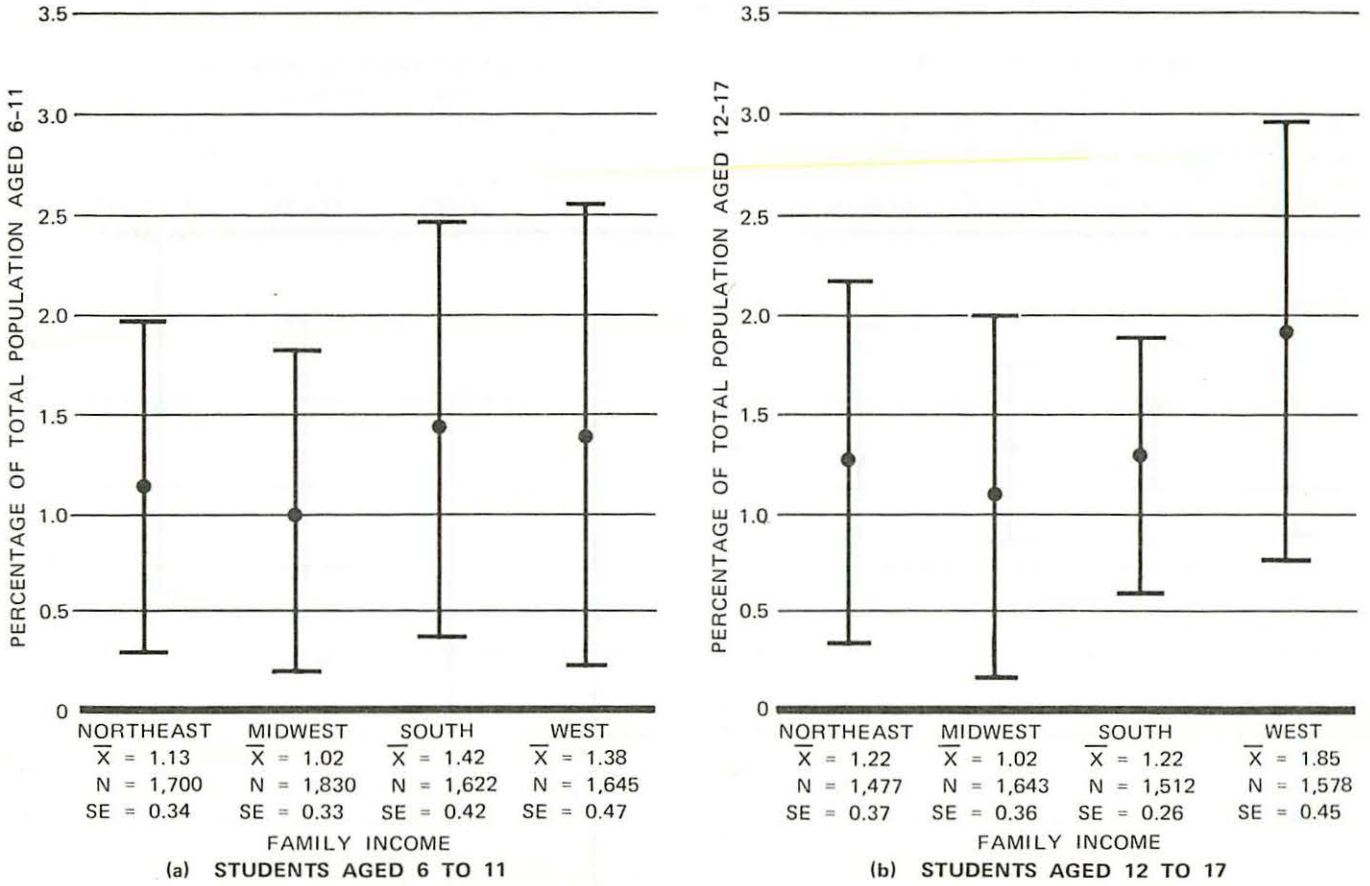


FIGURE B-18 TEACHER-IDENTIFIED MENTALLY RETARDED BY REGION: JOINT 95% CONFIDENCE INTERVALS

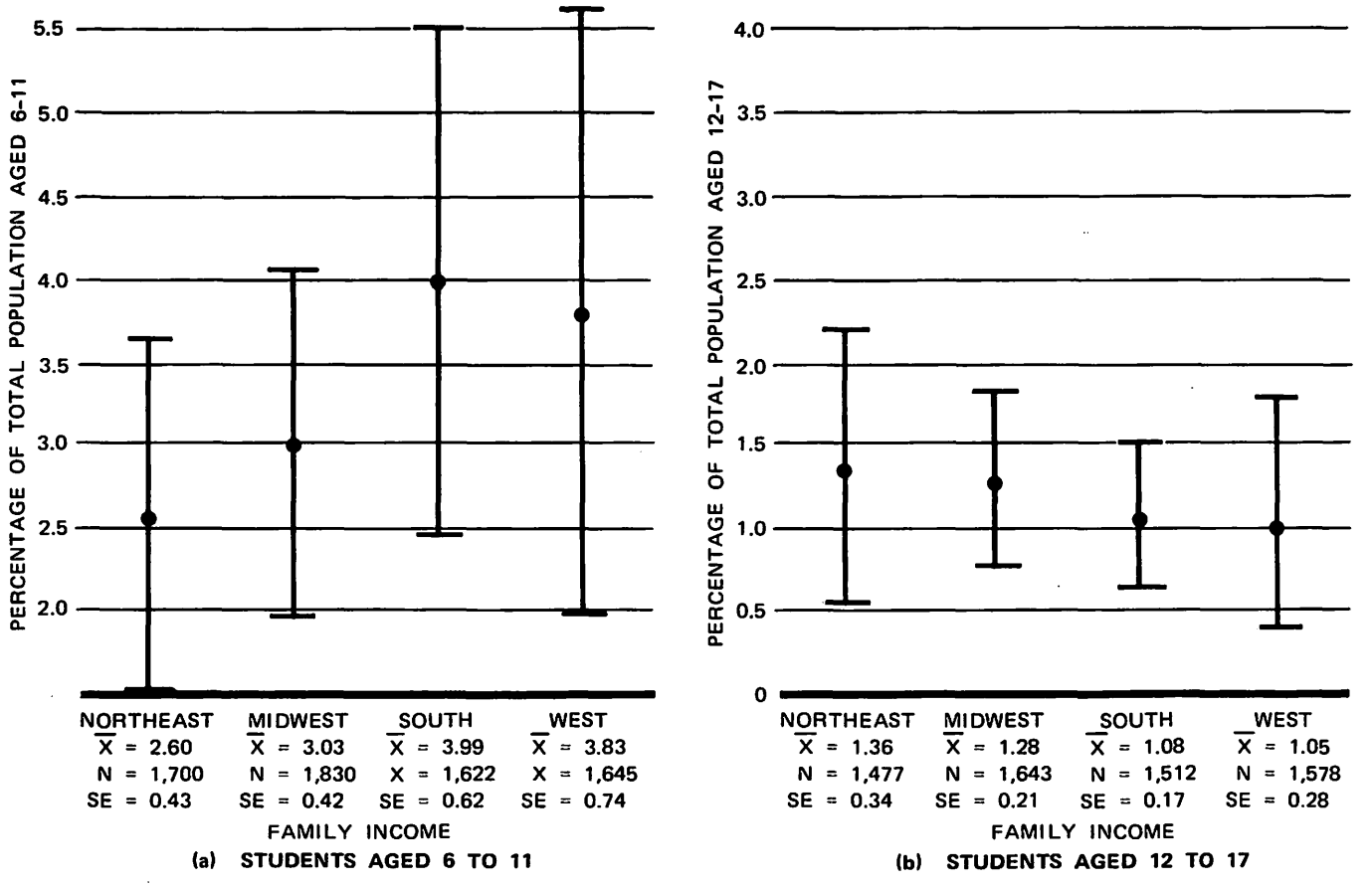
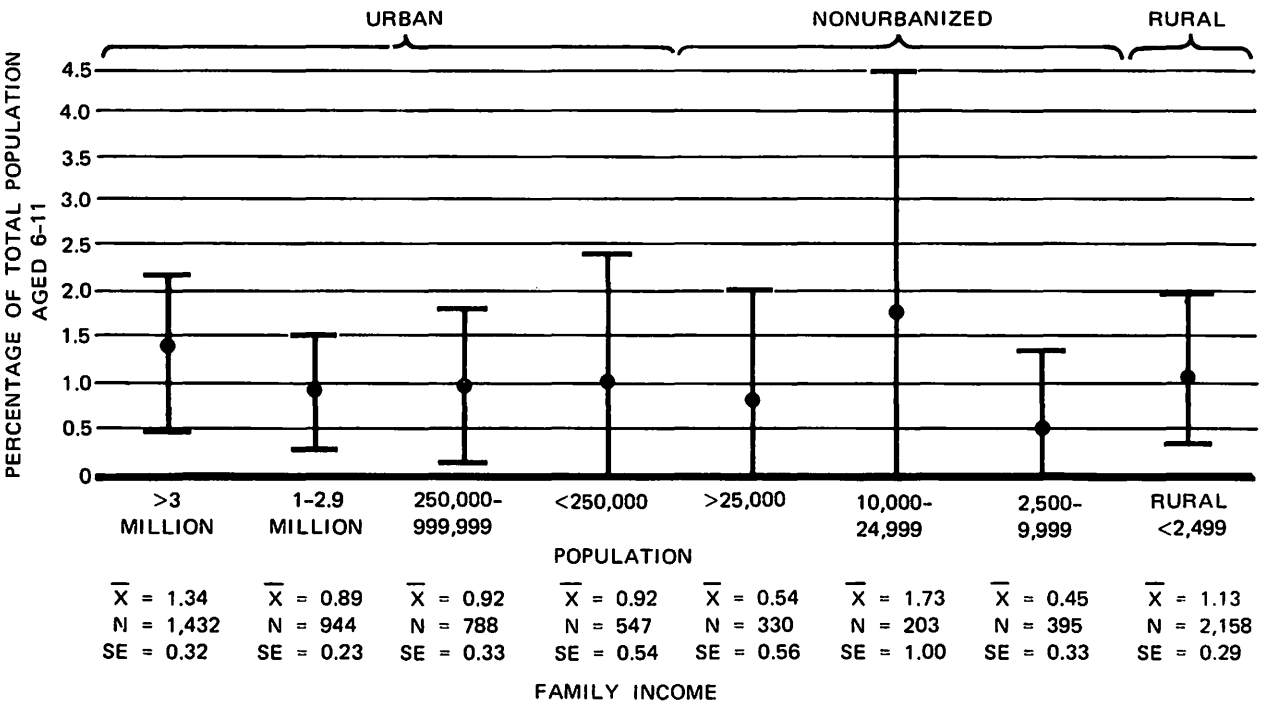
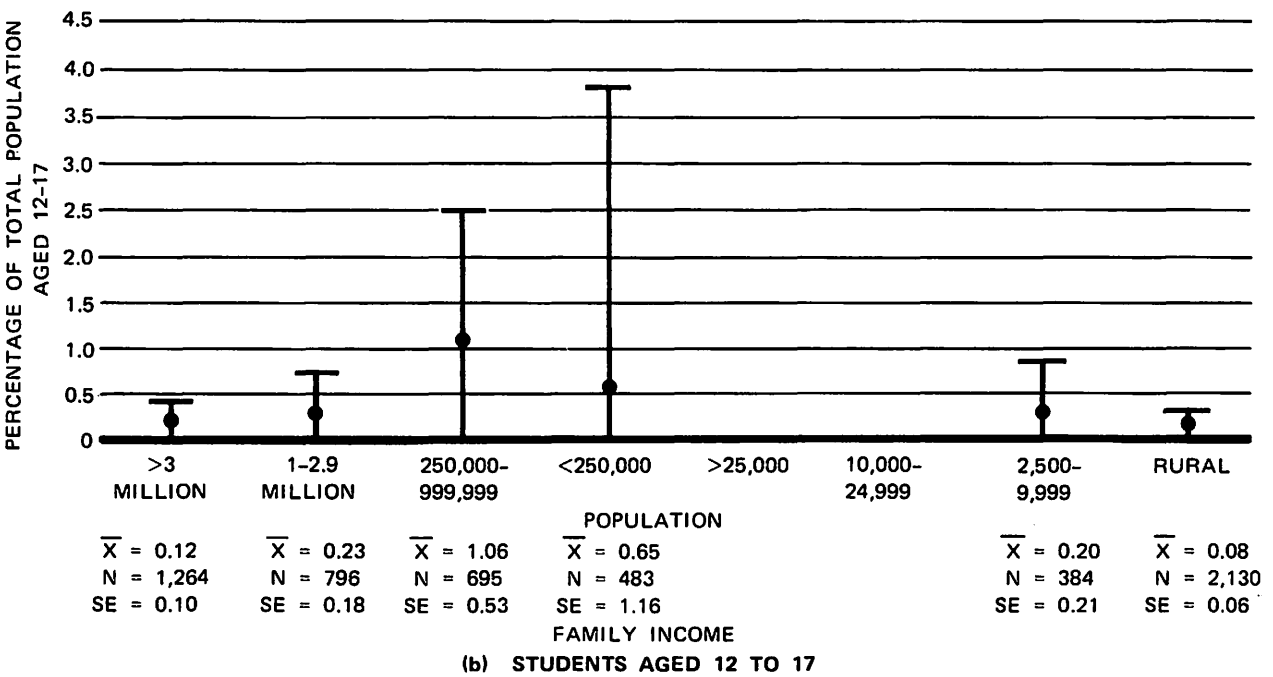


FIGURE B-19 TEACHER-IDENTIFIED EMOTIONALLY DISTURBED, BY REGION: JOINT 95% CONFIDENCE INTERVALS

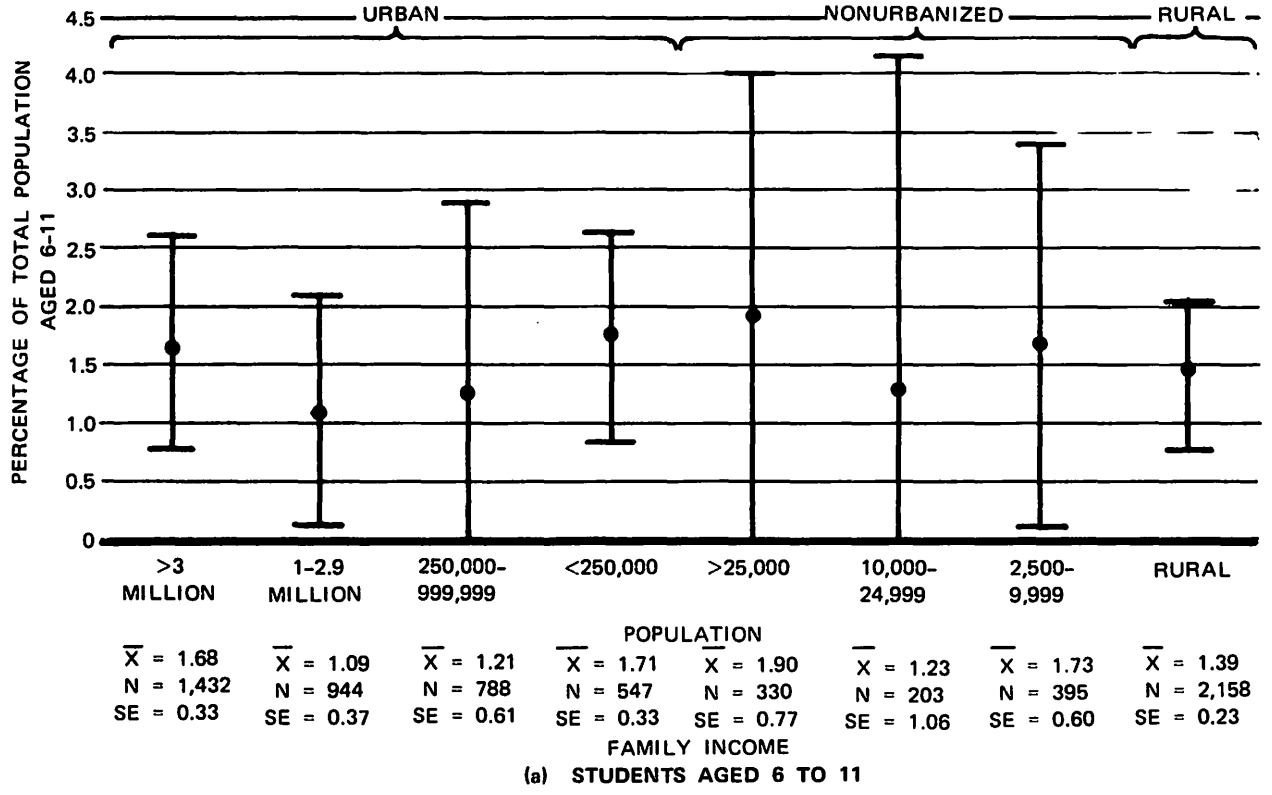


(a) STUDENTS AGED 6 TO 11

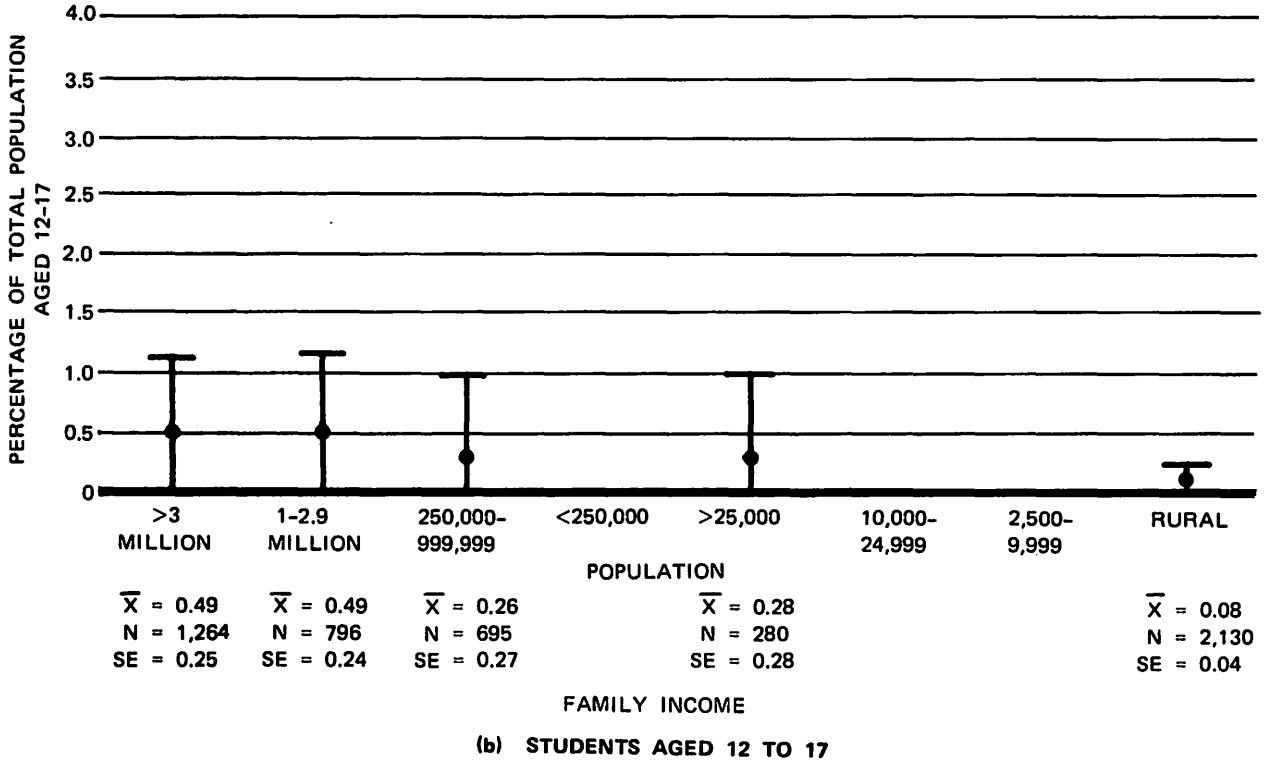


(b) STUDENTS AGED 12 TO 17

FIGURE B-20 TEACHER-IDENTIFIED HEARING HANDICAPPED, BY POPULATION DENSITY OF PLACE OF RESIDENCE: JOINT 95% CONFIDENCE INTERVALS



(a) STUDENTS AGED 6 TO 11



(b) STUDENTS AGED 12 TO 17

FIGURE B-21 TEACHER-IDENTIFIED SIGHT HANDICAPPED, BY POPULATION DENSITY OF PLACE OF RESIDENCE: JOINT 95% CONFIDENCE INTERVALS

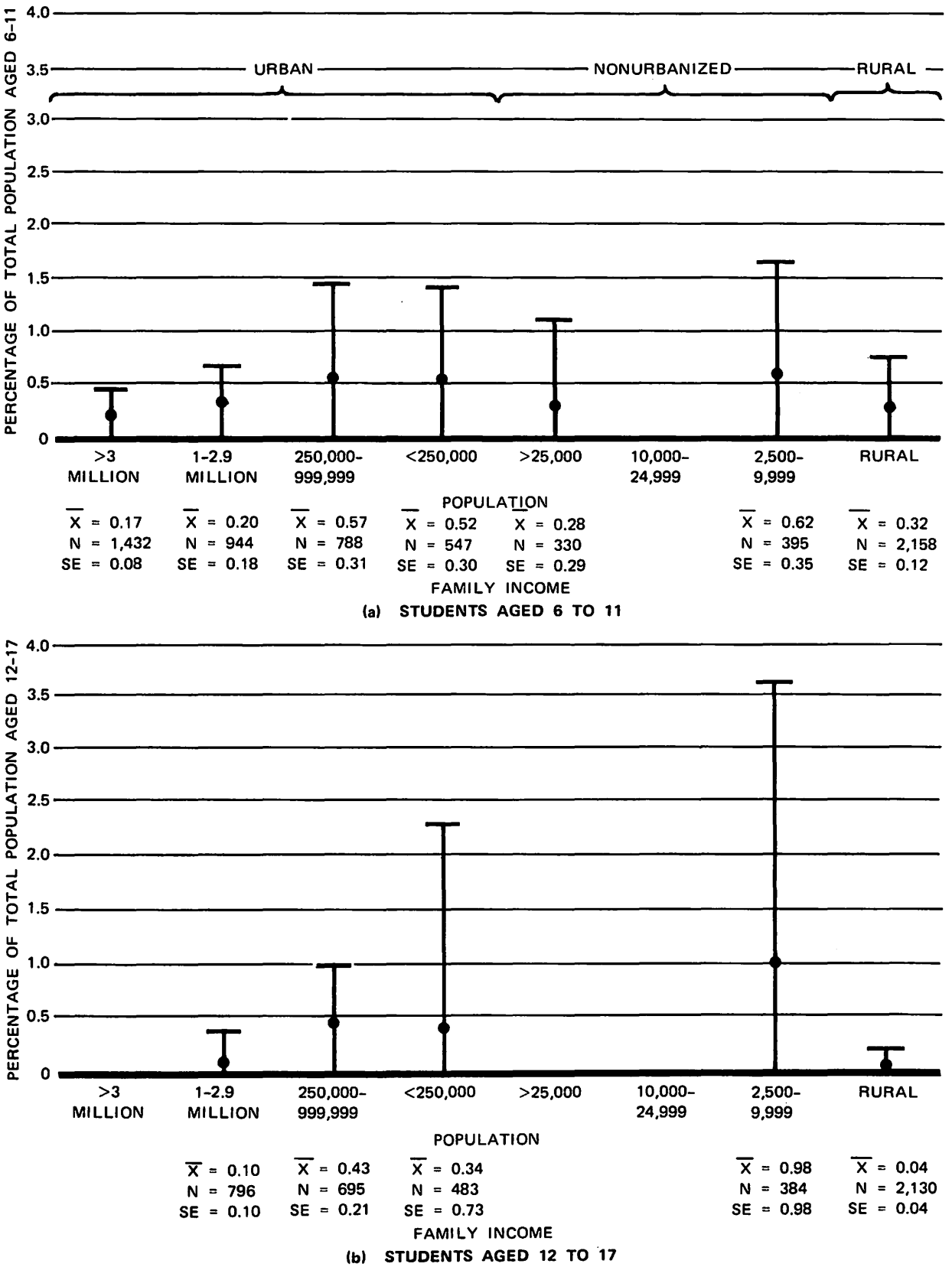
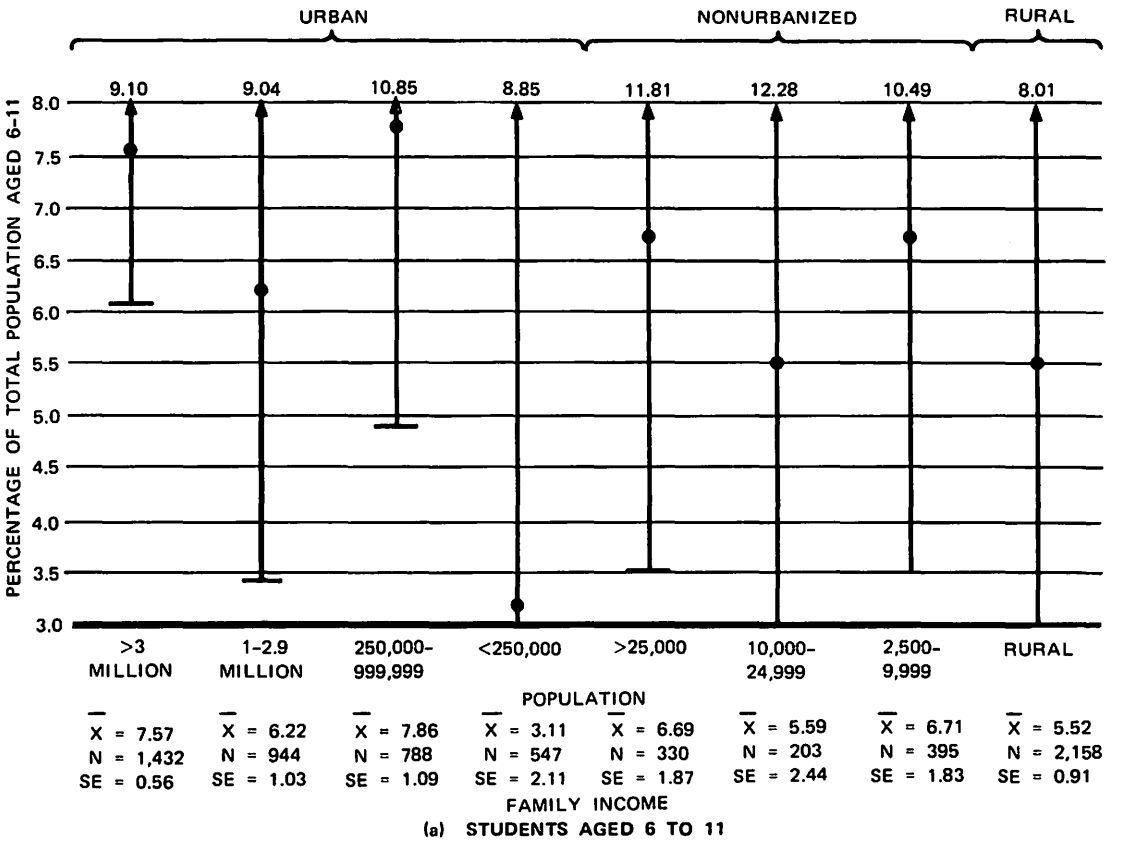
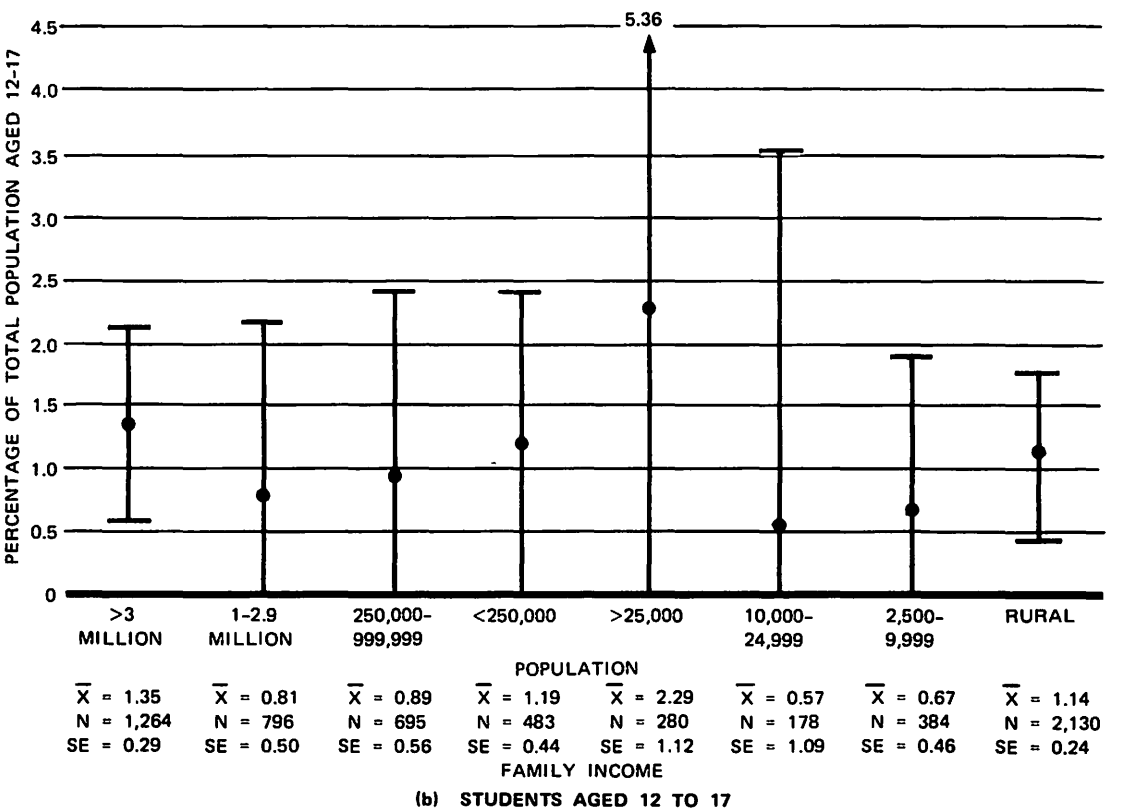


FIGURE B-22 TEACHER-IDENTIFIED ORTHOPEDICALLY HANDICAPPED, BY POPULATION DENSITY OF PLACE OF RESIDENCE: JOINT 95% CONFIDENCE INTERVALS



(a) STUDENTS AGED 6 TO 11



(b) STUDENTS AGED 12 TO 17

FIGURE B-23 TEACHER-IDENTIFIED SPEECH HANDICAPPED, BY POPULATION DENSITY OF PLACE OF RESIDENCE: JOINT 95% CONFIDENCE INTERVALS

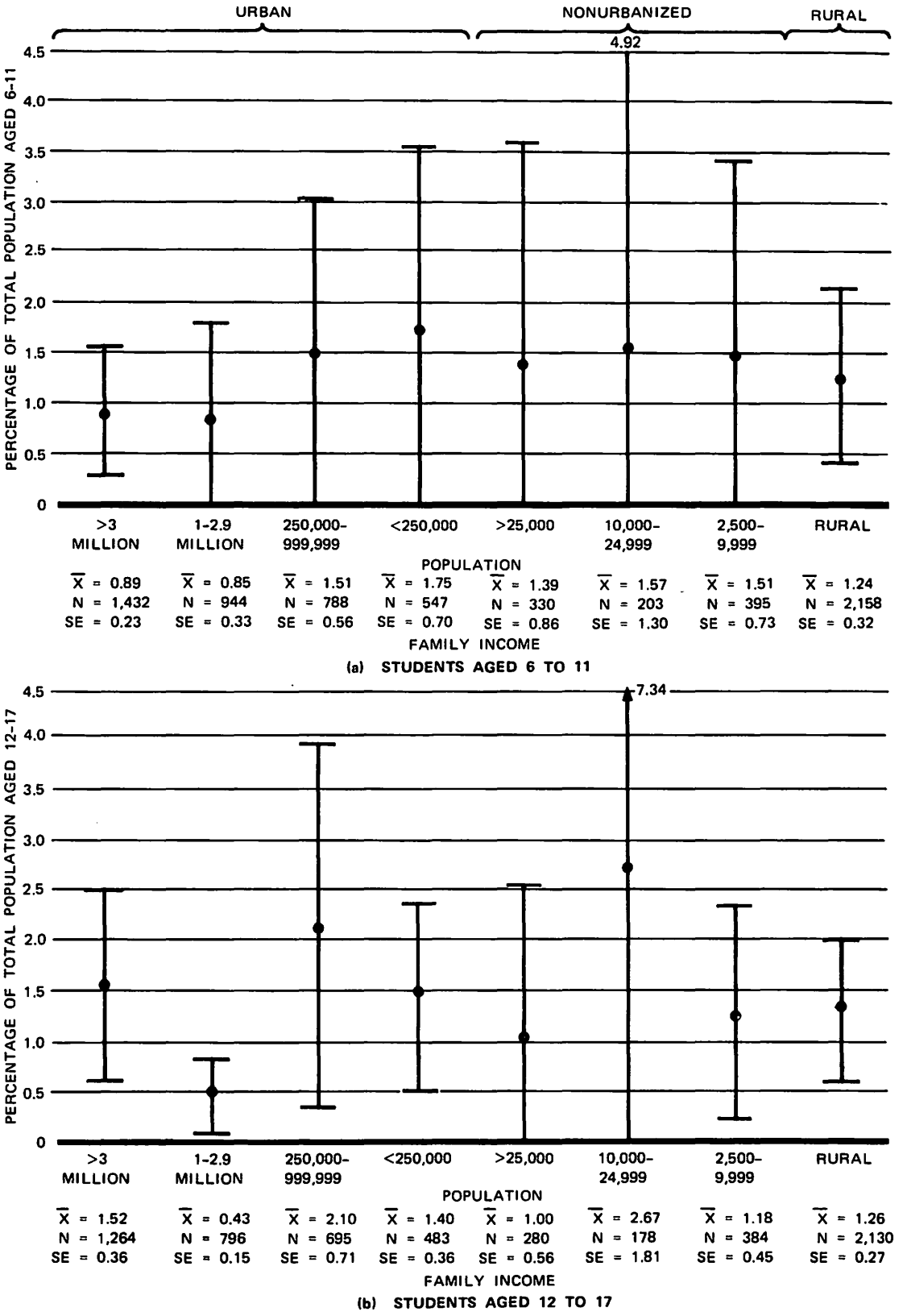
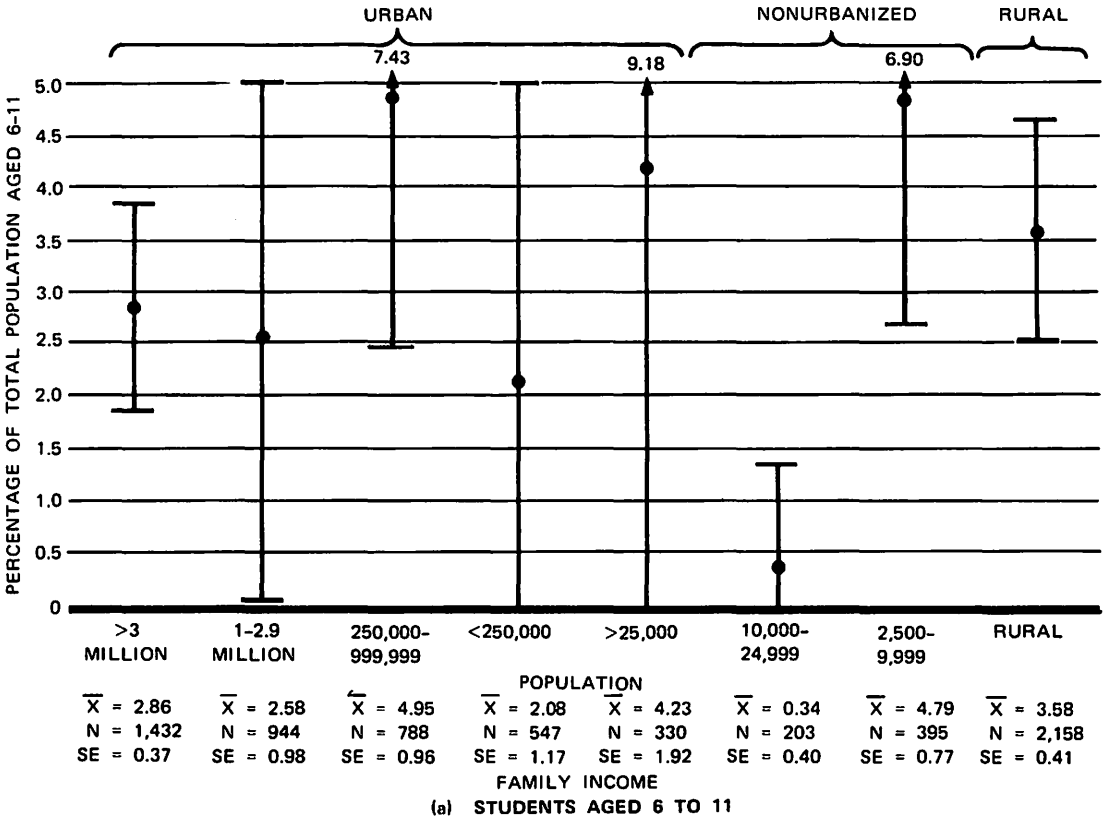
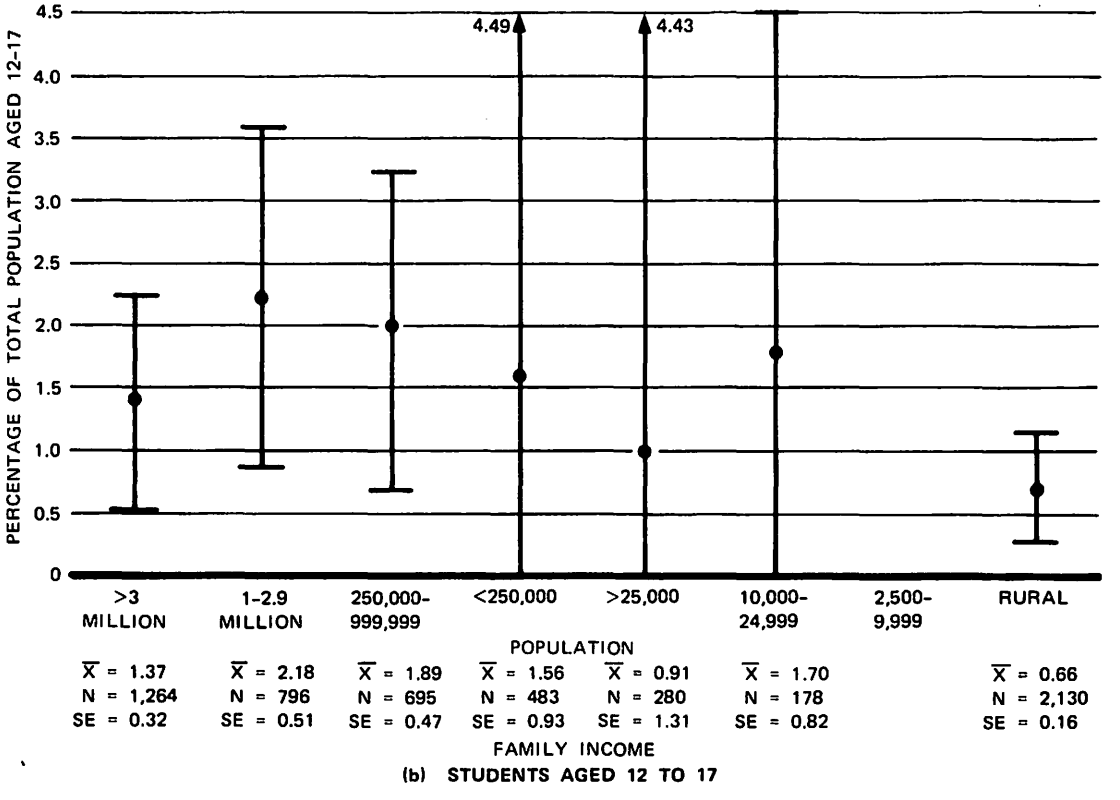


FIGURE B-24 TEACHER-IDENTIFIED MENTALLY RETARDED, BY POPULATION DENSITY OF PLACE OF RESIDENCE: JOINT 95% CONFIDENCE INTERVALS



(a) STUDENTS AGED 6 TO 11



(b) STUDENTS AGED 12 TO 17

FIGURE B-25 TEACHER-IDENTIFIED EMOTIONALLY DISTURBED, BY POPULATION DENSITY OF PLACE OF RESIDENCE: JOINT 95% CONFIDENCE INTERVALS

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