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ABSTRACT

The content of the Public-Use Data Tapes of the National Assessment of Educational Progress (NAEP) is summarized and descriptions of recent research using the database are provided. Since 1969, NAEP has surveyed 9-, 13-, and 17-year-old students and occasionally young adults in assessments of achievement in art, career and occupational development, citizenship, literature, mathematics, science, writing and other learning areas. Over 400 national probability samples for approximately 2,500 respondents each are available, providing data on 150-250 variables. The format and content of the tape files are discussed. Focus areas for secondary research can be methodological, hypothesis- and model-testing, and descriptive or policy relevant studies. The summaries of research studies included briefly describe the researchers, affiliations, purposes, procedures, and results of their work. There are 23 summaries provided with availability information. Primary type of information provided by report: Results (Secondary Analyses). (CM)

EXPLORING NATIONAL ASSESSMENT DATA THROUGH SECONDARY ANALYSIS

No. AY-SA-50

National Assessment of Educational Progress

Education Commission of the States
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The National Assessment of Educational Progress is an education research project mandated by Congress to collect and report data, over time, on the performance of young Americans in various learning areas. National Assessment makes available information on assessment procedures and materials to state and local education agencies and others.

The work upon which this publication is based was performed pursuant to Contract No. OEC-0-74-0506 of the National Center for Education Statistics and the National Institute of Education; also, Grant No. NIE-G-80-0003 of the National Institute of Education. It does not, however, necessarily reflect the views of those agencies.

National Assessment

The National Assessment of Educational Progress is a continuing survey of the knowledge, skills, understanding and attitudes of young Americans. Since 1969, 75,000 to 100,000 persons have been assessed annually or biennially in one or more learning areas normally taught in the schools. In that period, National Assessment has conducted major assessments in art, career and occupational development, citizenship, literature, mathematics, music, reading, science, social studies, writing and in several other learning areas on a smaller scale. Nine of these major areas have already been reassessed, allowing changes in achievement to be reported. The age groups assessed are 9-year-olds, 13-year-olds, 17-year-olds and occasionally, young adults, aged 26-35.

The data collected by National Assessment are a unique resource for secondary analysis. This document describes data files that are currently available to the public and suggests types of research that could be performed using these data. It concludes with brief descriptions of secondary research studies that have already been conducted using National Assessment data files.

Public-Use Data Tapes

Due to its broad coverage of learning areas and nationally representative samples of respondents, National Assessment's data base provides an unparalleled source of information for researchers. The complex sampling design and regulated testing conditions provide results that are generalizable to the nation as well as to many subgroups. Since 1979, National Assessment has made a major effort, with National Institute of Education and National Science Foundation funding, to create public-use data tapes. Over 400 national probability samples for approximately 2,500 respondents each are available, with each sample providing data on 150-250 variables per respondent.

The tapes contain complete respondent information except for identifiers (such as school, district, county, state, etc.) that violate Privacy Act provisions and/or confidentiality agreements.

Documentation is provided in machine-readable form on the tapes. It includes procedural and technical documentation, cross-reference lists and detailed codebooks. OSIRIS-IV, SPSS and SAS-readable documentation files are also included. The SPSS and SAS files contain all information required to create labeled systems files and to

begin analysis. Copies of exercise booklets, exercise scoring guides and other data collection forms are provided on 24x microfiche. Researchers are required to sign a nondisclosure agreement stating that they will not publish the exact contents of secure items.

In general, a separate public-use data tape is provided for each age level in an assessment year. Each tape contains several data files, one for each item booklet; there are 2-16 booklets per age group per assessment. Each file typically contains responses to 25 to 30 attitudinal and achievement questions for a separate national probability sample of about 2,500 respondents from public and private schools (ages 9, 13 and 17) or households (young adults).

Additionally, each file contains numerous background variables at the school and respondent level. Background variables common to all data files are listed below.

- School-level variables. Included are region, census division, type and size of community, occupational mix of attendance area, grade range, racial composition, total enrollment and ESEA Title I eligibility.

- Respondent-level variables. Included are age, sex, race/ethnicity, grade, parents' education and reading materials in the home. From 1972-73 on, regional migration variables are included for the older age groups. From 1975-76 on, 17-year-olds were asked a number of additional background questions, including: homework and TV viewing habits, languages spoken at home and self-identified racial/ethnic heritage.

Interested researchers are encouraged to obtain the brochure "Public-Use Data Tapes" (NAEP publication SY-DT-36), which includes more detailed information on tape contents, file contents, learning area specifics, tape characteristics and how to order data tapes. An additional recommended document is the "Introduction to the National Assessment of Educational Progress Public-Use Data Tapes," which users receive with any data tape purchased. This document describes variable documentation and technical considerations and presents examples of analyses using SPSS and SAS files. Further information about public-use data tapes may be obtained from the NAEP Department of User Services, (303) 830-3752.

Analyses With Public-Use Data Tapes

The public-use data tapes allow access to information on American educational achievement in various content areas for selected age groups. Research may focus on methodological issues, hypothesis-testing or model-testing, descriptive studies or policy relevant studies. While these categories are not mutually exclusive, the following list provides some examples of the breadth of topics that may be explored.

Methodological	Design effects, item response theories, item characteristics (such as format and readability), bias, effects of guessing, response patterns
Hypothesis-Testing and Model-Testing	Relationship of achievement to attitudes and experiences, relationship of achievement to school characteristics, exploration of education and psychological models
Descriptive and Policy Relevant	Trends in achievement over time, analysis of groups with special needs (such as bilingual, minority and low achievers), analysis of special topics (such as television watching habits, reading habits and use of calculators and computers)

A number of published studies have already been conducted using public-use data tapes, including nine that were supported by small contracts from the National Institute of Education. The remainder of this paper presents brief descriptions of some recent projects. The study designs, findings and interpretations reflect the views of the individual researchers and are not necessarily endorsed by the National Assessment of Educational Progress. The descriptions are preceded by a table entitled "Summary of Recent Projects Using National Assessment Public-Use Data Tapes."

SUMMARY OF RECENT PROJECTS USING NATIONAL ASSESSMENT PUBLIC-USE DATA TAPES

AUTHOR	TYPE OF STUDY			SUBJECTS ASSESSED						DESCRIPTION LOCATION
	Methodological	Hypothesis Testing & Model Testing	Descriptive and Policy Relevant	Mathematics	Science	Reading	Writing	Citizenship/ Social Studies	Career and Occupational Development	Page
Anderson, Ronald E.	X			X						5
Burton, Nancy W., et al		X	X	X	X	X	X			6
Burton, Nancy W., et al	X						X		X	7
Enemark, Peter, et al		X		X						8
Folsom, Ralph E. Jr., et al	X			X						9
Gottfredson, Linda A.		X	X						X	10
Haertel, Edward H.		X		X						11
Haertel, Geneva D., et al			X		X					12
Hambleton, Ronald K.	X			X						13
Harnisch, Delwyn L., et al	X			X						14
Jones, Ruth S.		X	X					X		15
Kalk, John M., et al		X	X	X	X	X				16
Larson, Meredith A.			X			X				17
Mead, Nancy A., et al		X	X			X				18
Miller, Jon D., et al	X		X					X		19
Mislevy, Robert J., et al	X			X						20
Mullis, Ina V.S.		X		X				X		21
Noe, Michael			X		X					22
Pascarella, Ernest T., et al		X	X		X					23
Romberg, Thomas A.	X			X						24
Sherman, Susan W.	X		X		X					25
Walberg, Herbert J., et al		X			X					26
Welch, Wayne W., et al		X		X						27

Ronald E. Anderson
Minnesota Center for Social Research
University of Minnesota
Minneapolis, Minnesota

"Measurement Properties of Attitude Scales in the National Assessment of Educational Progress Data on Mathematics"

Availability: ERIC

This study evaluated the psychometric properties of attitudinal indicators from the 1975-76 and 1977-78 mathematics assessments. The purpose of the study was to determine if reliable, valid and usable affective scales are derivable from data collected in the mathematics assessments.

Affective items in a number of test packages were examined both individually and as potential scales. Factor analyses were then performed to determine the dimensionality of each item set. The derived dimensions and composite item sets were analyzed for internal consistency. Additionally, a canonical analysis was performed to evaluate the predictive power of attitudinal dimensions.

In the age 17 test packages, at least one scale of adequate interral consistency was found in each test package examined. The results for the age 13 students were similar.

Three additional studies may be found in the appendix to the report:

- The Home Environment and Mathematical Learning
- Attitudes Toward Mathematics Activities and the Prediction of Achievement
- No response and "I Don't Know" Response Problems in the National Assessment data

Nancy W. Burton and Lyle V. Jones
L. L. Thurstone Psychometric Laboratory
The University of North Carolina
Chapel Hill, North Carolina

"Recent Trends in Achievement Levels of Black and White Youth"

Availability: Educational Researcher, vol. 11, No. 4, (1982), pp. 10-14

Using National Assessment results for five learning areas that have been assessed more than once, this study explored the changes in performance for black and white youths. For the period 1970 to 1980, the authors examined data for reading, writing, mathematics, science and social studies and compared the average black-white differences over the decade.

While noting little change in national achievement scores, the study concluded that during the 1970s the discrepancy in average achievement levels between white and black youths became smaller for 9- and 13-year-old students.

Nancy W. Burton, Robert C. Larson and Alex M. Pearson

"The Effect of Position and Format on the Difficulty of Assessment Exercises"

Availability: NAEP, 05-SA-50, 1976;
ERIC, ED 124 589

The purpose of the study was to determine the effect of two sources of non/sampling error: position in package (beginning, middle or end of the assessment instrument) and exercise format (multiple choice with an "I don't know" alternative, multiple choice without the IDK alternative and open-ended exercises).

An analysis of variance was performed on data collected in the 1973-74 assessments of writing and career and occupational development for students aged 9, 13 and 17.

Results indicated that there was a significant position effect for 9-year-olds, with a disadvantage in performance for beginning-of-the-package exercises. A large difference was noted between the open-ended and multiple-choice formats, indicating that some tasks are more difficult in the open-ended format. A smaller, but statistically significant difference was found between the two multiple-choice formats, with the presence of the "I don't know" option reducing the overall percent correct.

Peter Enemark and Lauress L. Wise
American Institutes for Research
Palo Alto, California

"Supplementary Mathematics Probe Study"

Availability: ERIC

The primary purpose of this study was to examine the effects of various demographic, attitudinal and environmental variables on student performance in the 1975-76 basic mathematics assessment. To this end, 40 achievement items and 241 background variables for 10,000 17-year-old respondents were reduced through logical and statistical clustering techniques to a set of 12 composite variables. These included various demographic, attitudinal and environmental variables, such as community characteristics, school characteristics, school programs, math courses taken and comfort/confidence about mathematics. The report also presents descriptive analyses and summaries of achievement data for 13-year-old respondents.

This study provides the initial steps towards building a model of mathematical achievement through clustering and correlational techniques.

Ralph E. Folsom Jr. and Rick L. Williams
Research Triangle Institute
Research Triangle Park, North Carolina

"Design Effects and the Analysis of Survey Data"

Availability: ERIC

Because of the complex, stratified multistage probability sample NAEP employs, the computer software required to take the sampling design into account is not generally available to NAEP data users. This paper examines design effect adjustments that assume simple random sampling from an infinite population. The 1977-78 mathematics assessment data were used in this study.

Several new decompositions were obtained that display the effects of multistage clustering, stratification and unequal weighting on the covariance matrix. An empirical comparison of asymptotically valid sample design-based chi-squared tests versus analogous simple random sampling tests and design effect adjusted tests is presented.

For exploratory linear models, overall design effects are quite variable but appear to approach the value of one.

Linda S. Gottfredson
The Johns Hopkins University
Baltimore, Maryland

"Race and Sex Differences in Occupational Aspirations: Their Development and Consequences for Occupational Segregation"

Availability: ERIC, ED 159 456

This paper examines the development of race and sex differences in occupational aspirations during the elementary through postsecondary school years and the possible role of these differences in perpetuating the current under- or overrepresentation of women and blacks in different occupations.

Career and occupational development data collected in 1973-74 were examined for students aged 13 and 17 and young adults aged 26-35. Their occupational aspirations, values and self-reported competencies were analyzed by race and sex.

The analyses revealed that race and sex differences in aspirations are generally consistent with race and sex differences in actual employment among adults. The differences in aspirations between blacks and whites appear to increase with age. Sex differences were noted at all ages.

Edward H. Haertel
School of Education
Stanford University
Stanford, California

"Developing a Discrete Ability Profile Model for Mathematics Attainment"

Availability: ERIC

Data from the 1977-78 mathematics assessment were analyzed using latent class models or probability models of a response pattern. These models were employed to determine patterns of distinct skills required by different clusters of mathematics items and to estimate the distribution of these skill patterns for populations of 9-, 13- and 17-year-olds.

At age 9, three hierarchical skill areas were detected: addition was easiest; subtraction, counting, working with place values, common measuring units and simple geometric concepts were more difficult; and using a ruler was most difficult. At age 13, several levels of algebra and computational skills were detected, but they did not fit into a hierarchy. At age 17, only algebraic skills were examined and for all but the easiest items, a linear hierarchy was identified; items that could be solved by reasoning were easier and items that required formal training in algebra were harder.

This study demonstrated the utility of using latent class models in describing National Assessment data.

Geneva D. Haertel, Herbert J. Walberg, Linda Junker and Ernest T. Pascarella
University of Illinois, Chicago Circle
Chicago, Illinois

"Early Adolescent Sex Differences in Science Learning: Evidence From the National Assessment of Educational Progress"

Availability: American Educational Research Journal, vol. 18, no. 3 (1981) pp. 329-341

The purpose of this study was to explore sex differences in science learning and their determinants. Using the 1976-77 science attitudinal, achievement and background data for 13-year-olds, scales measuring science learning and five related factors were related to sex, race and socioeconomic variables in a three-way analyses of variance and covariance.

The study concluded that there is a lack of significant overall differences between boys and girls in science learning, while a sex-specific trend was noted in science motivation. For males, an increase in motivation appeared with higher levels of socioeconomic status (as evidenced by parental education levels). At lower SES levels, motivational levels for males and females were comparable.

Ronald K. Hambleton
School of Education
University of Massachusetts
Amherst, Massachusetts

"Applications of Item Response Models to NAEP Mathematics Exercise Results"

Availability: ERIC

The feasibility of applying item response models to National Assessment data was explored in this study. Relatively little research has addressed the problem of determining the goodness of fit between an item response model and a test data set of interest. When sample sizes are as large as they are in National Assessment, nearly all departures between a model and a data set will lead to rejection of the null hypothesis of model-data fit. A second objective of the study was to fit one- and three-parameter logistic models to several mathematics exercise booklets and evaluate and compare the results.

Using 1977-78 mathematics assessment data for 9- and 13-year-olds, goodness of fit investigations were organized into three categories: (1) checks on model assumptions, (2) expected features and (3) additional model predictions. A number of traditional goodness-of-fit investigations were performed, along with several newer methods. There were some inconsistent findings, but it appeared that the three-parameter model provided a better fit to the data sets than the one-parameter model.

Delwyn L. Harnisch and Robert L. Linn
University of Illinois, Urbana-Champaign
Champaign, Illinois

"Identification of Aberrant Response Patterns"

Availability: ERIC

To examine whether special cautions are required in the interpretation of a total (summary) test score, this study employed Sato's caution index and a modified caution index to determine the degree to which an individual response pattern is unusual and whether these indexes are related to background characteristics. A second purpose of the study was to determine if schools could be reliably distinguished in terms of consistent response patterns that deviated from the national norm. The 1977-78 mathematics assessment data for 13-year-olds were employed for these purposes.

The results indicated that females exhibited smaller caution values than males across the total test score interval, while blacks showed significantly larger caution values than whites. Differences in response patterns at the school level were also identified. Further analysis of a small number of schools indicated specific skill areas where curricula may not match the test content.

Ruth S. Jones
University of Missouri
St. Louis, Missouri

"Changes in the Political Orientations of American Youth: 1969-1975"

Availability: Youth and Society, vol. 10, no. 4 (1979), pp. 335-359

"Democratic Values and Pre-Adult Virtues: Tolerance, Knowledge and Participation"

Availability: ERIC, ED 179 470

"News Media and Politicization: American Youth 1969-1975"

Availability: ERIC, ED 191 759

Three different studies were conducted using 1969-70 and 1975-76 citizenship/social studies data. The purpose of the first study was to track changes in the levels of political knowledge and participation among 9-, 13- and 17-year-olds from 1969-70 to 1975-76.

The second study explored the extent of tolerance among 9-, 13- and 17-year-olds and the relationship between tolerance and political knowledge and orientation to political participation. The data was based on the 1975-76 assessment, and results indicated that there is modestly strong lip service given to general principles of tolerance but that there is constrained application of these rules to specific groups and activities.

The third study analzyed media usage among 13- and 17-year-olds in 1969-70 and 1975-76. Findings indicated that by 1975-76 American youth of both ages watched less television news and read fewer newspapers than their age cohorts in 1969-70. In addition, although news media usage decreased during this period, individuals who used the news media in 1975-76 were as likely to recall news topics of interest as media users in 1969-70. It was also found that no single medium dominated adolescents' attention in 1975-76 and that the linkage between television news and information levels was slightly stronger than the linkages between other media and information levels.

John M. Kalk, Phillip Langer and Donald T. Searls
National Assessment of Educational Progress
Education Commission of the States
Denver, Colorado

"Trends in Achievement as a Function of Age of Admission"

Availability: NAEP, AA-AY-51, 1981

This study investigated the relationships between students' achievement, their ages relative to their classmates and school entrance cutoff dates for first grade.

Data from the 1974-75 reading, 1977-78 mathematics and 1976-77 science assessments were analyzed for non/minority students, ages 9, 13 and 17, in the modal grades of 4th, 8th and 11th.

The results from stepwise multiple regression analyses for the combined achievement data indicated significantly higher achievement for students who were older relative to their classmates at age 9, a smaller but significant advantage at age 13 and no advantage at age 17 for students still in school.

The influence of school entrance cutoff dates on achievement was significant at age 9; 9-year-olds from schools with early cutoff dates and relatively older student bodies performed better. The influence of cutoff dates was not significant at ages 13 and 17.

A second analysis revealed that significantly higher proportions of relatively younger students are retained one grade. This pattern was more dramatic for boys than girls.

This study provides important implications for school cutoff dates for entry into first grade, indicating that inadequate readiness poses potentialy serious threats to children's academic careers.

Meredith A. Larson
Educational Policy Research Center
Stanford Research Institute
Menlo Park, California

"Better Basic Skills for Youth: Four Proposals for Federal Policy"

Availability: Stanford Research Institute
Menlo Park, California 94025

This project combined data from the National Assessment of Educational Progress, the Bureau of the Census and the National Center for Health Statistics to roughly estimate the distribution of funding to districts or states under four proposed alternative strategies of the Elementary and Secondary Education Act (ESEA). The four strategies are described along with their target groups and the consequences of the allocation formulas.

Data from National Assessment were used in two ways. First, in order to analyze how school districts in different kinds of communities would be affected under two of the proposals, derivations from National Assessment's size- and type-of-community classifications were employed. This allowed an examination of target groups and of the distribution of funding among potential users. The second use of National Assessment data combined census data with achievement results from the 1974-75 reading assessment. This plan created a categorical program for youth and identified target groups through the use of criterion-referenced tests rather than poverty measures. The general effect of changing to an achievement-based formula was found to benefit Northern and urban districts somewhat more than is currently the case.

Nancy A. Mead and John M. Kalk
National Assessment of Educational Progress
Education Commission of the States
Denver, Colorado

"The Relationship Between Reading-Related Background Variables and Comprehension Achievement: A Secondary Analysis of the 1979-80 Reading/Literature Assessment Data"

Availability: ERIC

Two objectives were addressed in this project. First, the relationship between reading-related background variables and reading comprehension achievement was explored. Second, methods for conducting secondary analyses using the public-use data tapes and SAS and SPSS statistical packages were described. Common problems in using the data files were discussed, and the programs used to generate the analyses and excerpts from computer output were provided in appendixes.

Analyses concentrated on selected comprehension exercises for white students in the eighth grade to potentially eliminate some of the nonreading-related background variables. Most analyses were descriptive, primarily composed of frequencies and mean percentages for combinations of variables.

The results indicated that three factors appear to be related to achievement for this group of students -- sex, frequency of reading in spare time and type of reading in spare time. Girls consistently performed better than boys; girls read more often than boys in their spare time; girls read mostly fiction and boys read mostly nonfiction. Regression analyses indicated that the frequency and type of reading during spare time are related to the sex differences.

Jon D. Miller and Janet McConeghy
The Graduate School
Northern Illinois University
DeKalb, Illinois

"The Efficacy of Alternative Strategies for the Measurement and Analysis of Citizenship/Social Science Achievement Across Time and Age Groups"

Availability: ERIC

This project investigated the possibility of constructing consolidated SPSS files from National Assessment's public-use data tapes and providing a common index of variables. Also, the project used these files and documentation to construct comparable indices of achievement across age and year groups.

Using the 1971-72 social studies and 1975-76 citizenship/social studies files, a method was identified for the consolidation of all test booklets from a given year into a single SPSS file, with a common codebook and variable index. The construction of achievement indices for individuals that bridge across packages and age groups was unsuccessful. The distribution of items was too thin to use factor analysis for identification of comparable items.

Robert J. Mislevy, Mark R. Reiser and Michele Zimowski
International Educational Services
Chicago, Illinois

"Scale-Score Reporting of National Assessment Data"

Availability: ERIC

The purpose of this study was to develop an approach, based on item-response theory, to link results across assessment years and/or age groups. Responses from 13- and 17-year-old students from the 1972-73 and 1977-78 assessments of mathematics were used. Because few items from a given skill area are administered to any selected respondent in multiple-matrix sampling, the study furthered the extension of item response-curve theory to complex sampling designs.

Successful calibration and linking for subtopics are feasible for item-response methods; however, scaling must be accomplished within narrowly defined skill areas if the integrity of the scales across demographic groups and over time is to be preserved. Item response scaling is discouraged for NAEP test booklets as a whole because it guarantees item parameter drift over time and poor fit to unidimensional item response models.

Ina V. S. Mullis
National Assessment of Educational Progress
Education Commission of the States
Denver, Colorado

"Effects of Home and School on Learning Mathematics, Political Knowledge and Political Attitudes"

Availability: NAEP, SY-HS-50, 1979

Using data collected from the 1975-76 mathematics and citizenship/social studies assessments, this study investigated the importance and relative effect of three clusters of variables on achievement. The variables were: (1) home environment, (2) community and school environment and (3) school resources and instruction. Regression analyses were performed in a path analytic method suggested by Coleman.

The effects of school resources and instruction on learning were quite large for all three learning areas relative to the effects of the other variables. The effect of school resources and instruction on learning was relatively larger than the effect of community and school environment and tended to be relatively higher than the effect of home on learning. Although the largest total effect on achievement for all three learning areas was due to variations in home background, the effects of school resources and instruction on learning were comparatively large.

Michael Noe
National Assessment of Educational Progress
Education Commission of the States
Denver, Colorado

"Scientific Literacy and Support of Scientific Research"

Availability: NAEP, 08-S-51, 1978

This study examined the relationship between student attitudes toward support of scientific research and science achievement. In addition, demographic background variables and self-report questionnaire variables, such as time spent on homework and expectation of college graduation, were related to science achievement.

SPSS analyses were conducted on 17-year-olds' responses in the 1976-77 science assessment. The results suggest that one's knowledge of science may play an important role in determining the extent of support for scientific research. Although males held a small performance edge on the achievement items, males and females did not differ on the average in their support of research. Analyses for racial groups indicated that whites were more supportive of research than blacks. Regional differences in support of research were small; the "medium city" reporting group was somewhat more supportive of scientific research than were other size-of-community groups. The study presents a number of other analyses, such as two-way analysis of blacks/whites by background variables, as well as two models for path analysis.

Ernest T. Pascarella, Herbert J. Walberg, Linda K. Junker
and Geneva D. Haertel
College of Education
University of Illinois, Chicago Circle
Chicago, Illinois

"Continuing Motivation in Science for Early and Late Adolescents"

Availability: American Educational Research Journal, vol. 18, no. 4 (1981), pp. 439-452

Classroom environmental correlates of continuing motivation in science were examined for national samples of 13- and 17-year-olds in 1976-77. A series of factor analyses were performed to group attitude items into four classroom environment scales: (1) quality of social environment [class morale], (2) utility of science classes and content, (3) teacher encouragement and (4) teacher control.

At both ages, measures of the quality of the classroom social environment and the utility of science content/classes had significant positive regression weights for continuing student interest and participation in voluntary science activities. For 13-year-olds at the highest achievement levels, the strongest positive correlation with continuing motivation was the utility of science classes and content. Class morale showed the strongest positive correlation with continuing motivation for 17-year-olds at the highest achievement levels. The teacher control variable was negatively associated with continuing motivation, while teacher encouragement was significantly related to motivation for 13-year-olds but not for 17-year-olds. All four scales had positive correlations with science achievement at both ages.

Thomas A. Romberg
Wisconsin Center for Education Research
Madison, Wisconsin

"The Development and Validation of a Set of Mathematical Problem-Solving Superitems"

Availability: ERIC

As an aid in developing items to measure problem-solving skills, this project was designed to provide information about levels of reasoning ability in response to a set of mathematics superitems (a set of test questions based on a common stem). The structure for the superitems was based on the SOLO taxonomy in which a response is classified into one of five ascending levels. A more sophisticated use of information from the stem should parallel the increasing complexity of structure noted in the SOLO categories.

Thirty-eight mathematics items were administered to over 300 students at four age levels. The results of this project supported the validity of the sequence of SOLO levels.

Susan W. Sherman
National Academy of Sciences
Washington, D.C.

"Multiple-Choice Test Bias Uncovered by Use of an "I Don't Know" Alternative"

Availability: NAEP, 04-S-54, 1974
ERIC, ED 121 824

This study investigated the possibility that analysis of the "I don't know" response alternative would uncover a form of bias among some groups of National Assessment's respondents. Using results from the 1972-73 science assessment for all four age groups, regression analyses were performed to adjust correct response percentages for group differences in use of the "I don't know" alternative.

The findings indicate that performance differences between some reporting groups are inflated by differences in usage of the "I don't know" response. Generally, groups that are correct less often use the "I don't know" alternative more often. However, because the correspondence is far from perfect, the results suggest that lack of information is only one of several reasons respondents use the "I don't know" alternative. The author suggests that personality variables may account for some of the "I don't know" response patterns.

Herbert J. Walberg, Geneva D. Haertel, Ernest Pascarella,
Linda K. Junker and F. David Boulanger
College of Education
University of Illinois, Chicago Circle
Chicago, Illinois

"Probing a Model of Educational Productivity in Science With National Assessment Samples of Early Adolescents"

Availability: American Educational Research Journal, vol. 18, no. 2 (1981), pp. 233-249

To test a psychological theory of educational productivity developed by Walberg, this study used 1976-77 science data for 13-year-olds to execute statistical probes of the validity of the theory.

The science achievement scores were regressed on indexes of socioeconomic status, motivation, quality of instruction and the classroom (social-psychological environment). All of the factors were significant in multiple least-square regressions when controlled for one another and for race and gender. Only the classroom social-psychological factor appeared as an unequivocal and potentially manipulable influence on learning.

Wayne W. Welch, Ronald E. Anderson and Linda J. Harris
University of Minnesota
Minneapolis, Minnesota

"The Effects of Schooling on Mathematics Achievement"

Availability: American Educational Research Journal, vol. 19, no. 1 (1982), pp. 145-153

In the 1977-78 mathematics assessment, 17-year-olds were asked to indicate the cumulative amount of instruction (in semesters) they had received in mathematics. This study examined the proportion of variance in mathematics achievement attributable to the difference in the number of semesters mathematics was studied.

Using multiple regression analyses and taking into account the influence of antecedent conditions (home and community environment and previous math learning), background characteristics accounted for 25 percent of the variance while the exposure to mathematics courses accounted for 34 percent. Thus, nearly 60 percent of the variance was explained, with home and school effect each accounting for about one-half of the total.