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ABSTRACT

An overview is presented of the scope and findings of the International Association for the Evaluation of Educational Achievement (IEA) studies, which analyzed student achievement in 22 nations, one of which was the United States. Using these findings, this paper identifies national differences in the performance of pupils representing the United States and other nations which are part of a set of relatively more developed countries. Three principal considerations in the differences found--time spent on the subject, curriculum content, and student, teacher, and family expectations--are discussed, along with the principal findings: (1) Among more advanced countries and students, there were no marked deviations in the pattern of achievement test scores; (2) Time given to instruction and opportunity to learn were two key characteristics associated with high test scores and achievement; (3) Curriculum content was consistently and significantly related to achievement scores in the less developed countries and to only a slightly smaller degree in the more developed countries; and (4) Inferences with respect to the place of expectations in student achievement were largely limited to personal expectations and motivation of the individual student. (JD)

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TIME, CONTENT AND EXPECTATIONS as PREDICTORS of SCHOOL ACHIEVEMENT in the USA and OTHER DEVELOPED COUNTRIES: a REVIEW of IEA EVIDENCE

by

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INTRODUCTION

There are many good reasons why the USA should be interested in comparing the scholastic performance of its national studentbody with the performance of similar students elsewhere in the world. People want to know "where we stand," and generally that means in comparison with other countries. Parents, educators, and policy makers alike are concerned to improve education--to make it the best that can be provided within the limits of our ability to pay. But how shall we know the best? What standard is there against which we may examine our own schooling and judge its quality?

In this context it is a great help to see how well we are doing in this country in comparison with others who we would consider to be an appropriate standard. Considerations of efficiency also motivate our desire to compare. If some other country is able to bring its youth to the same level of academic achievement as ours and to do it at far less cost we would certainly want to consider whether similar cost efficiency could not be obtained here. In the case of the USA this is an especially pertinent concern. We, more than any other nation, stand as an example of committment to a comprehensive enrollment policy. Whether it is possible to produce an internationally competitive intellectual elite under such a system has been much debated. And if it is possible, is such an accomplishment worth the price?

Crossnational comparisons such as the ones undertaken here are inherently hazardous ventures, fraught with risk of failure. Our task has been made simpler by the Commission's request that we limit our analysis to three variables which are thought to affect academic performance, namely; time, content and expectations.

The International Association for the Evaluation of educational Achievement, known as the IEA, is a useful resource from which to draw comparative achievement data. The IEA which grew out of international concern for an explicitly comparative international school assessment agency, represents the only source of information on variables carefully measured in strictly comparable fashion across similar probability samples from different nations. Still, not all of our concerns are adequately addressed in the IEA data. So while we base our examination of the topic at hand on IEA data, we will necessarily embark from time to time on intellectual journeys of our own design. It is after all, in the thinking about the problems we face rather than merely in their description, that a true understanding is achieved.

ABSTRACT

The prodigious IEA study is a massive attempt to understand the factors associated with student achievement in 22 nations, one of which, was the United States. The IEA data are a valuable resource for nations wishing to understand the effects of their national educational policies against a backdrop of similar and disimilar countries and a wide range of school practices. We have learned from the IEA reports that there are very substantial differences separating the less developed from the more developed countries. This paper turns to a different question: Are there important national differences in the performance of pupils representing the USA and other nations all of which are part of the same set of relatively more developed countries? Insofar as such differences are found, this paper seeks to explain them in light of three principal considerations--time, content, and expectations. The principal findings are: (1) Among the more advanced countries and sets of students of the same age, there are no marked deviations, high or low, in the pattern of achievement test scores. The school systems in the advanced countries are all more or less equally effective, as long as the human material they are given to work with is approximately comparable; (2) We could find no other characteristic of the school systems of the different countries which showed anything like the same strength of association with test scores as did the sheer time given to instruction and the related variable, of opportunity to

learn. More emphasis in the curriculum and more time spent on the subject, as measured in years of exposure and hours of work, are the key to higher achievement in international competition; (3) Content variables, defined in familiar terms of curriculum, school quality, and learning environment were extensively measured in the IEA. We found, contrary to published research based on U.S. data alone, that content was consistently and significantly related to achievement scores in the less developed countries and to only a slightly smaller degree in the more developed countries; (4) Inferences with respect to the place of expectations were largely limited to the personal expectations a student has for himself. We found no reason to conclude that these are systematically lower or less stringent in the USA than in other comparable nations. The direct influence of expectations upon achievement scores was not analyzed by the IEA project staff and, as a result, is not addressed in this paper.

THE IEA STUDY - HISTORY AND PURPOSE

Representatives of national centers for research in education met in London and Hamburg in 1959. It was realized that it would be helpful to move beyond descriptive techniques in comparative research to those which employed measurement. It was known that there were differences from one country to another, for example in age of entry to school, system structuring and grade repetition. The hope was that quantitative research would provide the opportunity for countries to learn from one another, if it could be demonstrated that certain methods were more productive than others. These 1959 conferences were the spur to a number of international studies.

The centers engaged in a feasibility study in twelve countries that eventually developed into a full scale study of mathematical achievement requiring the design suitable test instruments. The project was a considerable undertaking, for it involved 5,000 schools, 13,000 teachers and 133,000 students. Because of differences in language and culture, it was necessary to first pretest the instruments in four countries and with two different age groups. Considerable care was taken over sampling procedures to ensure representativeness. The purpose of the study was not to measure output as expressed in achievement, but rather to relate achievement to input variables that are educational, social and economic. The study revealed differences in curricula, in national emphasis, age of entry, size of class, number of subjects studied in the final year of school,

variation in the percentage of students still in school at the pre-university stage and father's occupational status. The results of the study were published in 1967 (Husen, 1967).

Things moved along quickly. Even before the mathematics study was completed, a council was formed in 1960 for the International Evaluation of Education Achievment (IEA). It brought together centers from 23 countries who agreed to participate in a Six Subject study. The countries did not have to have a separate political identity, but the criterion was a separate educational system. The six subjects chosen were: Science, Reading Comprehension, Literature, English as a foreign language, French as a foreign language, and Civic Education. It is worth remembering that the IEA Study was initiated before either the Coleman or Plowden Commission studies were published.

The purpose of the Six Subject Survey was to analyze and account for the between-student and between-school differences in scholastic achievement. The design of the study was essentially based on an Input-Output model. Two conferences were convened, one in Hamburg and the other close to New York, in which researchers from the social sciences (i.e., economics, sociology, psychology and anthropology) suggested variables that seemed to hold promise in accounting for differences in achievement. From these conferences and other sources, almost 2,000 variables were proposed for consideration. After careful attention, this number was

reduced to between five and six hundred for the practical purpose of testing. They were then grouped into four categories: (1) Long-term or family variables, (2) Middle-term, (3) Short-term, and (4) Kindred variables. To these four groups were added a standard measure score from the Short Test of Word Knowledge and Reading Comprehension scores.

Sampling was generally done in two stages: schools were selected randomly from a national list, then a sample of students was randomly selected from each school. In some of the larger countries, it was necessary to have an additional phase in the process of selection, an initial phase of selecting randomly districts from which the schools could then be chosen. The result of all this activity was the involvement of 10,000 schools, 50,000 teachers and 250,000 students. The resulting data presented a massive problem of data reduction, analysis, and interpretation.

Considerable care went into the preparation of this vast undertaking. Each country through its National Center was asked to appoint a National Technical Officer. These officers gathered for a week-long briefing meeting. Each participating school was asked to provide a coordinator, who in turn organized the test administrators; both were provided with suitable manuals. The tests were designed with a marked card response system which could be read by an optical scanner so data could be electronically transferred to a computer.

For each subject area an international team was brought together to design the instruments. Pilot testing and modification was undertaken, and generally acceptable levels of reliability and freedom from cultural bias established. It was not possible to construct the study on longitudinal lines or obtain measures of student entering ability. The study was thus cross-sectional in design. The resulting structure creates a problem in explaining causality, but does allow the strength of relationships between and among variables to be estimated. Differences in achievement and attitudes were studied with respect to differences between countries, then between schools within countries, and finally between students within schools or countries.

The size of the task which the IEA undertook was enormous. Hundreds of variables had to be sifted, overlap determined, and the variables with predictive power identified. Factor analysis and step-wise regression were used in the task of data analysis. It is unfortunate, but not all of the planned analyses were undertaken. Funds ran out before the task was completed. The most serious loss was probably the abandonment of the plan to identify the ten most effective schools in each country and then study them in depth. Had that been done the present task of identifying factors that define excellence would have been easier.

Work on the Six Subject Survey resulted in the active participation of twenty-one countries and extended over a whole decade. Nine reports were produced with the final one

published in 1976 (Walker, 1976). Report number VIII (Peaker, 1975) covers the technical aspects of the undertaking, while Walker's final report is not only an overview of the Six Subject Survey written in a relatively non-technical manner, but it is also a comprehensive summary.

The findings of the Survey are important for educational policy and practice and have bearing on three domains. They are: socioeconomic and instructional factors, the proper structure of school systems, and factors which influence achievement. The student's environment, both at home, and in school, and within the country, has considerable bearing on acnievievement. It follows, therefore, that improving achievement is a social, political, and educational concern.

MAIN FINDINGS OF THE IEA STUDY

The IEA Study resulted in an enormous data which is held in the IEA Data Bank in Stockholm and is also available to researchers in various centers around the world. The analyses of these data by various researchers were also published in nine volumes. It is clear from these reports that accounting for differences in achievement is a complex business and varies between subjects and at different points along the student's path through the school system. Great caution, therefore, is appropriate in drawing generalizations and, indeed, even in interpreting the data. The studies however, do account for a large number of

factors which influence variation in achievement. Left unresolved in a fully satisfactory sense is the question of variation in natural ability and its relationship to achievement. At first appearance, so also is the question of outstanding teaching, strange as it may seem. Teaching in the majority of the countries studied is a well developed, professionally determined enterprise. Variations between teachers are small in comparison to the other influences that affect students. And since the relative amount of influence is proportionately very different, so also are the consequences. The task of measurement is therefore very difficult. Schools contribute an enormous amount to the aggregate achievement of students, but accounting for variations in achievement that can be directly attributed to specific strategies is a daunting task. It is a tragedy that the funds for the project ran out before the case-study approach to the highly successful schools that were identified was implemented. As it turned out, the measures used in the study do not permit discriminations among the best schools.

The IEA Studies have established that non-scholastic factors account for a considerable proportion of the differences in achievement between students, between schools, and between countries. It is appropriate to improve schools and factors within schools, but educational reform without social and economic reform will not be sufficient to alter radically educational outcomes. Secondly, the Studies address issues of school size, structure, selectivity, elites, sex differences in student performance and retention in the

school system. For the latter, the United States retains 75% of its students in the pre-university level, in contrast to the Federal Republic of Germany where the amount is 9%. The nearest country to America is Sweden, with a 45% retention. It is perhaps appropriate to note that the top 9% of American students achieve as highly or better than the students from any of the highly selective societies in the study. The Six Subject Survey was designed to account for the variation in achievement, but so strong were the exogenous variables that this was not fully accomplished. What does emerge even so, is the importance of the opportunity to learn and the significance of time. In both the case of science and the study of Foreign Languages, time is critical in different ways. In the case of Science, it was the time allocated to the different sciences that affected individual specialization scores; and with languages, the number of years spent with the particular language.

Gilbert Peaker (1975), in his technical report, was convinced that schools do make a difference in achievement. This can be seen by comparing the Home Background group of variables through the four age populations studied. They lose dominance over time and the school variables become more significant. He thought that the student competence variations were strikingly limited given the extent of formal differences in the characterics of schools. He also asserts that throughout the findings there is evidence that the amount of teaching is positively related to outcomes. It

is easy to lose sight of the fact, he further suggests, that because a variable has little variation, its variation will explain very little, but that does not render the variable unimportant. Schools in the developed countries have been in existence for many years and much effort has been expended in creating equality of opportunity. Schools therefore have more in common than that which distinguishes them from another. Gross differences will show up more readily in a study than small ones, by virtue of the nature of statistical analysis. Clearly there are some unidentified characteristics of the school, either physical, social, or organizational, that make a small impact on achievement (Peaker, p. 52). He feels that such variables are not very consistent in their impact from one year to another.

In a later section of this paper, we review the IEA Study with respect to time, content and expectations, but there are broad findings that it would be useful to consider first. Both Peaker and Walker are emphatic on the difference between the developed and developing countries, and the role that non-scholastic factors play in differences between students, schools, and countries. It is therefore important to recognize that variables operate over different periods of time, so that time and intensity impact the objects of concern in varying amounts. Walker (1976) has described this double effect:

> The gap in average performance in all subject areas between highly industrialized and largely non-literate, agricultural countries is startling. The multivariate analyses in both types of systems is conducive to a

> deeper understanding of the interaction between school resources and methods of instruction on the one hand and the socio-economic structure on the other. IEA findings consistently show that non-scholastic factors account for a considerable portion of the between-student, between-school and between-country variation (pp. 11, 12).

In the studies variables were scaled and combined, thus enabling composite variables to be developed and classified as long-term, middle-term and short-term. Not many short-term ones survived. Beyond the fact that they were short, Peaker suggests that:

> The main reason . . . is that the variation in school characteristics within a well established educational system is itself very small

in comparison with the variation in home background and natural talent. Teaching is a profession, with standards of entry, whereas parentage is open to all. Staffing ratios do not vary much. The range in books and buildings is not enormous (pp. 57, 58).

Home Background Variables

Alex Inkeles (1979) reviewed the IEA study and was less inhibited about pursuing the differences between more developed countries (MDCs) and less developed countries (LDCs). To him the differences were startling and largely attributable to the early environment of the child. He also demonstrated the probability that school systems in LDCs are at least as productive as in MDCs. Schools have a considerable problem in overcoming the impact of the student's early environment, and time is a critical factor in the process. Background is more critical for Reading Comprehension than for Science where recent conditions of learning play a bigger part. Reading is the fundamental skill

and is strongly determined by factors beyond the reach of the schools. Parents and children vary far more than school practices (Peaker, p. 140). Walker summarizes the question of home background and its influence upon achievement:

> The relationship between Home background and achievement showed up very strongly in some countries in the between-school analyses. In Science over 60% of the variance of scores for the 14-year-olds was associated in England, Finland, Scotland and the United States with a composite describing the home backgrounds of the students attending each school, and similar results were obtained for achievement in the Literature tests. . . . The removal of these differences is a concern not so much of the educational policy-maker as of the town-planner and the social services (p. 228).

It would be unnecessarily repetitious to provide further quotations clearly the cluster of Home background variables and the strength of their influence across countries is a striking finding of the IEA study. In four of the six subject areas, the contribution to variance was greater for home background factors than was the contribution of learning conditions in the prediction of student achievement in science and literature.

Sex of the Student

Boys showed more interest and ability in Science than girls, but girls showed greater interest in Literature. With French as a foreign language, girls chose to study it more frequently and in some countries were also superior in achievement.

Sex gender differences in preference for subjects were found in all countries and are probably related to role expectations and differences in the development of characteristics of the sexes. Perceptions of future employment possibilities also probably play a part in

selection of subjects to study.

The Teachers

Teachers provided a great deal of information about themselves, with respect to their qualifications, training experience, and the teaching methods they employed. In Science, the amount of post-secondary education of the teacher, the time the teacher spent in lesson preparation and teacher membership in a subject association, were positively associated with pre-university students who tended to gain

higher scores in the Science tests. Teachers of Foreign Languages also reported characteristics which correlated with student performance. A self-reported competence in speaking English was positively associated with student achievement along with length of teaching experience. In the case of French teachers, those who rated either their reading or speaking skills higher tended to have students who also scored higher in those aspects of competence. It also helped student listening skills if the teacher had resided in a French-speaking country. The difficulty of research is demonstrated by the fact that with English teachers, the same correlation was not in evidence. Neither were consistent patterns found with teacher variables in connection with Reading Comprehension.

The Pre-University Population

There were striking differences in the respective sizes of the pre-university student population from one country to another. The contrast between the United States and the Federal Republic of Germany has already been commented on earlier in this paper. The retention percentage is not high in many countries. Clearly Americans have chosen to use resources in extending the opportunity for education to a wider section of the population than in other contries. Walker summarizes well the implications:

> In the earlier investigation (Husen, 1967), where the subject was mathematics, it was shown that the differences between countries in the achievements of their pre-university populations could be largely accounted for by the differences in the percentages of the age-groups still in attendance at school. Similar findings were obtained in the current project. In Science the countries retaining higher proportions had lower average levels of performance, but the performance of the top 1% or 5% or 9% in each country did not appear to have been affected by the degree of retentivity in that country. The different systems produced comparable proportions of high achievers, but the less selective systems produced, in addition, greater proportions of students with at least moderate achievements in Science. Similar results were obtained in Reading Comprehension, Literature and Civic Education. It was not possible to make comparable calculations in the Foreign Language projects.
>
> The position is neatly summarized thus in the Science Report: "High selectivity minimizes failure, whereas low selectivity maximizes success. Somewhere between the two extremes lies a point that a particular country can afford and which fits the particular set of circumstances as well as can be judged" (p. 236).

The IEA Study clearly shows that two important facts emerge about American comprehensive education. First Americas best students are as high achievers as students from highly

selective elitist systems overseas; and secondly, there is a higher proportion of moderate achievers, than there is other countries studied. It is important to realize that considering mean scores alone can paint a possibly misleading picture. This is essentially the same statistical phenomenon as the decade of declining SAT scores in America. Even the top fourth of the test taking population was doing as well or better than ever. The mean scores declined, due in part to the changing composition in the pool of test takers.

Other Kindred Variables

Student expectations about their education and eventual occupation contributed to the prediction of achievement in most subjects. IN the case of Science, the kindred variables explained between 5 and 6 percent of the variance in achievement.

The IEA Study has contributed a great deal in establishing the validity of generally held assumptions, has identified the complex nature of what leads to student achievement, it has dispelled a number of cherished myths. School systems, at least in the twenty-one countries studied, are more alike than might be supposed and contribute greatly to the student's knowledge. Reading skills are central to the learning process but they are also subject strongly to home and environmental factors. Fast learners tend to retain their momentum through their school, and so, unfortunately, do slow learners. Achievement is dependent on the emphasis given in school through the curriculum, which in turn is contingent upon the time available or allocated to a subject area. The student's own motivation and willingness to work in and out of school is also part of the total picture. It is a complex process, involving ability, many out-of-school influences, the contribution of both school and teacher and the inner responses of the student to the opportunities provided. There are also undoubtedly other factors which remain to be identified. This is clear from the varying amount and incomplete explanations offered in the Six Subject Areas Survey findings. It is clear that factors vary in importance and influence from subject to subject, student to student, student to school, school to school, school to country, and country to country. The greatest advances in improving achievement will be obtained by addressing the fundamental social and economic disparities in society and

by requiring educators to continue to improve learning conditions. Table 1 provides a simplified summary of the way variables operated in the Six Subject Areas.

The IEA Study has established that schools do a good job by and large. They do contribute to their student's achievement.

The Two Dimensions of Achievement

In the years since the IEA Studies were published, there has been considerable discussion of the value of schooling. Many misconceptions have arisen, a number of them based on the strength of the Home Background cluster of variables. Gilbert Peaker (1975) recognized that interpretation of the IEA Studies would be a critical issue. He used G.B. Shaw's, The Doctor's Dilemma (1906) to illustrate how many things can have an apparent relationship without in the least addressing cause. Shaw, with his inimitable humor, goes to the heart of the issue of the use of statistics:

> Thus it is easy to prove that the wearing of tall hats and the carrying of umbrellas enlarges the chest, prolongs life and confers comparative immunity from disease, for the statistics show that the classes which use these articles are bigger, healthier, and live longer than. . . . (Peaker, 1975, p. 16).

Frequently in research, it is necessary to use a proxy to uncover a relationship. In the IEA Studies, many proxies were used and therefore interpretation is critical. The Home Background variables emerged with considerable strength in different parts of the study. They seem to overshadow

TABLE I
Influence of Variables on Achievement

	HOME BACKGROUND	SEX	TYPE OF SCHOOL COMP. SEL.		TIME FACTOR	TEACHER VARIABLES	METHODS	STUDENT ABILITY
SCIENCE	✓✓✓	M ✓✓	✓		✓✓✓	✓✓✓		?
READING COMPREHENSION	✓✓✓	F ✓				✓		?
LITERATURE	✓✓✓	F ✓				✓		?
ENGLISH A. F. L.	✓	F ✓			✓✓✓	✓✓	✓✓	✓✓
FRENCH A. F. L.	✓	F ✓			✓✓✓	✓✓	✓✓	✓✓
CIVIC EDUCATION	✓✓✓	M ✓✓✓		✓			✓	✓✓

HIGH ✓✓✓ MEDIUM ✓✓ LOW ✓

? ambiguous

▱ imp. to draw conclusion

FIGURE 1 (Diagramatic)

Interaction of Variables that Contribute to Achievement

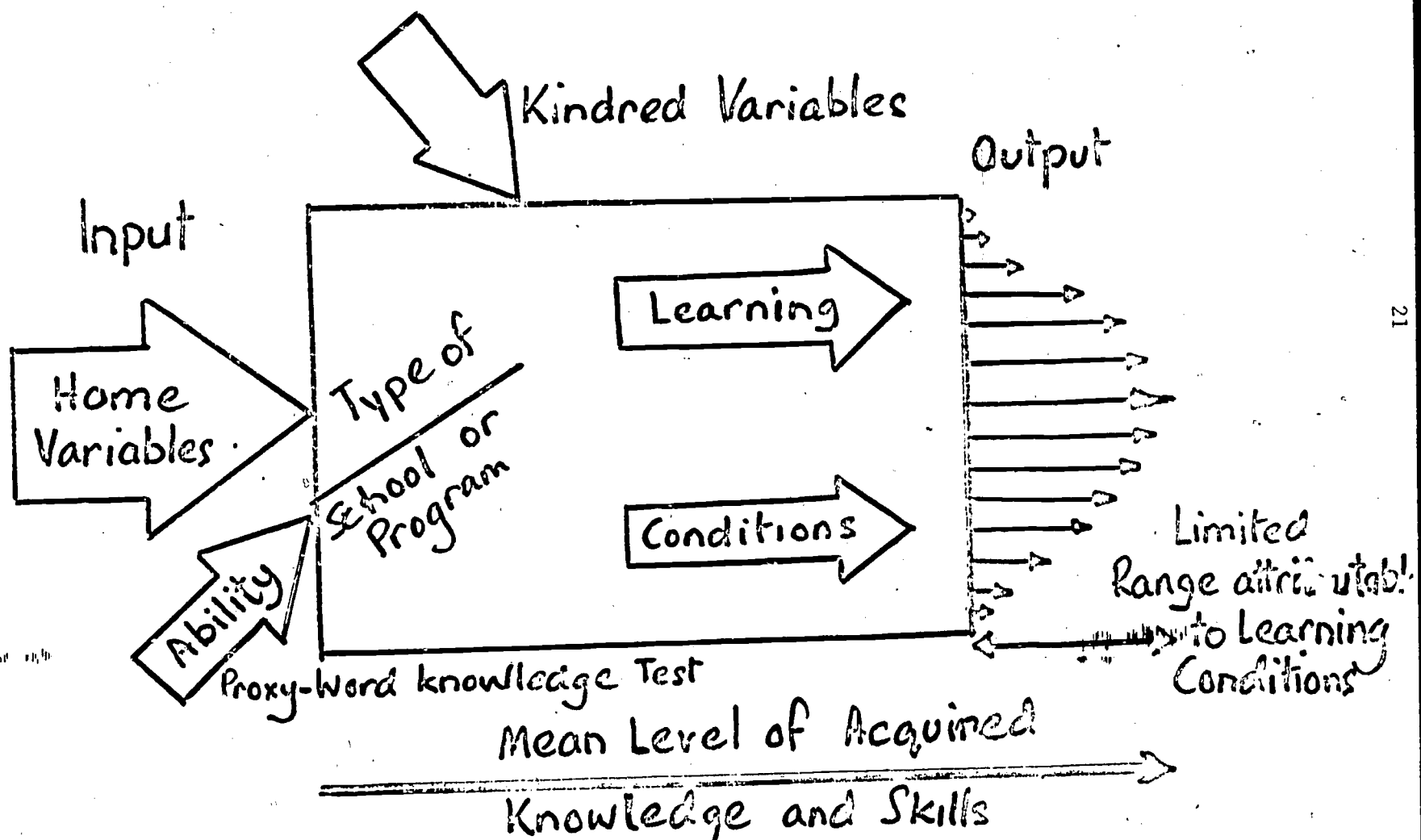
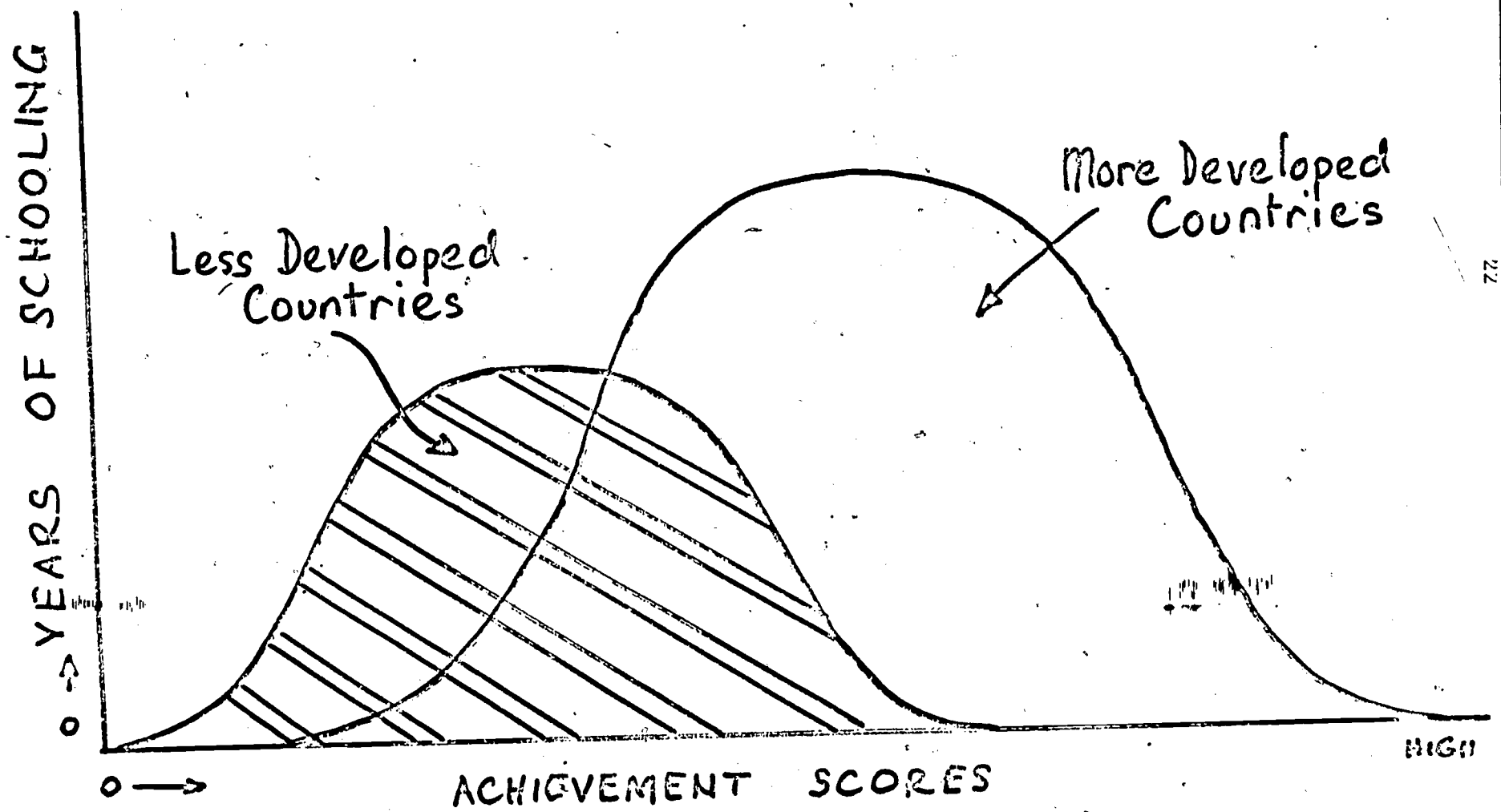


FIGURE 2
Difference in Achievement Between More Developed Countries and less Developed Countries



instructional influences in a number of places, but this does not mean that instructional influences are unimportant.

Figure 1 attempts to diagram the interaction of the clusters of variables identified by IEA. Schools achieve considerable forward movement and this can be demonstrated by comparing two different sets of conditions, namely the more developed countries with the less developed countries. The differences are represented diagrammatically in Figure 2. Peaker uses the metaphor of habit in connection with the similarity of schools and their influence:

> Mankind, and indeed the whole animal world, has relatively uniform habits of eating and drinking, but this does not show that these habits are in need of amendment. What it does show is that if the supply of food and drink were cut off the consequences would be serious. Similarly the consequences of cutting off the supply of schools and teachers would be serious irrespective of whether given the educational system and the consequent student achievement, much or little of the variation of that achievement is to be attributed to variation in schools and teachers (p. 60).

Peaker continued to discuss the issue of the difference that schools make and the relative strength of the external influences and therefore the differences in outcome between different overall conditions:

> This argument overlooks the fact that the variation in question is variation within a system of teaching -- and without the system there would be no achievement. This point is illustrated in the IEA Study by the very large difference in scores of the developed and the developing countries. In the one case, the teaching systems have existed for several generations; in the other, they are comparatively recent (p. 68).

Peaker was particularly suited to summarize the issues involved in the overall value of schooling and in fluctuations in achievement by students influenced by different environmental

conditions. He had spent a lifetime in educational research and was responsible for the statistical analysis for the Plowden Commission which may legitimately claim to be a full-scale longitudinal study. And, as we noted earlier, he has written the technical report on the IEA Study:

> The first is that to say most of the variation in achievement within a country's educational system is caused by factors outside the control of the school is by no means to say that schools and teachers matter little. The success of a lesson, or of a course of study, is to be judged by the amount of learning that has taken place, and not by the change, if any, that has occured in the relative standing of students. The total amount of learning that now takes place in the schools in a developed country is much greater today than formerly, because the educational system has now existed over several generations. This point is so plain that it would not be worth mention were it not that experience shows that misunderstanding can occur.
>
> The second point is that there is no suggestion that special educational efforts in deprived areas should not be undertaken, or that if undertaken such enterprises are doomed to futility. Whether they should be undertaken is an ethical question. The evidence suggests that the difficulties are likely to be formidable but not that success is impossible. The evidence also suggests that the enterprise should begin when the children are very young, and that success is likely to depend mainly upon the extent to which their parents can be persuaded to participate (p. 105).

Schools then do make a considerable contribution but determining what will most effectively improve achievement is a far from completed task. The IEA Studies have identified the strong influences from outside the school system that influence what takes place within. Some children start with considerable advantages, so that they continue to advance quickly; others are adversely influenced and even with considerable effort by the schools are likely to be slowed in their achievements.

In this section, we have endeavored to show that assessing achievement is two-dimensional. Overall, taking the whole population of students, schools make a massive contribution to their students. But when variations of achievement are considered, many factors are involved, a number outside of direct school control. Research must continue to uncover ways of ameliorating adverse circumstances.

In the next section, we consider what IEA has to contribute to a discussion of time, content and expectations within the school situation.

ACHIEVEMENT DIFFERENCES IN THE MORE DEVELOPED COUNTRIES

Earlier we described the essential homogeneity of scores in the countries judged by the IEA as comparable in terms of national development. To summarize, nine of the twelve more developed countries participating in the study were within two percentage points of having 65 percent of their students getting a correct answer in the reading comprehension test. Other test results are similarly clustered around the group mean. So it is that we must bear in mind the obvious conclusion that schools in these developed countries are turning out students of roughly comparable overall academic ability. There are some notable outliers in the test score distributions but the USA is not among them.

The IEA was naturally concerned to explain such variations in test scores. Unfortunately for us, the variables they scrutinized as possible sources of explanation for differences in student performance are not precisely those of present concern. Despite the fact that the set of variables explored was very large, they consistently failed to correlate significantly with achievement scores in the MDC's. Writing in the IEA summary volume, C. Arnold Anderson (1976) concluded that: "Among countries of the same type further search for correlates of national differences in average scores will not be a fruitful exercise."

It is not in further search of additional correlates of

achievement scores that we now turn in violation of Professor Anderson's admonition. Rather we seek to understand to what extent are questions of time, content and expectations addressed in the massive IEA undertaking for the purpose of explaining achievement test scores among countries. We will examine each of these in turn.

Time

Time on Task has received widespread attention in this country in recent years as a major source of variation in school achievement. While many observers of the educational research scene might have found such a finding intuitively obvious, few had understood the extent to which differences in time devoted to the study of specific curricular objectives actually differed in the USA. The IEA study explored the question of time spent on instruction in specific subjects as a possible explanation for national differences. Both number of years and minutes per week devoted to the study of certain subjects were obtained.

Several of the IEA Project writers make pointed reference to time spent on instruction. Passow (1976), in speaking of reading comprehension, drew attention to the time spent on subject study and indicated that it was perhaps the only factor, apart from sheer wealth, which was consistently associated with reading comprehension test scores. Passow reports a correlation of +.36 for data from 13 countries. While not regarded as a strong correlation, it is certainly high in studies of this type.

English as a foreign language was tested in many of the

IEA countries, though obviously not in the USA. Still it is worth noting the explanation of Lewis and Massad (1975) who cited time spent in studying the subject as one of the four main predictors of success.

It is perhaps the work of Carroll (1975) concerning the French tests that most convincingly demonstrates the relation between amount of instruction and achievement scores. In describing that relation, Carroll wrote, "to a large extent the variations in performance levels of different country/population samples are accounted for by variations in average amounts of French instruction received up to the time of testing." In order to construct a cross-nationally valid indicator of "adjusted years of French study" Carroll modified the years that a student indicated he had studied French by incorporating a measure of intensity of study. French test scores for both 14- and 18-year olds were then plotted against the adjusted measure of years of study and a strong association was observed which, in some instances, approached perfect positive correlation.

The IEA data complement a growing body of evidence from educational researchers in this country by pointing out in certain terms that the amount of time given in classrooms to instructional purposes is a potent contributor to the amount of subject matter students actually learn as measured by their performance on achievement tests. Given this importance, what can we learn from the IEA project about the way in which the USA compares to other MDC's on this aspect of schooling.

The objective of undertanding inter-country variations in school performance is materially assisted by the inclusion of an opportunity to learn variable in the IEA study. Although the authors of the study hoped to avoid an international school test olympic competition, the wish to understand one's own performance for the purpose of improving it can often best be accomplished through comparison with others. In the present case there can be little doubt that the comparative method has led us to conclude that mayif not most. differences in learning accomplishments in school can be attributed to the differences in the opportunity to learn that children have enjoyed. In this international "competition" more classroom time spent on the subject, as measured by years of exposure or hours of dedication per week, will lead to top achievement. Some have contended that life experiences relevant to the subject are practical surrogates for classroom time. Indeed, it is doubtless the case that the tight association between time on task and subject matter mastery is more likely to occur in subjects more or less infrequently encountered outside the classroom walls. However, if it is test scores we speak of, the association is likely to persist in almost all subject areas.

Where achievement on standardized tests is concerned, it is quite obvious that formal inclusion of geography in the school curriculum and time spent on its study is also a good method of insuring that a large number of students will

learn about it. From the IEA data alone we would conclude that if national educational planners and policy makers wished to do one thing which would have a high probability of improving national averages in a certain subject, they should give that subject strong emphasis in the curriculum and encourage teachers to devote as much time as possible to it in the classroom. If they would do that they could reasonably expect to observe measureable improvements in test scores.

Content

The IEA nations differ in regard to what is included in the formal program of instruction (a narrow definition of content). Subject matter is organized differently, the sequence of presentation may vary as does emphasis accorded a particular topic. Because of the tradition of community control of education in the USA, the differences named can be quite substantial within this country.

It would have been ideal from the standpoint of our concern with content if the IEA had made explicit comparisons among countries concerning the content of their instructional programs. Had they done so, it would then have been possible for us to determine whether variations in content, everything else held constant, were related to variations in student achievement at the national aggregate level. However, the IEA planners were more interested in their ability to obtain curriculum valid tests of achievement that would be comparable across national boundaries. For that reason, the emphasis was more toward selecting similar curricular content. The IEA survey data are not ideal for purposes of comparing content. Insofar as content is defined as the emphasis of time, we have the opportunity of assessing its contribution to learning. But it is in the more traditional sense of curriculum, objectives, sequence of learning tasks and the integration of material that we find the IEA less useful.

Its limitations notwithstanding, there are many different facets of content that can be analyzed by way of the

IEA variables. The variables of greatest interest to us are the IEA "Learning Condition" variables; those which might, a priori, be expected to affect the achievements of students. Examples of these variables are: grade to which student is assigned, the number of students per classroom, opportunity to study topics dealt with in the tests, size of the school, teacher qualifications, presence of a library, type of textbooks used, time teachers spend in correcting student work, and hundreds of others. Most of these would commonly be thought of as falling within the boundary of school content.

The statistical procedure used by IEA analysts was correlation and correlation based multivariate regression techniques. In order to reduce the massive number of variables to a more manageable size, variables were combined into blocks of variables assumed to be related. These blocks were: (1) family background, age and sex; (2) type of school and program; (3) learning conditions, including curriculum, time and teacher characteristics; and (4) "kindred" variables such as student interest and motivation. There was some variation in this procedure in the case of certain subjects but these four blocks account for the great majority of all of the predictor variables.

One of the most important findings of the IEA studies demonstrates that school content variables play a substantial role in determining the scores children obtain on standard tests. Depending upon the parti-

cular way in which the statistical analysis was handled, the content variables were either as important or more important than the Home Background variables. The United States was not different from other developed countries in this respect. In the Science test, for example, the Learning Conditions variables which we have been discussing account for 7% of the achievement variance in the USA. The comparison figures are: Sweden - 7%; Scotland - 9%; New Zealand - 8%; Japan - 4%; Hungary - 5%; and England - 7%.

Many readers will be aware why there is so much apparent concern for demonstrating the contribution of school content variables to achievement scores. Others may find it puzzling that educational researchers may question the importance of school variables to learning outcomes. To overabbreviate the reason, we refer to two major investigations of achievement in America -- the so-called Coleman report and Jencks' study entitled Inequality. In both cases, the popular impression reinforced extensively in the news media was that school factors, at least when compared to family background, were relatively unimportant.

One interesting caveat in the school effects literature is the question of what kind of school outcome variable is being measured. Someone once quipped that had the researchers been concerned with the elapsed time in swimming 100 yards as an important school outcome variable, then a school variable, namely presence of a swimming pool, would have been very important. The point we make is that the relative importance of the variables in the personal background block

and the educational content block cannot be accurately judged without taking into account the subject on which the students were tested.

Inkeles (1979), in investigating the question of the difference subject matter (content) made in the analysis of IEA Study data, came to the conclusion that

> . . . whether the qualities of the school milieu have a distinctive impact on learning a subject seems to depend on whether the skill being acquired is one with which homes and families may be well stocked or, by contrast, is a skill which is, relatively speaking, monopolized by schools and teachers.

In other words, school content variables are much more likely to be more important, relative to homes, in the teaching of French, for which many families, however well to do, have no facilitating capacity. For language arts, mathematics or music, families may vary from none to quite considerable capacity to teach their young charges. When Inkeles compared the school content variables across the different subjects on which the children were tested, he discovered that the percent of variance explained for tests of English and French as foreign languages was

higher than it was for tests of other subjects.

Expectations

The Commission has apparently decided upon a fairly common definition of expectations which equates roughly to measurable standards of performance in school learning tasks. The recent concern with declining standards in the USA stems from the popular belief that standards or expectations are causally linked to the learning behavior of students. Where there is an erosion in what is expected of students, we can anticipate that achievement will follow lockstep. The same logic and social significance is attached to other forms of student behavior, often categorized broadly by educational researchers as the non-cognitive outcomes of schooling. This behavior defines the role of student in society. It is a school responsibility to socialize the present encumbants of the student role in the ways of behaving that are acceptable to society, that conform to societal expectations. These expectations are important and the agency entrusted with their socialization is a vitally important link in the chain of survival.

One of the great problems of an open society such as that of the USA, with a comprehensive school enrollment policy, is that responsibility for giving instruction in social expectations may become terribly diffuse and yield serious failures of socialization. To some extent this situation arises from the nation's values which emphasize personal initiative and distrust indoctrination. We view askance organizations with intense and rigid indoctrination programs for entering person

nel. The army is held by some to epitomize such excesses by not only telling one what a soldier is like but then telling him to the smallest detail how to be one. In the United States, student expectations are frequently much less clearly articulated than is true of the military or by contrast with high schools in Asia, for example.

The need for expectations (expressed as school standards) becomes especially important in those spheres in which people cannot alone learn from models or lack the resources for self-instruction. Students need to learn what standards society holds for them concerning dressing, speaking, manners, lovemaking, hygiene, driving an automobile, filling out complex forms, or dealing with credit obligations. In many respects it appears that schools in America have defaulted in their traditional role of purveyors of such social standards and that the media have willy-nilly taken over much of this burden. This is not to say that this change in the socializing function of schools is unique to the USA. Fortunately the IEA did include some items in its surveys which help us understand better the extent to which U.S. schools are successful in setting expectations in a variety of behavior and skills which are variously socially required, useful or customary, and that contribute to the integration and effective functioning of our society.

The IEA items which appear to fit under our heading of expectations are:

1. Is it important to you to do well at school?
2. I want as much education as I can get.

3. I hope eventually to study at a College or University.
4. Do you worry about doing well in class?
5. If you were given lower marks than usual in a test would this make you feel unhappy?
6. Do your teachers think you misbehave too much?
7. Do you work hard most of the time?
8. The teachers always seem to criticize our best ideas.
9. The students decide for themselves where they will sit in the classroom.
10. Most teachers expect us to stand up when they come into the classroom.

For our purposes we have chosen to present results of the tabulation of responses to the above questions as reported in a Swedish reanalysis of the IEA data by Fagerlind and Munck (1981) Japan, Sweden and the USA are reported at three age levels. A reading of the questions reveals them to be mainly expectations that the individual has in relation to self. The final two are student perceptions of school expectations. Expectations of significant others for the student's achievement and the effect of institutional expectations have been studied elsewhere and with results confirming their contribution to explaining variation in test scores. Such data are not available in the IEA. However, we do believe that the personal expectation variables have a valuable part to play in increasing our understanding of behavior contributing to academic success. We now turn to a brief examination of

each question in turn. (See Appendix A for the corresponding graphs.)

Item 1. Is it important to you to do well at school.

The great majority of the students in England, Hungary, Sweden and the USA at all three age levels feel that it is important to do well at school. Finnish students differ from other countries at the upper secondary level. In Finland only 69 percent agree with the statement, compared to about 90 percent in the other countries. Considering the competition which is prevalent in the Japanese school system, the Japanese results, indicating low perception of importance, are puzzling.

Item 2. I want as much education as I can get.

Responses to this question are influenced by the availability of educational opportunity in each country. The desire to obtain as much education as possible is, in all industrialized countries, more widespread among 10-year-olds than among 14-year-olds. In Sweden and the USA a large percentage of students are still in school at the upper secondary level, and in these countries a lower percentage of the upper secondary students than of the 14-year-olds want as much education as they can get. In England and Finland the upper secondary students are more interested in further education than the 14-year-olds. Finland has the lowest score on educational aspiration, both among the 10- and 14-year-olds, and Hungary has the highest score at all age levels.

Item 3. I hope eventually to study at a college or university.

This item was considered relevant for the 14-year-olds and the upper secondary level students. Remarkably, between 40 and 50 percent of the 14-year-olds in England, Hungary, Sweden and Japan hope to continue at a university or college. A larger percentage (74%) of the 14-year-olds in these countries had answered that they wanted as much education as they could get. That many fewer actually expected to enter higher education is obvious recognition that many aspirations would remain unmet. By contrast, in the USA approximately the same proportion of 14-year-olds who wanted as much education as they could get, also expressed a desire for university education. The high percentage of "yes" responses from the USA sample can partly be explained by the fact that we have in this country the highest real educational participation rate in the world.

Item 4. Do you worry about doing well in class?

Swedish students differ considerably at all age levels from students in other countries, with a scant 50 percent who answered "yes" to this question. In the other industrialized countries included in the study, a high percentage (between 60 and 90 percent) at all levels answered that they do worry. Hungarian students worry the most, followed by American, British and Finnish students. A tendency towards less worry is noticeable among the upper secondary students compared to the other two levels in each country. The fact that Swedish students do not worry about their schoolwork as much as students in other countries was

interpreted by more optimistic Swedish observers as a positive fact, especially when considering that over 90 percent of Swedish students feel that it is important to do well in school. However, in light of surprisingly low test scores of Swedish students in some areas, the importance of worrying about doing well should not be prematurely dismissed. American students are at the midpoint in the distribution of responses to this item.

Item 5. If you were given lower marks than usual in a test, would this make you unhappy?

The American and Hungarian results on this question are interesting. In Hungary over 90 percent of the students at all levels agree that they would be unhappy if they scored lower than usual on a test. The corresponding proportion at all levels in the USA is about 85 percent. Different types of school systems with different ideologies with respect to individual achievement can apparently produce similar answers. In Finland, England and Sweden, about 60 percent answered "yes" to this question, both at age 10 and 14.

Item 6. Do your teachers think you misbehave too much?

It is encouraging to find that, for all countries and all age levels, less than 30 percent of the students answer "yes" to this question. American students experience their teachers as disapproving of their conduct to a small extent, about 12 percent among upper secondary students. At the lower levels the predictable increase still represents a small fraction. Evidently teacher expectations for students

to conform to an acceptable standard of deportment and successful. Over time an increasingly small percentage of students are perceived as misbehaving. In each country there are roughly equal percentages of "yes" answers between 10 and 14-year-olds, with a substantial drop at the upper secondary level.

Item 7. Do you work hard most of the time?

A common trend among students of all the industrialized countries is that they experience theselves as working less hard as they progress in age. Japanese and Hungarian students consider themselves lazier than English and Americans students do. Swedish and Finnish groups are placed in between these two groups.

Item 8. The teachers always seem to criticize our best ideas.

The outcome of the answers to this question in Finland and Japan is diametrically opposed. American students are closer to the Japanese results. Finnish students experience their teachers as often not appreciating their best ideas. Japanese and, to a lesser extent, American students experience their teachers in a more positive way and only about 20 percent of the 10-year-olds in Japan agree with the statement, versus 55 percent in Finland. The US students experience a small but steady decline in the extent of perceived criticism. We find it difficult to interpret the meaning of this question. Criticism of ideas is an essential ingredient of the educative process assuming that it is done for the purpose of instilling greater capacity to reason

rather than to belittle the student.

Item 9. The students decide for themselves where they will sit in the classroom.

At age 10, only 20 percent of the students in most of the industrialized countries decide where they will sit. In all of the countries, students generally get to decide where they will sit the older they get. England has the most liberal policy in this area, while Hungary and the USA give the students less freedom to choose. About 83 percent of the American students at age 10 get to decide where they will sit while 45 percent of the upper secondary students feel that they have this freedom. This contrasts sharply with Sweden where 90 percent of the older students choose.

Item 10. Most teachers expect us to stand up when they come into the classroom.

In Hungary, it is apparently quite unusual for students to be sitting down when the teacher enters the classroom. In Sweden, it is customary for students at the primary and lower secondary levels to stand up, while this is no longer a requirement at the upper secondary level. There is an element of tradition in this type of student behavior and when viewed from this perspective, the results are predictable. We suppose that few Americans would see cause for concern here. Nevertheless, we must wonder whether or not the American tradition of not honoring teachers in the manner suggested here is also symptomatic of, or even a subtle contributor to, a more general disrespect of classroom

authority, a condition widely believed to exist in this country.

CONCLUSIONS

The IEA Six Subject Survey was a landmark undertaking which has contributed greatly to our knowledge of the factors which influence scholastic achievement. The studies established the many similarities of schools and the extent and nature of their contribution in providing skills and knowledge to society. The studies also showed that across countries and cultures there are many kindred influences that facilitate or inhibit the learning process. The IEA Studies documented that the nature of the academic subject also seems to play a role in determining which particular feature of the student's school experience will prove important in influencing his or her test performance.

Selectivity versus comprehensiveness turns out to be not so much an educational question as a societal one of resource allocation. For the United States, this means that its best students are as accomplished as the best from the select systems. And the moderate achiever has a greater opportunity than in other countries to participate in the educational process at the higher levels.

Turning to the school factors that influence learning we have seen that the content of the curriculum and the time given to a subject are consistently important influences on achievement. It is important to allocate time in the day-to-day or time-table sense according to priorities of the learning components of a subject.

It follows logically, and the studies support the

conclusion, that content is also critical to achievement. The content of the school learning environment requires a decision about the allocation of increasingly scarce resources. We may at least conclude, now with greater confidence, that decisions concerning content are not unimportant relative to home background.

Expectations, often translated into standards the school sets for student behavior in subject mastery and other aspects of personal and student life, were not related statistically to measures of test performance. We have been able to show that significant variations across countries, in a variety of expectations, exist in the IEA project data. We did not find reason to believe that the comprehensive U.S. school system has altered in a downward direction the positive expectations that students hold for themselves. Our students are as eager to do well, attain high marks, go on to higher education and behave in class as are students from similar nations.

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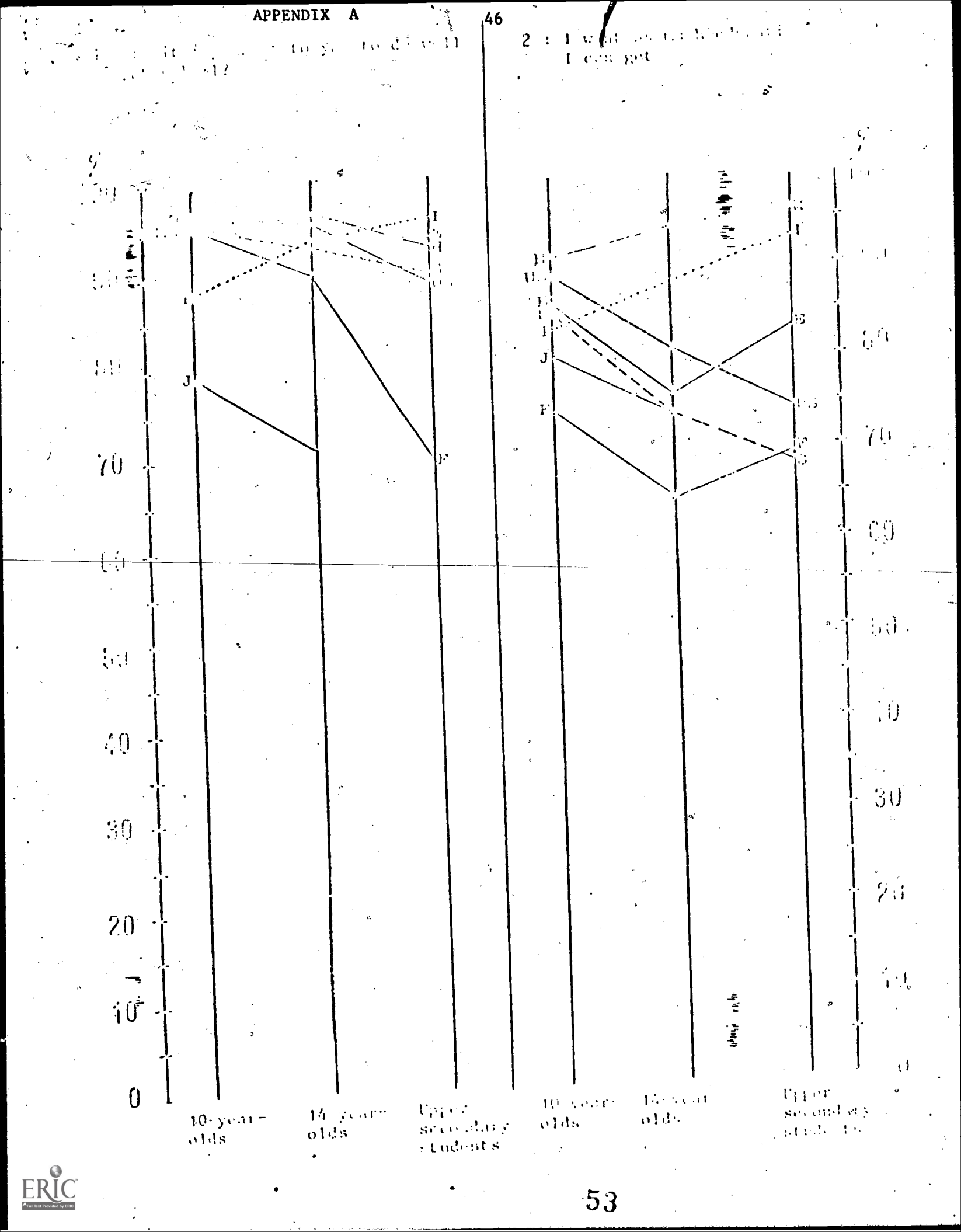
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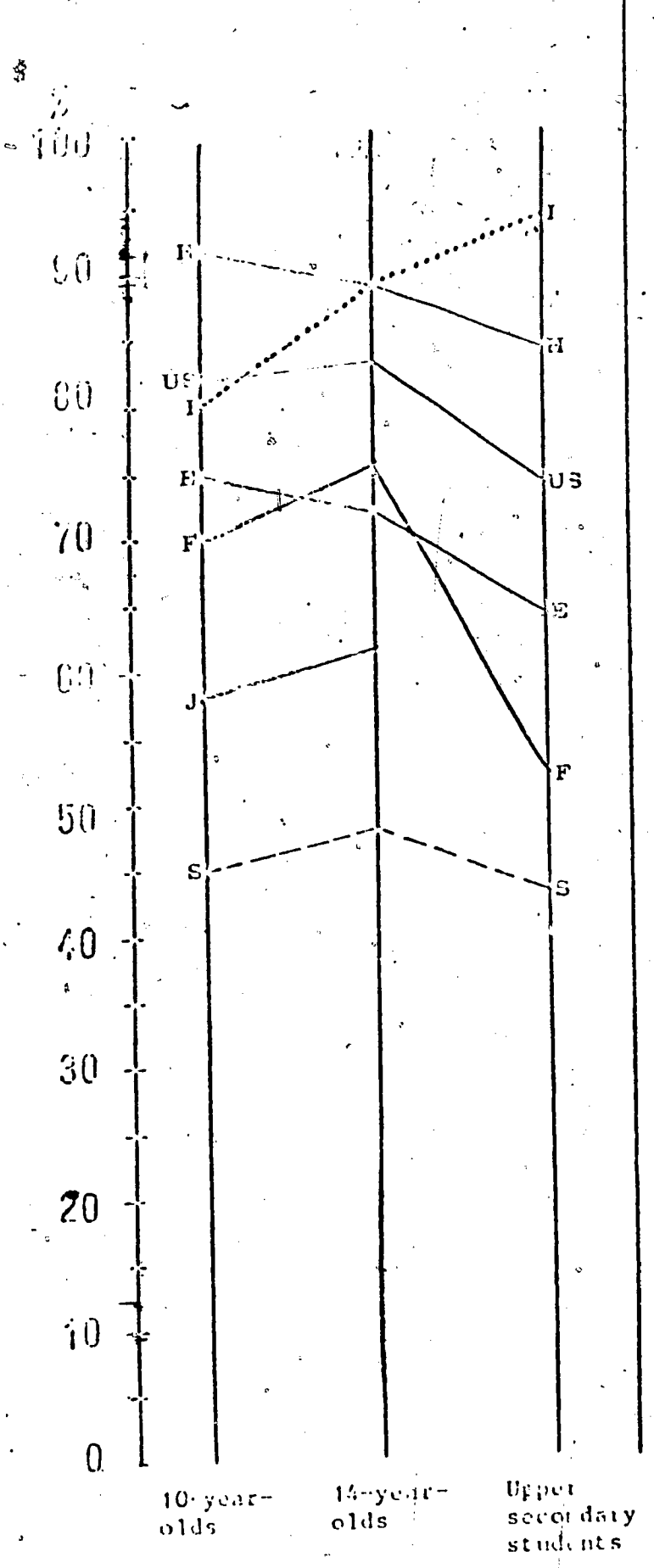

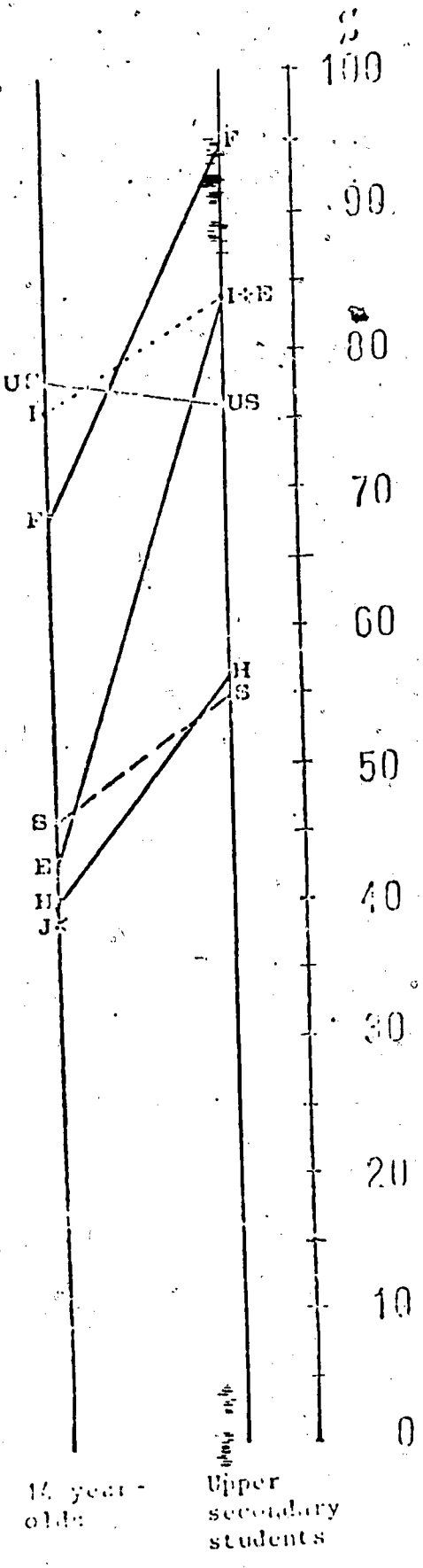

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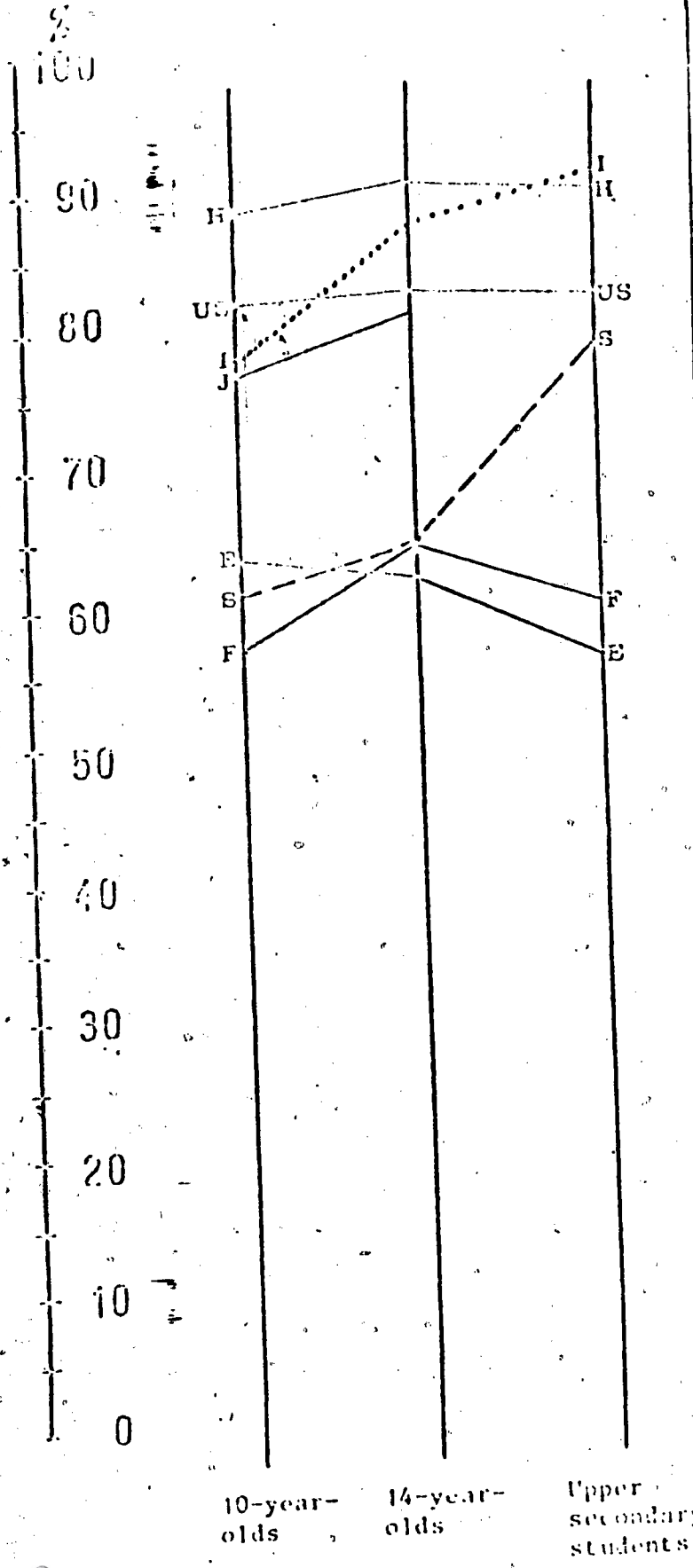

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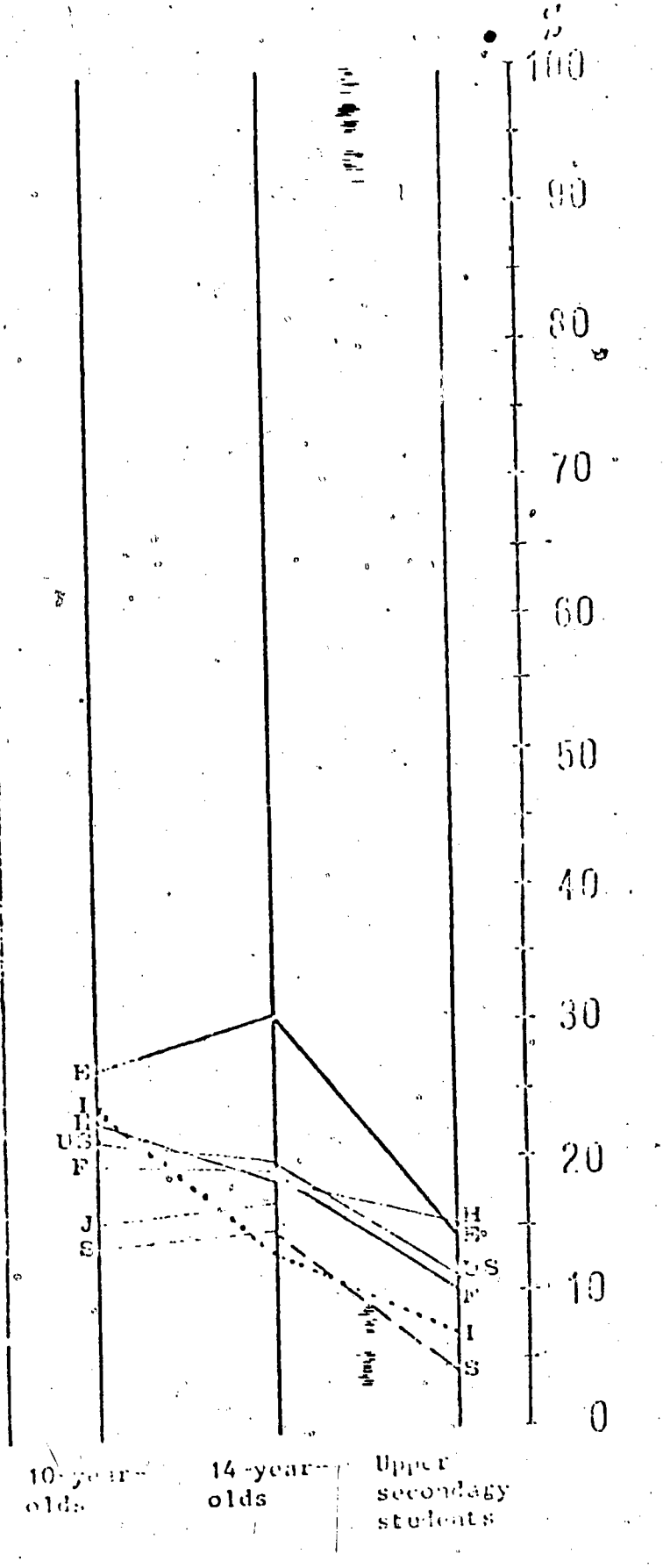

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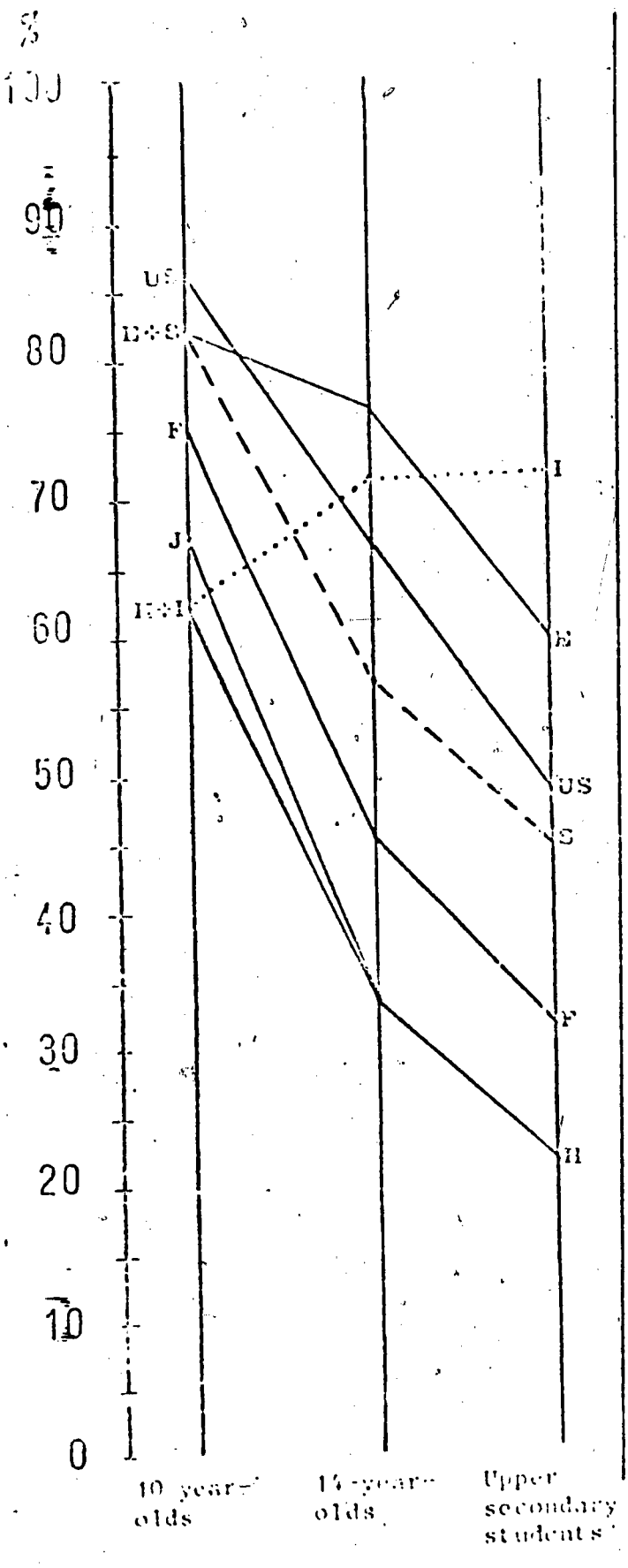
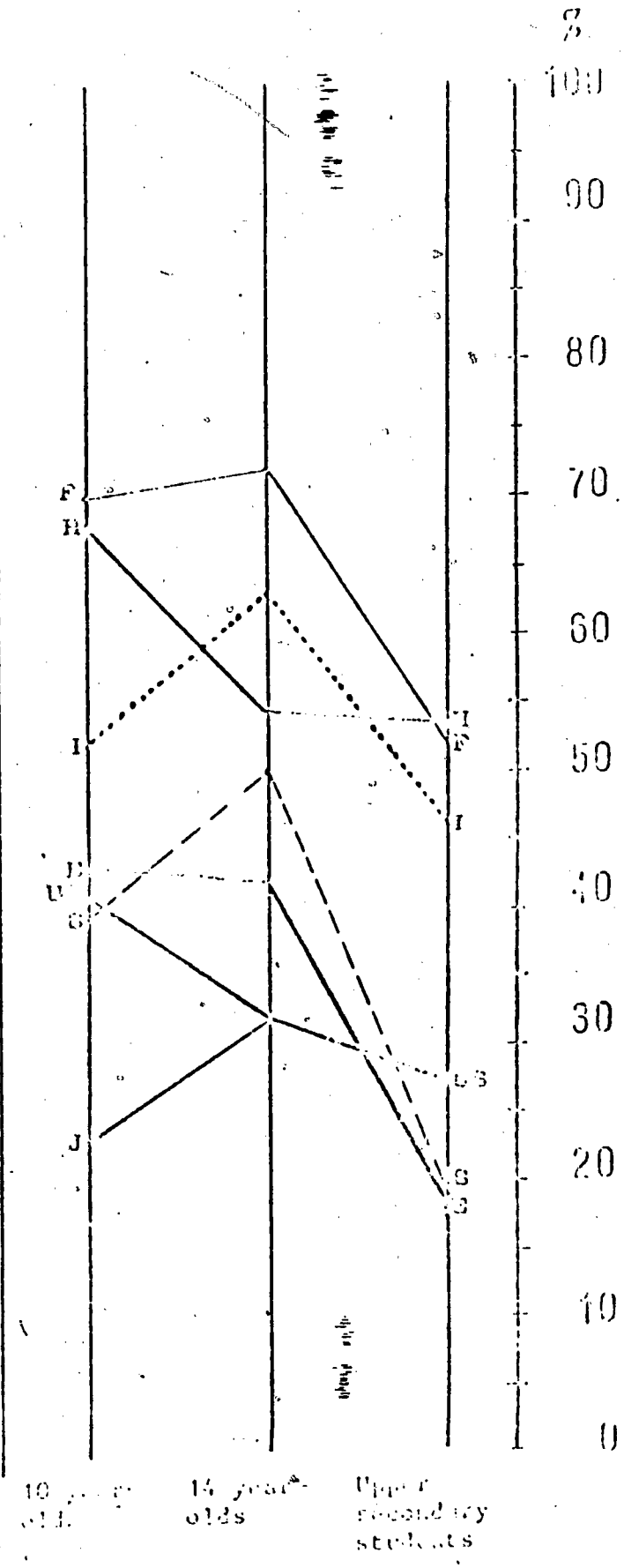
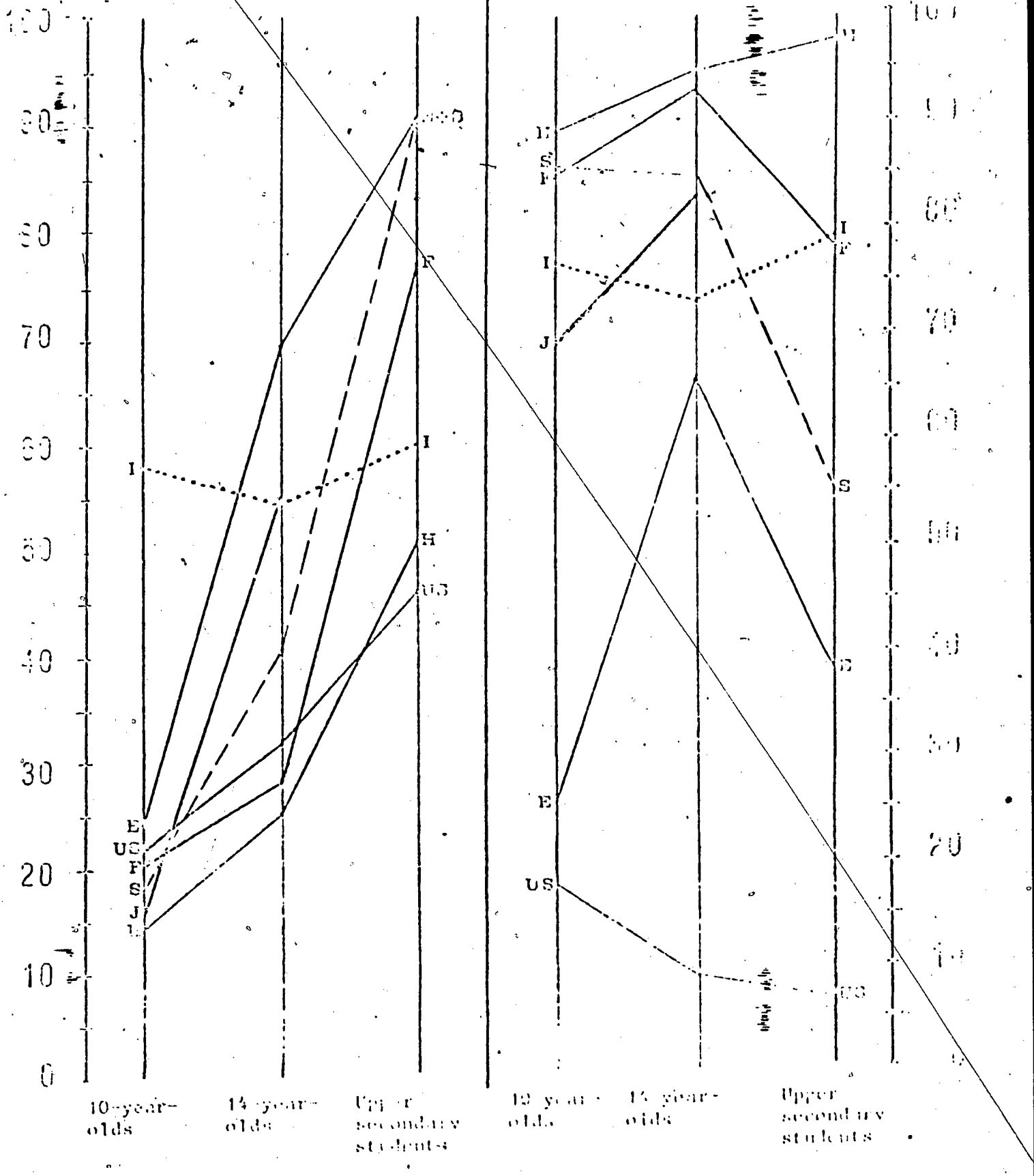
8 : The teachers always [illegible] to criticize our behaviour.





10: Most teachers stand up when they come into the classroom



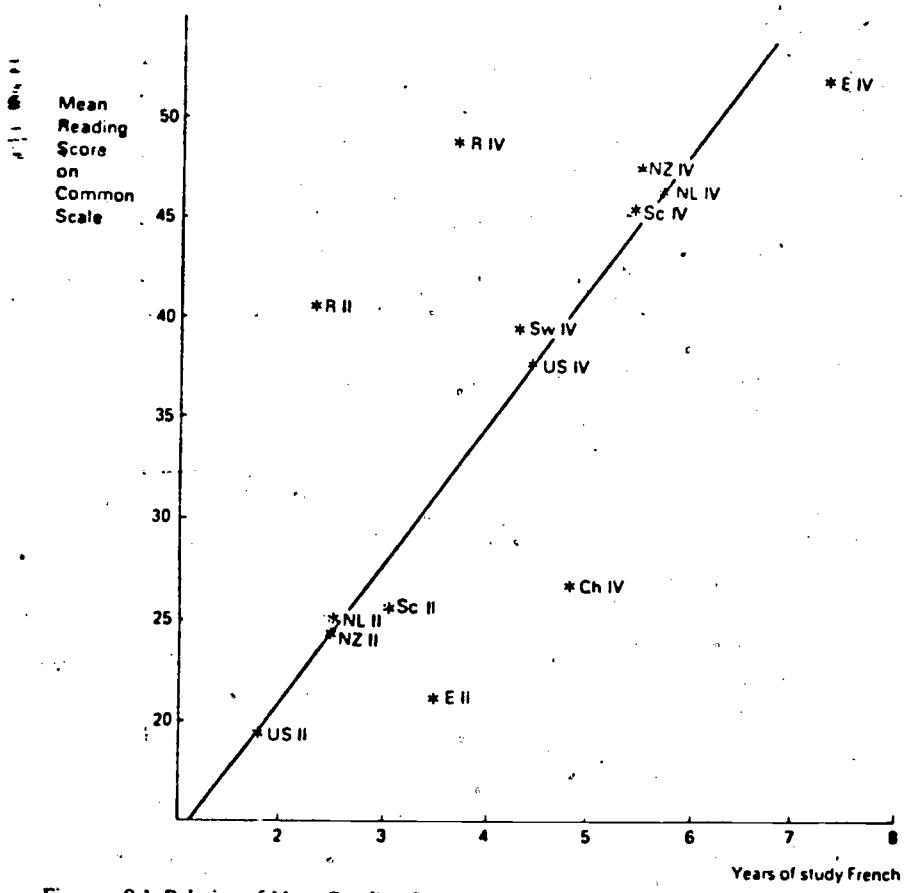


Figure. 9.1. *Relation of Mean Reading Score to Number of Years of French Study, by Country.*