DOCUMENT RESUME

ED 088 941 TM 003 502

AUTHOR Austin, Gilbert R.; Postlethwaite, T. Neville
TITLE Cognitive Results Based on Different Ages of Entry to School: A Comparative Study.
NOTE 23p.

EDRS PRICE MF-$0.75 HC-$1.50
DESCRIPTORS *Academic Achievement; Age Differences; *Comparative Education; *Early Admission; *Early Childhood Education; Elementary Science; *Family Influence; Intervention; Mathematics; Perceptual Motor Learning; Psychoeducational Processes; Reading Achievement
IDENTIFIERS International Evaluation Educational Achievement

ABSTRACT

This review is a secondary analysis of work done by the International Association for the Evaluation of Educational Achievement (IEA). It concerns the subject areas of mathematics, reading comprehension, and science. The main thrust of this analysis was to look for a possible relationship between age of entry into pre-formal school education programs and achievement as measured by these IEA tests at ages 10 and 13. The principal findings suggest that there may be a specificity of effect between early entrance into school and greater achievement in mathematics; this is not true in reading comprehension or science. It is suggested by the authors that gain in achievement based on early education may in fact be due to the sensory motor experiences which are so commonly part of early childhood education programs. It is further suggested that the carefully planned and sequenced curriculum approach to teaching mathematics may have an effect here. The research also examined the commonly held phenomenon of the home background of the child being a very important contributor to his academic success in school. (Author)

Abstract

This review is a secondary analysis of work done by the International Association for the Evaluation of Educational Achievement. It concerns the subject areas of mathematics, reading comprehension, and science. The main thrust of this analysis was to look for a possible relationship between age of entry into pre-formal school education programs and achievement as measured by these IEA tests at ages 10 and 13. The principal findings suggest that there may be a specificity of effect between early entrance into school and greater achievement in mathematics; this is not true in reading comprehension or science. It is suggested by the authors that gain in achievement based on early education may in fact be due to the sensory motor experiences which are so commonly part of early childhood education programs. It is further suggested that the carefully planned and sequenced curriculum approach to teaching mathematics may have an effect here. The research also examined the commonly held phenomenon of the home background of the child being a very important contributor to his academic success in school

COGNITIVE RESULTS BASED ON DIFFERENT AGES OF ENTRY TO SCHOOL: A COMPARATIVE STUDY

Gilbert R. Austin
Organisation for Economic Co-Operation and Development
Paris

and T. Neville Postlethwaite
International Institute for Educational Planning
Paris

Interest in early childhood education has grown rapidly in Europe in the last few years reflecting an increasing demand for equality of educational opportunities, widening opportunities for women and the changing role of the family in society.

This article draws on recent research on early childhood education carried out by the Center for Educational Research and Innovation of the Organisation for Economic Co-operation and Development in Paris and the International Association for the Evaluation of Educational Achievement in Stockholm.

In the last 10 years much has been written about the importance of early childhood education as it concerns building a basis for later school learning. Hunt (1961) and Bloom (1964) are important contributors to this literature. An outgrowth of these authors' writings helped conceive and develop such projects in the United States as "Head Start" and Follow Through" programs. The American efforts have been duplicated in a number of countries such as England, with the Educational Priority Act: the Netherlands, with early compensatory education programs; and the Federal Republic of Germany, with a wide variety of cognitively oriented pre-school programs. Many of these projects, in both North America and Europe, have made the assumption that early entry into school would have a beneficial effect on the children's later school achievement. In a number of national studies in Canada, the United States, Sweden and the Netherlands, the benefits of these early school intervention programs have been very difficult to document, particularly any long-term effects (Ryan (1972), Bissel (1972), Stukat (1971), Kohnstamm (1970) and Halsey (1972)).

Two studies, both done in Britian, strongly argue in support of an earlier entry age. The Plowden Report (1967) consistently found that children who enrolled earlier out-performed later arrivals. Although the argument in the Plowden Report refers to date of birth and age of entry <u>within</u> a year group, those children who are older, and therefore receive more infant schooling, clearly demonstrate a consistently higher school achievement. Davie, Butler and Goldstein (1972) state "children who commence full-time infant schooling before the age of five are, as they approach the transfer to junior school or classes some two years later, more advanced educationally and better adjusted in school than those who commence school after the age of five, irrespective of socio-economic status of their families (page 25)". This is an impressive statement because the children in this study represent the entire population of children born in one week in March 1958 in England, Wales and Scotland, nearly 16,000 in all, and all were tested at age 7.

The effects of age of entry discussed above have been concerned primarily with national populations. The subject, however, has also been studied on an international level by Postlethwaite (1967) using the International Study of Achievement in Mathematics. Postlethwaite examined the mathematics achievement data to determine whether there were any simple relationships between <u>official</u> age of entry to school and mathematics achievement at age 13 (population 1A) and at the modal grade level of 13-year-olds (population 1B).

He divided the countries into three groups based upon official age of entry - 5, 6, and 7. Means were c omputed for the groups and statistical comparisons were made. Postlethwaite concluded "that all the differences are statistically significant and that countries with an entrance age of six produced, on average, higher scores than those where children enter school at 5 or 7 years of age. There is little difference between the two countries with a 5-year entry; a weak majority of countries with a 6-year entry do better than these two, but two countries with a 7-year entry do worse. This suggests that some loss attends delaying entry until 7 years (page 118)".

In the original IEA mathematics study, Postlethwaite undertook an analysis of the scores for the age group (population 1A) by social status groups. He concluded that children from middle and upper social groups (professional and white collar workers) benefit more from early entry into school than do children from lower social groups (farmers and blue collar workers) but also noted that it was difficult to draw final conclusions because of the heterogeneity of the scores within each of the age groups. A similar finding was reported by Ball and Bogatz (1970) in the first year of the Sesame Street evaluation where children of middle class tended to watch the show more often and therefore learned more from it. Where poor children watched for similar amounts of time, this difference did not appear.

Method

Austin (1972), reanalyzing the IEA mathematics data, suggests that if the twelve countries are categorized by moving from the official age of entry to the effective age of entry (effective age of entry being defined as the year in which 75 per cent or more of an age group enter school and indulge in some cognitive pursuits), the results change slightly. He finds that in population 1A, seven out of the first eight ranked countries have an effective age of entry of 5 or less; in population 1B this is true for eight of the first ten ranked countries. This analysis suggests that countries providing education beginning at age 5 or earlier produce higher mean scores on the average than those with the effective age of entry of 6 or 7. The data from both analyses are presented in Table 1, and figures 1 and 2.*

(Insert Table 1 and Figures 1 and 2 about here)

Using a similar method, an analysis was done of work started in 1966 by the International Association for the Evaluation of Educational Achievement, which began surveys in reading comprehension, science, literature, civics education and English and French as foreign languages. In the school year 1970-71, probability samples of 10-year-olds and 14-year-olds were tested in reading comprehension and science. The results for these two subjects have been reported in Comber and Keeves (1973) and Thorndike (1973). The results as they reflect the effects of age of entry are presented in Tables II and III and figures 3 and 4, again making comparisons between official and effective ages of entry.* (It should be noted that developing countries in the IEA study are omitted from Tables II and III and figures 3 and 4). It is clear from

Insert Tables II and III and Figures 3 and 4 about here)

* The regression line and the correlation coefficient were calculated for informational purposes. The authors realize the number of observations is very small.

studying the tables and figures that there is only a slight relationship between age of entry and reading achievement at age 10 or 14 as measured by the IEA tests. The 7-year-old entrants appear to perform better than do the 5 or 6-year-old entrants on the reading comprehension tests. The rank correlation between the reading comprehension test scores of the 10 and 14-year-olds is 0.51. In science, there is even less relationship between age of entry and school achievement.

The findings shown above for mathematics and reading comprehension suggest a modest but divergent relationship between the effect of early school entry and achievement in mathematics or reading comprehension. What is of interest is the divergence in the slope of the lines, particularly in figures 2 and 4. It is unfortunate that international scores in mathematics at age 10 do not yet exist.

Disscussion

How can we account for these apparent differences in mathematics and reading comprehension achievement? Clearly, there are many factors which influence the mean level of performance and the variation from the mean. It is necessary to measure as many as possible of these influences and separate the various discrete and conjoint effects. One possible source of variation is, as we have indicated, age of entry, official or effective. The following hypothesis is advanced in an attempt to explain the apparent difference. Mathematics instruction reflects the effects of early school intervention more than does reading comprehension. This hypothesis is based on the developmental sequence of children as proposed by both Piaget and Montessori, both of whom indicate that sensorimotor learning precedes symbolic or abstract learning. It may be possible that the sensorimotor play activities of pre-school transfer to beginning mathematics skills more easily than they do to the acquisition of reading comprehension skills. Bloom (1964) suggests support for this hypothesis when he identifies the following differences between growth in intelligence and general achievement, including reading comprehension.

Bloom says: "Put in terms of intelligence measures at age 17, from conception to age 4, the individual develops 50% of his mature intelligence, from ages 4 to 8, he develops another 30% and from ages 8 to 17, the remaining 20%." (page 68). And of general achievement, he says, "We may conclude from our results on general achievement, reading comprehension and vocabulary development that by age 9 (grade 3) at least 50% of the general achievement pattern at age 18 (grade 12) has been developed, whereas at least 75% of the pattern has been developed by about age 13 (grade 7)." (page 105).

Unfortunately, Bloom's book does not provide data on the development of mathematical abilities, but is clear that this general area could profit from further research.

It is recognized by the writers that not all the variation reflected in figures 2 and 4 is due to age of entry alone. What then are other possible sources of variation observed?

The quality of the homes from which the children come will also have an influence, although this may vary somewhat from country to country. The curriculum (the extent to which the educational objectives embodied in the materials used in school stretch the children) as well as the amount of homework will be important (cf IEA study). An extended list of other such variables could be given. In examining the mathematics and reading results, one might suggest a specificity of effect between mathematics achievement and/or reading comprehension achievement and the qualitative planning which go into the presentation of the material to the students. Mathematics is generally judged to be a more easily sequenced set of learning experiences than is reading. Additionally, mathematics is more commonly thought to reflect the effects of in-school instruction than does reading comprehension.

The effects of qualitative planning of early childhood education programs have, in recent years, been studied by many people; see Stanley (1972), Pre-school Programmes for the Disadvantaged; and Little and Smith (1971), Strategies of Compensation. These authors plus many others come to the conclusion that to bring about qualitative changes in early childhood education, it is necessary to plan carefully for the attainment of stated goals and objectives and to evaluate the success of their attainment - see Chall (1967), Learning to Read: The Great Debate. The three books mentioned above are based primarily upon research in the United States. Similar findings, however, are reported by Stukat (1971) in Sweden, de Vries (1972) in the Netherlands and Parry and Archer (1972) in England. The study done by Stukat and its conclusions are representative of the others and therefore are presented here. Stukat's study had as its purpose the evaluation of the existing pre-school programs by comparing 130 pre-school children with 130 home-reared children in a number of variables related to pre-school objectives. The evaluation was carried out when the children were in grade 1; they follow up with a more limited number of variables undertaken two years later in grade 3. The results indicated that positive effects appeared in those areas to which special attention was given, i.e. general knowledge, vocabulary, verbal expression, daily life routine, painting, manual constructive tasks, whereas areas with more intangible objectives such as social-emotional adjustment and mental health did not show corresponding effects. Nor did there seem to be any general transfer of achievement in elementary school subjects. Stukat concludes that results seem to suggest that pre-school achieved its most evident effects in areas where some kind of planned teaching takes place.

Most of the authors mentioned above agree with Cazden (1972) who states that careful planning (structuring) seems to benefit the teachers by offering them guides to follow and this structuring subsequently benefits the child.

The results of this review suggest that there may be some interaction between the effects of age of entry, sensorimotoric activities, and qualitative planning on the attainment of instructional objectives in mathematics. This does not seem to be the case with reading comprehension achievement. We therefore conclude that some of the differences in achievement found in the international mathematics and reading comprehension achievement study reflect planning for the different presentations.

Another possible explanation for these differences could be the different degree of emphasis placed on the mastery of these subjects in different countries. In the original analysis reported by the IEA in the mathematics study, they looked at this question of degree of emphasis and concluded that variation in achievement between countries was highly associated with curriculum (what the IEA authors called "opportunity to learn"). The rank correlation between teachers' ratings of opportunity to learn and the mean score for the countries for population 1A is 0.96 and for population 1B it is 0.98. This high correlation is what we would expect and it seems to strengthen the argument that degree of emphasis (opportunity to learn) in school does make a real difference in mathematics achievement.

It is unfortunate that on the reading comprehension study the IEA authors did not collect any information about opportunity to learn so we can present no data on that subject. We do have this correlation for science, though, and it is 0.47, indicating a much weaker relationship between opportunity to learn and achievement in science than was true in the area of mathematics. We would hypothesize, based on this data, that we would likewise find a much lower correlation between reading comprehension and opportunity to learn than we did for mathematics achievement and opportunity to learn. In support of this argument we quote from Davie, Butler and Goldstein (1972), the study to which we referred earlier. They report regional differences in reading but not in mathematics between England and Scotland, favoring the Scottish across all social classes. They attribute these differences to two factors:

(i) the parents of Scottish children read to their children more than the English and they also seem to have a higher regard for reading than English parents;

(ii) the Scottish tend to use a more systematic phonetic approach to teaching reading than teachers in England.

The findings by these authors would be in agreement with Coleman (1967) data in the United States on equality of educational opportunity which states "only a small part of the achievement variation is due to school factors. More variation is associated with the individual's background than with any other measure."

Given the fact that many factors influence school learning and that age of entry is only one of them, one set of analyses which is of interest is that undertaken by IEA in the reading and science study, which consisted of estimating the relative importance of groups of factors associated with the difference between students within countries. Since the analyses were undertaken in sixteen countries, one can examine to what extent the same groups of variables are important in predicting the variance in each country in turn. One group of factors constitutes the home background of the students and the sex and age of the students; a second, the type of school or program in which the student is enrolled; a third, the school organization and teacher training and behavior variables; a fourth, variables concerned with the leisure time activities of the student; and a fifth, a word knowledge test. The fifth block was entered into the regression as a surrogate for intelligence, teaching quality, character of the student and the many other variables not measured.

The blocks of variables were entered into the equation in this order, thus maximizing the variance accounted for by the first block. Table IV presents the incremental variance as each block is entered into the regression analysis. The last entry in each row presents the total variance accounted for. It is clear that the home variables account for most variance and more than the school variables, and yet the school variables predict for as much as 3 -20 per cent of the total variance accounted for. This is not surprising since, in general, bad schools are now allowed to exist whereas there is little, if no, control on the quality of parents.

It is through such studies as these that the more important variables influencing school achievement can be identified. However, age of entry varies more between than within nations and, given only nineteen countries, it is difficult to draw conclusions about either the official or effective age of entry without taking into consideration many other variables.

Insert Table IV about here

The IEA data on official age of entry to school and performance in various subject areas at either 13 or 10 years of age have been re-analyzed by transforming the official age of entry into an effective age of entry (defined as the year in which 75 per cent or more of an age group enter school and indulge in some cognitive pursuits.)

In mathematics, earlier effective age of entry results in higher performance in mathematics at age 13. In science there is little difference in performance at age 10, whereas in reading at age 10 and 14, later entry is associated with higher performance. The divergence between mathematics and reading is striking and provides much food for thought and further investigation.

Although it might be argued that selected cognitive performance five or eight years later is an unfair criterion, the authors have suggested some possible reasons for the differences in findings between mathematics and reading. It is important to consider many of the other factors influencing performance as well as official or effective age of entry in order to disentangle the separate effect of age of entry. In practice this is difficult to do since it is difficult to have different ages of entry in a single country. It would seem on the evidence presented here that it is not age of entry alone which plays a part but also what happens within the school, especially with children from poor homes. It is in this area that carefully contrived experimental situations can yield data which will help in identifying critical variables and their manipulation resulting in better performance.

References

Austin, G. "Early Childhood Education in Eight Countries". OECD, 1973.

Austin, G. "International Comparative Study of School-Related Achievement as It Reflects Effects of Early Childhood Education". OECD, 1973.

Ball, S. & Bogatz, G. The First Year of Sesame Street: An Evaluation. Educational Testing Service, Princeton, New Jersey, October, 1970.

Ball, S. & Bogatz, G. The Second Year of Sesame Street: A Continuing Evaluation. Vol. I & II. Educational Testing Service, Princeton, New Jersey, November, 1971.

Bissell, J. "Planned Variation in Head Start and Follow Through". U.S. Department of Health, Education and Welfare, January, 1972. (Mimeographed)

Bloom, B. Stability and Change in Human Characteristics. New York, N. Y.: John Wiley and Sons, Inc., 1964.

Cazden, C. "Evaluation of Learning in Early Language Development". Formative and Summative Evaluation of Student Learning. New York: McGraw Hill, 1971.

Chall, J. Learning to Read: The Great Debate. New York: McGraw-Hill Book Company, 1967.

Davie, R., Butler, N. & Goldstein, H. From Birth to Seven: A Report of the National Child Development Study. London: William Clowes & Sons, Ltd. 1972.

Halsey, A. Educational Priority: E.P.A. problems and policies, Vol I. Her Majesty's Stationery Office, October, 1972.

Hunt, J. Intelligence and Experience. New York, N.Y.: Ronald Press Co., 1961.

Husen, T. et al International Project for the Evaluation of Educational Achievement. Phase I: International Study of Achievement in Mathematics: A Comparison of Twelve Countries. Vol. I and II. Almqvist and Wiksell, Stockholm and John Wiley & Sons, Inc., New York, 1967.

Keeves, J. & Comber, L. Science Education in Nineteen Countries: An Empirical Study. International Studies in Evaluation. Almqvist & Wiksell, Stockholm and Halsted Press, New York, 1973-1974.

Kohnstamm, G. Project Compensation Programme, Department of Education, University of Utrecht, December 12, 1968.

Little, A. & Smith, G. Strategies of Compensation: A Review of Educational Projects for the Disadvantaged in the United States. Paris: Organisation for Economic Co-operation and Development. 1971.

Parry, E. & Archer, H. The Significance of Recent Research in Early Childhood Education in the United Kingdom. OMEP, World Council Seminar, September, 1972.

Plowden Children and Their Primary Schools (The Plowden Report) Central Advisory Council for Education. H.M.S.O. 1967 Vol. I and II.

Postlethwaite, N. School Organization and Student Achievement: A Study Based on Achievement in Mathematics in Twelve Countries. Stockholm: Almqvist & Wiksell, 1967.

Ryan, T. Poverty and Early Education in Canada. Carleton University, 1971.

Stanley, J. Preschool Programs for the Disadvantaged: Five Experimental Approaches to Early Childhood Education. Baltimore: Johns Hopkins University Press. 1972.

Stukat, K. Lekskolans Inverkan på Barns Utveckling, Almqvist & Wiksell, Stockholm, 1966.

Stukat, K. Förskolan och Skolstarten, Gothenburg, 1971. (Mimeographed).

Thorndike, R. Reading Comprehension Education in Fifteen Countries: An Empirical Study. International Studies in Evaluation. Almqvist & Wiksell, Stockholm, and Halsted Press, New York, 1973. 1974.

de Vries, A. The Utrecht Language and Thought Programme, S.V.O. Project 083, Dept. of Ped. Studies, State University of Utrecht.

Table I

Official and Effective Age of Entry, Mean Scores,

And Standard Deviations in Mathematics

Age 13

			Population 1A		Population 1B	
	OAE	EAE	Mean	S.D.	Mean	S.D.
Australia	6 years	5 years	20.2	14.0	18.9	12.3
Belgium	6	3	27.7	15.0	30.4	13.7
England	5	5	19.3	17.0	23.8	18.5
Finland	7	7	15.4	10.8	16.1	11.6
France	6	4	18.3	12.4	21.0	13.2
Germany (FR)	6	6			25.5	11.7
Israel	6	4			32.2	14.7
Japan	6	6	31.2	16.9	31.2	16.9
Netherlands	6	4	23.9	15.9	21.4	12.1
Scotland	5	5	19.1	14.6	22.3	15.7
Sweden	7	7	15.7	10.8	15.3	10.8
United States	6	5	16.2	13.3	17.8	13.3

OAE = official age of entry

EAE = effective age of entry

BEST COPY AVAILABLE

Table II

Official and Effective Age of Entry, Mean Scores,

Standard Deviations in Reading Comprehension and Science

Age 10

			Reading Comprehension		Science	
	OAE	EAE	Mean	S.D.	Mean	S.D.
Belgium (FL)	6	3	17.5	9.2	17.9	7.2
Belgium (FR)	6	3	17.9	9.3	13.9	7.1
England	5	5	18.5	11.6	15.7	8.5
Finland	7	7	19.4	10.8	17.5	8.2
Germany (FR)	6	6	-	-	14.9	7.4
Hungary	6	5	14.0	9.8	16.7	8.0
Israel	6	4	13.9	11.0	-	-
Italy	6	5	21.6	9.6	17.5	9.1
Japan	6	6	-	-	21.7	7.6
Netherlands	6	4	17.7	9.5	15.3	7.6
Scotland	5	5	18.4	11.1	14.0	8.3
Sweden	7	7	21.5	10.5	18.3	7.3
United States	6	5	16.8	11.6	17.7	9.3

OAE = official age of entry

EAE = effective age of entry

Table III

Official and Effective Age of Entry, Mean Scores,

Standard Deviations in Reading Comprehension

Age 14

			Reading Comprehension	
	OAE	EAE	Mean	S.D.
Belgium (FL)	6	3	24.6	9.6
Belgium (FR)	6	3	27.2	8.7
England	5	5	25.3	11.9
Finland	7	7	27.1	10.9
Germany(FR)	6	6		
Hungary	6	5	25.5	9.8
Israel	6	4	22.6	12.8
Italy	6	5	24.0	9.2
Japan	6	6		
Netherlands	6	4	25.2	10.1
Scotland	5	5	27.0	11.5
Sweden	7	7	25.6	10.8
United States	6	5	27.3	11.6

OAE = official age of entry

EAE = effective age of entry

Table IV

Reading Comprehension

Between Students Blocks

	1	2	3	4	5	Total
Belgium (FL)	1.7	0.0	11.4	9.2	32.7	55.0
Belgium (FR)	16.7	1.1	18.4	2.7	19.0	57.9
Chile	1.4	1.1	8.3	11.4	26.8	49.0
England	22.1	0.4	1.5	7.4	37.4	68.8
Finland	17.7	0.0	2.8	7.3	33.0	60.8
Hungary	18.7	0.4	3.8	5.6	26.5	55.0
India	1.6	0.4	14.9	13.9	21.0	51.8
Iran	8.7	9.1	7.2	5.3	17.1	47.4
Israel	25.4	1.9	3.7	5.7	17.3	54.0
Italy	9.6	0.2	4.5	3.8	37.5	55.6
Netherlands	11.1	1.6	4.0	9.7	33.5	59.9
Scotland	23.7	0.3	2.3	7.9	32.3	66.5
Sweden	11.4	0.3	2.9	3.7	38.4	56.7
United States	19.8	1.0	3.9	6.2	37.3	68.2

1 = home background, sex, age 2 = school program
3 = school organization and teacher training
4 = student leisure time activ. 5 = word knowledge

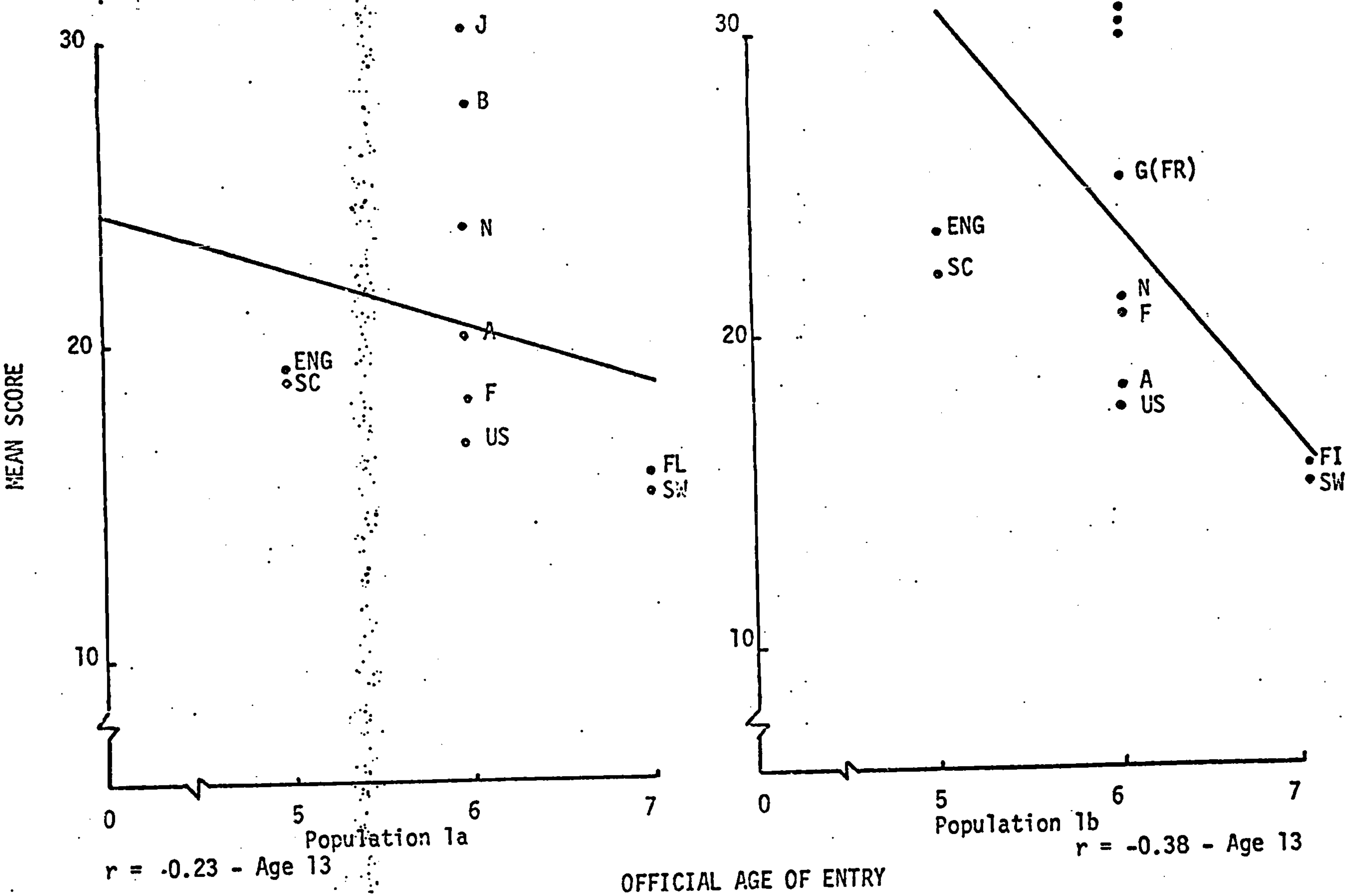
Science

Between Students Blocks

	1	2	3	4	5	Total
Belgium (FL)	4.4	1.5	7.7	7.7	30.0	51.3
Belgium (FR)	11.9	0.4	20.6	3.2	20.3	56.4
Chile	4.2	0.3	8.5	12.5	20.4	45.9
England	21.2	0.4	3.0	7.0	35.2	66.8
Finland	14.4	0.2	4.3	6.8	34.9	60.6
Germany (FR)	7.7	1.9	9.6	4.3	17.3	40.8
Hungary	7.5	0.1	7.4	4.9	27.7	47.6
India	1.3	0.1	19.8	8.1	26.0	55.3
Iran	6.5	14.3	6.0	5.0	14.7	46.5
Italy	4.3	0.0	3.5	5.8	38.5	52.1
Japan	16.6	0.2	1.2	3.7	0.0	21.7
Netherlands	16.3	1.2	6.7	4.3	30.1	58.6
Scotland	22.0	1.1	5.4	7.5	31.1	67.1
Sweden	15.5	0.1	4.8	3.5	35.4	59.3
Thailand	-	-	-	-	-	-
United States	17.6	0.9	8.8	7.1	33.8	68.2

Figure 1

MATHEMATICS



BEST COPY AVAILABLE

Figure 2

MATHEMATICS

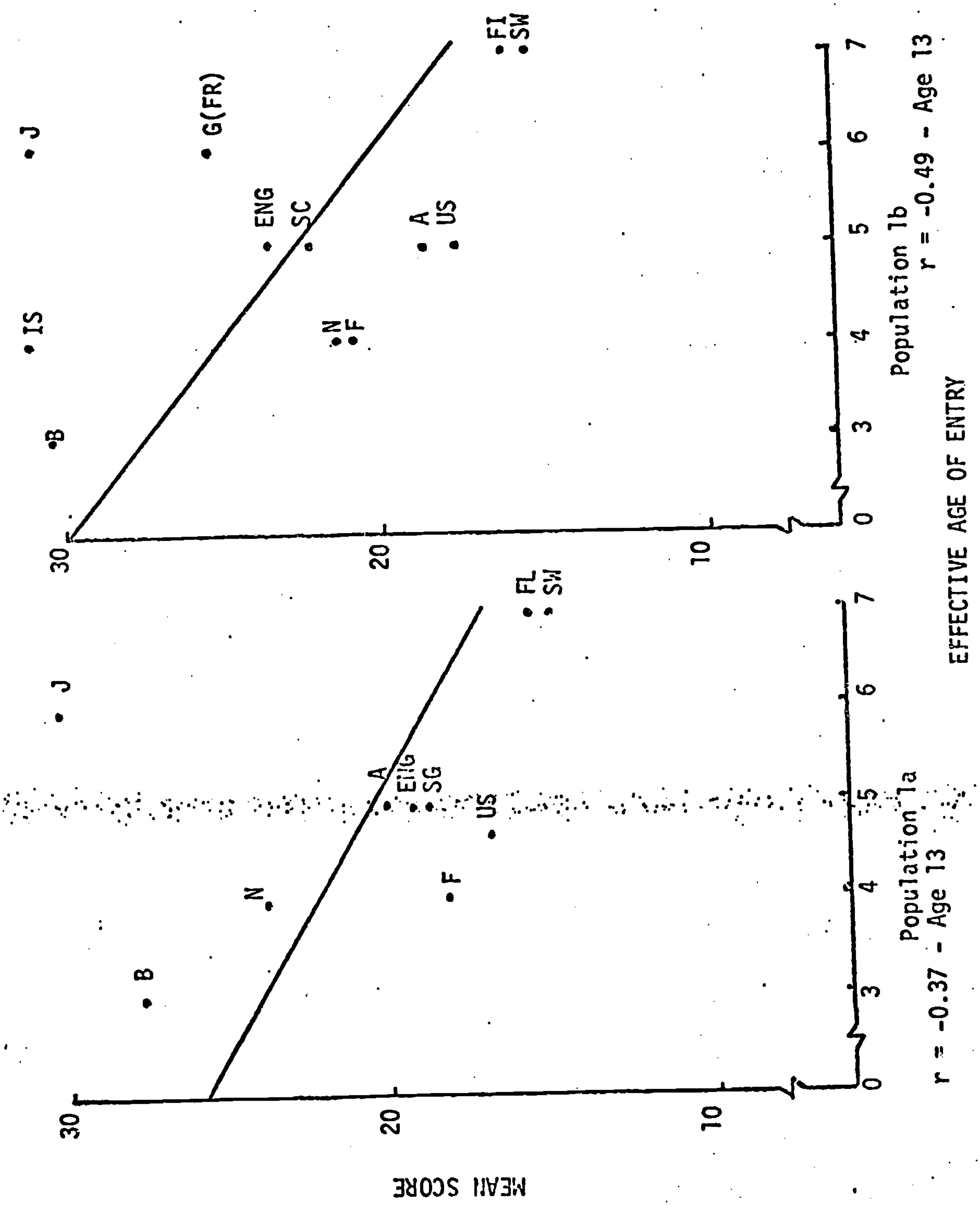
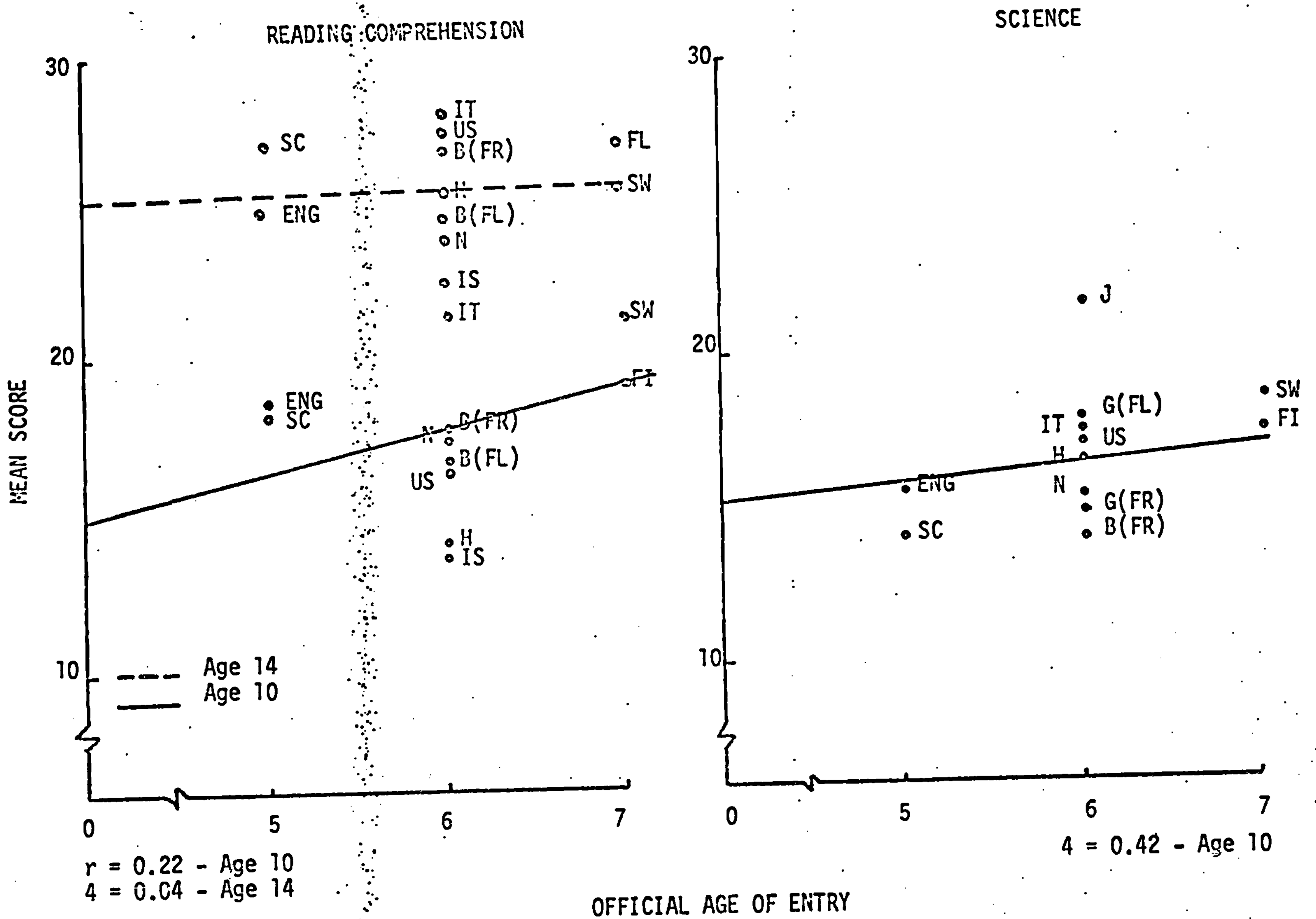


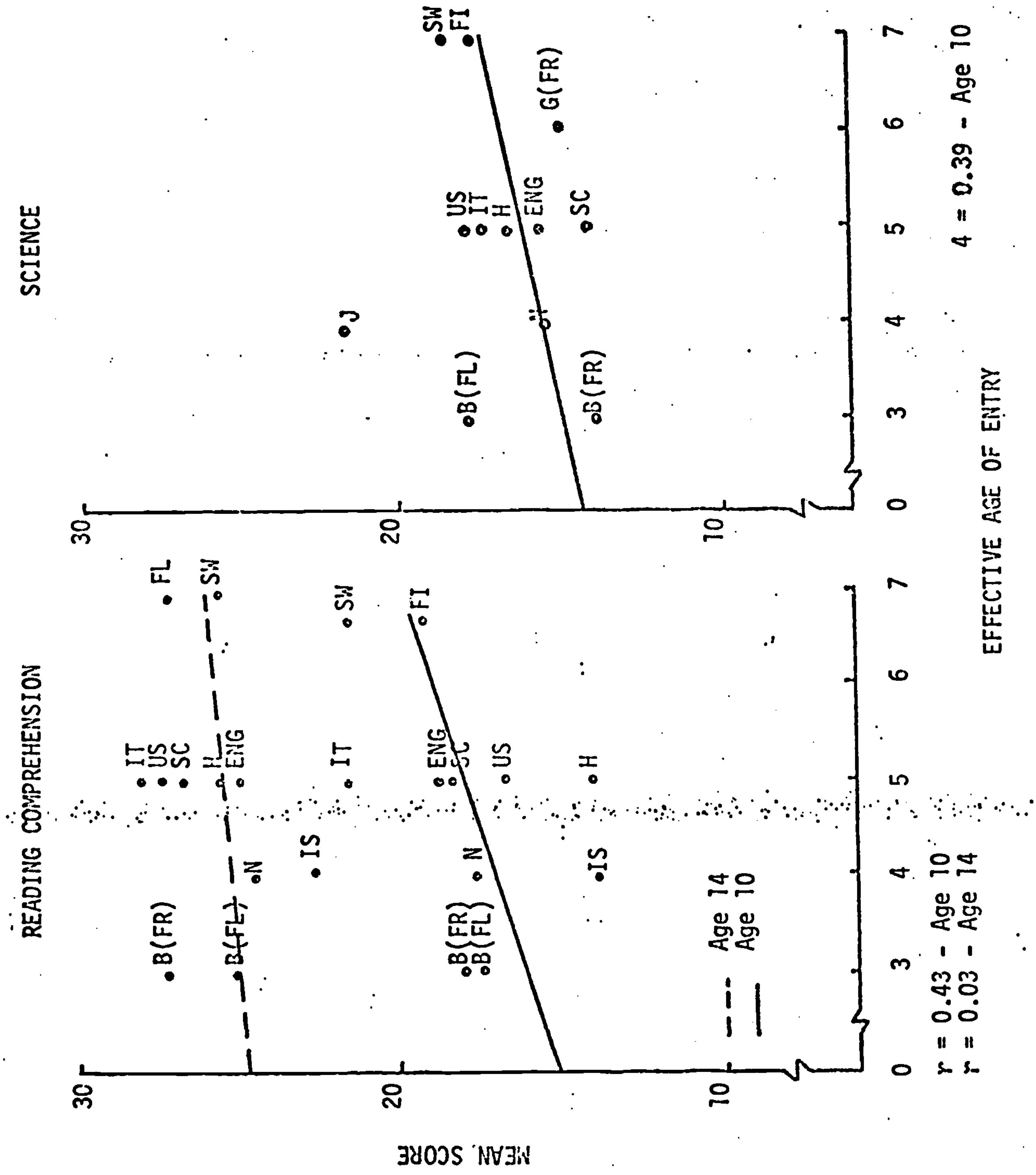
Figure 3



r = 0.22 - Age 10
4 = 0.04 - Age 14

4 = 0.42 - Age 10

Figure 4


READING COMPREHENSION
SCIENCE
MEAN SCORE
EFFECTIVE AGE OF ENTRY
Age 14
Age 10
r = 0.43 - Age 10
r = 0.03 - Age 14
r = 0.39 - Age 10