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ABSTRACT

Patterns of sex and socioeconomic differences in aptitude and achievement were compared among eight countries. A universal pattern appeared in which higher status children scored better than lower status children in aptitude, achievement, and school grades. Peer reputation largely ran the same way, with mild exceptions. The social differences in aptitude are generally less than the differences in achievement, although some countries appear to be approaching effective equality of educational opportunity. No notable systematic sex differences in performance were observed. Where differences appeared, cultural differences seem to be responsible. To the extent that school achievement is itself an important aspect of coping behavior, the socioeconomic bias evident to some degree in all countries constitutes something of a deterrent to the optimal development of working-class youth. However, this prejudice is not so complete a deterrent to equality of learning as it potentially could be. Finally, assumptions about the invariant nature and the comparability of the "same" measures in different cultures need to be critically scrutinized. The "same" measures either are not functionally the same, often, or their results are significantly altered by other influences which may be peculiar to particular societies. (Author/GS)

# A CROSS-NATIONAL COMPARISON OF SEX AND SOCIO-ECONOMIC DIFFERENCES IN APTITUDE AND ACHIEVEMENT

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A CROSS-NATIONAL COMPARISON OF SEX AND SOCIO-ECONOMIC DIFFERENCES IN APTITUDE AND ACHIEVEMENT

Abstract

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Patterns of sex and socio-economic differences in aptitude and achievement were compared among eight of the countries in the Cross-National Study of Coping Styles and Achievement. Instruments included the Raven, several standardized achievement tests in reading and mathematics, teacher-assigned grade average, and peer ratings on work habits and relations with teachers. A four-way analysis of variance was performed to determine age, sex, class and country effects.

There was a universal pattern, in the seven countries studied, by which higher status children scored better than lower status children in both aptitude and achievement. School grades followed the same pattern. Peer reputation largely ran the same way, with mild exceptions in Brazil and Mexico; probably because of differential school retention rates in the former case.

Schools in all countries, it appears, have a common problem in capturing the interest, the sustained effort and therefore the performance of skilled working class children. The social differences in aptitude, except in Sao Paulo and Chicago, are less than the differences in achievement. One or two countries appear to be approaching effective equality of educational opportunity, judging by their products; but most of the countries have an appreciable discrepancy to make up.

The notable lack of systematic sex differences in performance clearly seems to rule out any inherent intellectual superiority of either sex. Where differences appear, culture seems to create the difference.

There is a widespread tendency for teachers, and even age-mates, to approve more of girls. This may be a "man's world," at large, but in school boys have to work harder and learn more to get the same grades as girls, everywhere except in England.

To the extent that school achievement is itself a very important aspect of coping behavior, the socio-economic bias evident to some degree in all countries constitutes something of a deterrent to the optimal development of working-class youth. This bias, in most places, operates more strongly in the value judgments both teachers and children make than in the actual performance of the children from different social levels. It might be said that this prejudice is not as complete a deterrent to equality of learning as it potentially could be.

Finally, assumptions about the invariant nature and the comparability of the "same" measures in different cultures need to be critically scrutinized. The "same" measures either are not functionally the same, often, or their results are significantly altered by other influences which may be peculiar to particular societies.

# A CROSS-NATIONAL COMPARISON OF SEX AND SOCIO-ECONOMIC DIFFERENCES IN APTITUDE AND ACHIEVEMENT

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(This is one small part of the Cross-National Study of Coping Styles and Achievement.)

## Purpose

(1) Examine patterns of sex differences and socio-economic differences in aptitude and school achievement in several, diverse modern cultures;

(2) consider possible reasons for the national differences;

(3) consider the implications for a "universal" theory of intellectual development of both the differences and the absence of differences of certain kinds.

## Sample

Stratified samples of eight hundred urban school children were drawn from each of six countries (Brazil, England, Italy, Japan, Mexico and Yugoslavia) and in two parts of the U.S.A. (the Chicago metropolitan area and Austin, Texas). Boys and girls, age ten and fourteen, were drawn from the upper-lower and upper-middle socio-economic levels, with one hundred in each of the eight sub-cells of the sample. The total sample numbered 6,400.

## Instruments

### Aptitude

The Raven Progressive Matrices was given to most samples as an estimate of intellectual aptitude. The CTMM was used with some Austin subjects, and half of the Chicago subjects, and the Kuhlmann-Anderson Test with the rest of the Chicago sample. In these cases, conversion tables were used to convert to equivalent Raven scores. In all stations, the scores were standardized within age to a mean of 50, with a standard deviation of 10.

Standardized Achievement Tests

Appropriate standardized tests of mathematical achievement and of reading achievement were given to each age group in each country. The tests varied from country to country, but each sample's scores were standardized within age group, to a mean of 50, S. D. of 10. To cite some examples, the Metropolitan Achievement Test, Form A, Intermediate, Test 1: Arithmetic Computation, was given to 10-year-olds; and the UNESCO-IEA Math Test, Parts I, II, III and Problem 1 of Part IV, was given to 14-year-olds, in all places except Sao Paulo, Chicago and Tokyo. Brazil used the elementary form of the Metropolitan with 10-year-olds. Chicago used scores already available from the California Achievement Test (1957 edition) in one place, and grade-equivalent scores on the C.A.T. and Metropolitan Test in the other place sampled (standardizing all such scores within age group). Japan used tests developed by the Japanese Ministry of Education.

The Inter-American Test of Reading was given in most places, with exceptions similar to those for mathematics.

Grade Point Average

This was the average in either four or five "core" school subjects in each research station, as that country defined its "core" curriculum. The subjects could include native language (sometimes sub-divided into separate competencies), social studies, science, mathematics and a foreign language. The grades on these subjects were averaged, then standardized within age group, for each station.

Behavior Rating Scales

Students were asked to rate 25% of their own class' members positively and 25% negatively, on seven kinds of behavior. Of interest, here, are Items #1, "Who work hardest at their lessons," #2, "Who work hardest at outside activities," and #3, "Who get along best with teachers and other grownups." Each subject

received a score derived from an average of all ratings assigned to him by his classmates (with various appropriate corrections). This score could range from 0 for wholly negative ratings to 2 for wholly positive ratings.

Method of Analysis

A four-way analysis of variance was performed, using country, age, social status and sex as the independent variables. As had been anticipated at the outset, direct comparisons of countries were not sensible or desirable, since the point of the central study was to discover how children's coping styles relate to achievement in each country, separately, using the achievement measures most appropriate for that country. The diversity of instruments among some stations further ruled out such direct comparisons, as did the very nature of the school-class-limited nature of the behavior rating system.

Similarly, the necessity to standardize measures separately for each age group ruled out direct age-comparisons.

Nonetheless, it is possible and meaningful to compare the different patterns of the country-by-sex and country-by-socio-economic-status interaction effects, among the different countries. Table 1 presents the data on the socio-economic differences within the national samples. Table 2 similarly presents the data on sex differences within the national samples.

## FINDINGS

### Socio-Economic Differences in Aptitude and Achievement

There is a systematic, universal pattern (within the obvious limits of this study's samples). In all places studied, the upper-middle class children exceed the skilled working-class children on all three objective measures. Their aptitude scores are least far apart in Ljubljana, next closest in Milan. They are farthest apart (over one standard deviation) in the Chicago area, and

next most different in Mexico City. In math-achievement, Sao Paulo shows the smallest difference, followed by Ljubljana; Mexico City has the largest difference, followed by Austin. In reading achievement, the social differences are least in Milan, Ljubljana and Sao Paulo; greatest in Mexico City and Austin. Interestingly, despite the marked aptitude difference in the Chicago sample, the actual achievement of the two social levels is much closer, there.

In countries with similar patterns, however, there appear to be different factors at work to produce these patterns. For example, in Ljubljana, most children of skilled workers are still in school at fourteen; and the same is true in Milan. Thus, the relatively small social differences in achievement may indicate that these educational systems tend to give genuinely more equal opportunity and produce more equal results than do the schools of Austin, Texas, or those of Mexico City. The small social difference in Sao Paulo, on the other hand, is undoubtedly affected by the great social difference in retention rate. By fourteen years, Brazilian statistics show, all but five or ten percent of working-class children have left school. Consequently, those who make up the fourteen-year-old sample there are the "cream of the crop," have higher aptitude and may have stronger motivation to achieve than the average of their upper-middle class schoolmates. (This example illustrates only one of the many factors which inherently complicate all cross-cultural comparisons.)

Nonetheless, in <u>all</u> countries, upper-middle class children, whether at 10 or 14, score significantly higher on both aptitude and achievement tests than do the children from the skilled working level. The lower of these two groups does <u>not</u> include any of the children who are called "disadvantaged" or the "children of poverty," yet the difference is great enough to tend to perpetuate the socio-economic distinctions in this next generation.

(It is not within the scope of this paper to report, but other data in the larger study strongly suggest that these performance differences are linked to kinds of attitudes and motivation that are socially learned, not "inborn.")

This same social difference is also universally present in teacher-assigned grade point average. There are two fascinating deviations, however. In Ljubljana, the social difference in teacher-assigned grades is substantially greater than the difference in objectively tested performance. In Mexico City, on the other hand, teachers assign much more similar grades to the two social groups, despite the marked differences in their objectively tested performance. To be sure, all such comparisons are greatly complicated by the fact that in the elementary schools, at least, the children of the two social groups often tend to be in different schools, so that they are graded by two different sets of teachers. This social homogeneity, however, is far less, in fact, than any of the investigators had anticipated at the outset of the study. (This made it much more expensive to get usable subjects, since most schools were much more heterogeneous, socially, than was expected. Since whole classes usually had to be tested, data were collected on approximately 20,000 children before the 6,400 were obtained who fitted the sampling criteria.)

This same discrepancy between test-performance and peer evaluations is also evident in the Peer Behavior Ratings. In two countries, Mexico and Brazil, the lower-status children actually get slightly higher scores than the higher-status children, even though their objective performance is lower. In Ljubljana, however, just like their teachers, the children rate the two social groups relatively farther apart, by comparison with the other countries, than the objective performance of the two social groups puts them. On the whole, except in Milan to some degree, the children tend to agree quite closely with

their teachers in their appraisal of the two social groups, even where this does not match the two groups' relative mastery of subject-matter.

It seems likely that factors of cooperativeness, social character and personal likability operate to influence both teachers and age-mates in their judgment of the academic application and effectiveness of students. And the standards of teachers and children are more similar than is sometimes assumed.

Sex Differences in Aptitude and Achievement

Very unlike the systematic social difference, and quite contrary to many reports and assumptions based on earlier studies of American children, there are no systematic sex differences on the objective tests of aptitude and achievement. In Sao Paulo, Mexico City and Chicago, the boys even out-perform the girls on both aptitude tests and reading tests. The boys also read better in Ljubljana. In math, there are no significant sex differences anywhere, except in Sao Paulo. Judging by these data, the assumption that girls will do better than boys because they are developmentally advanced, or more conforming to adult demands, or for any other reason, simply does not hold up.

This statement does not apply, however, to the way teachers grade students. Except in London and Mexico City, where teachers grade boys higher than girls, girls are generally favored in the grading process. This is enough to put them significantly above boys for all samples, even when the English and Mexican samples show an opposite sex difference. This preference exceeds the sex differences in actual performance most markedly in Sao Paulo and Chicago, where teachers' grades actually reverse the sex difference in objective test performance; and in Austin, where the grade difference is considerably greater than the tested differences. In Mexico City, teachers give barely better grades to boys although the boys significantly excel the girls in test performance.

In London, however, the reverse happens. Boys get somewhat higher grades than girls even though they do slightly less well on the performance tests.

In short, while there is a positive correlation between teacher grades and test performance, where pupil sex is at issue they clearly do not measure the same thing, especially in some cultures. Except in England, and slightly in Mexico, teachers definitely favor girls. But even Mexico, land of the heroic male ideal, has to take second place to England as the land where teachers (more of them male, possibly?) prefer male students.

The children, themselves, show a significant but not notable preference for girls everywhere except in Mexico City; and, in the matter of non-academic work, in Chicago. Everywhere else, girls impress their classmates as harder working and better at getting along with adults than are boys. Since this near-universal superior respect for girls as workers does not correspond to any systematic differences in actual academic mastery, it appears that, in most of these countries, girls get better reputations for achievement than they earn, perhaps by halo effects from a more agreeable, less aggressive mode of interpersonal conduct. (Women's Lib. take note: if girls were treated more fairly and equally, they might get lower grades in school -- except in England.)

## CONCLUSIONS AND IMPLICATIONS

There is a universal pattern, in the seven countries studied, by which higher status children score better than lower status children in both aptitude and achievement. School grades follow the same pattern. Peer reputation largely runs the same way, with mild exceptions in Brazil and Mexico; probably because of differential school retention rates in the former case.

Schools in all countries, it appears, have a common problem in capturing the interest, the sustained effort and therefore the performance of skilled working class children, who make up the largest single portion of the population

in many of these countries. True, their aptitude scores are also lower, but the social differences in aptitude, except in Sao Paulo and Chicago, are less than the differences in achievement. Moreover, there is some reason to view these "aptitude" tests, also, as performance measures, affected by the same factors of interest, motivation and practice as "achievement" scores. One or two countries appear to be approaching effective equality of educational opportunity, judging by their products; but most of the countries have an appreciable discrepancy to make up.

The notable lack of systematic sex differences in performance clearly seems to rule out any inherent intellectual superiority of either sex. Where differences appear, culture seems to create the difference.

There is a widespread tendency for teachers, and even age-mates, to approve more of girls. This may be a "man's world," at large, but in school boys have to work harder and learn more to get the same grades as girls, everywhere except in England.

To the extent that school achievement is itself a very important aspect of coping behavior, the socio-economic bias evident to some degree in all countries constitutes something of a deterrent to the optimal development of working-class youth. This bias, in most places, operates more strongly in the value judgments both teachers and children make than in the actual performance of the children from different social levels. It might be said that this prejudice is not as complete a deterrent to equality of learning as it potentially could be.

Finally, assumptions about the invariant nature and the comparability of the "same" measures in different cultures need to be critically scrutinized. The "same" measures either are not functionally the same, often, or their results are significantly altered by other influences which may be peculiar to particular societies.

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TABLE 1

Cross-National Study of Coping Styles and Achievement

Socio-Economic Status Differences in Achievement

| Country | SES | Aptitude Raven | Standardized Achievement Math | Standardized Achievement Read. | G.P.A. | Peer Behavior Ratings: Acad. Work | Peer Behavior Ratings: Non-Acad. Work | Peer Behavior Ratings: Relations with Teachers |
|---|---|---|---|---|---|---|---|---|
| Sao Paulo | L | 47.7 (5)* | 49.2 (8) | 47.8 (6.5) | 49.1 (8) | 1.05 (7.5) | 1.04 (7) | 1.05 (7) |
| Brazil | M | 52.1 | 50.8 | 52.2 | 50.9 | 1.03 (-) | 1.02 (-) | 1.01 (-) |
| London | L | 48.0 (6) | 47.3 (4) | 46.6 (4) | 47.4 (4) | .99 (6) | 1.02 (6) | 1.00 (5.5) |
| England | M | 52.0 | 52.7 | 53.4 | 52.5 | 1.05 | .97 (-) | 1.03 |
| Milan | L | 48.2 (7) | 48.1 (6) | 47.8 (8) | 47.8 (6) | .99 (3) | .97 (3) | 1.00 (3) |
| Italy | M | 51.6 | 51.9 | 52.0 | 51.8 | 1.12 | 1.07 | 1.08 |
| Tokyo | L | 47.2 (3) | 46.8 (3) | 46.4 (3) | 47.3 (2) | .98 (2) | .97 (2) | .96 (2) |
| Japan | M | 53.0 | 53.2 | 53.6 | 52.9 | 1.22 | 1.12 | 1.11 |
| Mexico City | L | 46.0 (2) | 44.8 (1) | 45.7 (1) | 48.0 (7) | 1.04 (7.5) | 1.02 (8) | 1.02 (7) |
| Mexico | M | 53.9 | 54.9 | 54.2 | 51.9 | 1.02 (-) | 1.02 | 1.03 |
| Chicago | L | 44.7 (1) | 47.8 (5) | 47.2 (5) | 47.4 (5) | 1.00 (4.5) | .97 (4) | 1.00 (4) |
| U.S.A. | M | 55.0 | 52.3 | 52.6 | 52.3 | 1.08 | 1.06 | 1.05 |
| Austin, Texas | L | 47.2 (4) | 46.1 (2) | 46.0 (2) | 47.2 (3) | 1.02 (4.5) | .99 (5) | 1.01 (7) |
| U.S.A. | M | 52.9 | 53.8 | 53.9 | 52.6 | 1.08 | 1.05 | 1.04 |
| Ljubljana | L | 48.8 (8) | 48.3 (7) | 47.8 (6.5) | 46.6 (1) | .96 (1) | .94 (1) | .98 (1) |
| Yugoslavia | M | 51.3 | 51.8 | 52.3 | 53.5 | 1.28 | 1.11 | 1.20 |
| Universal | | X | X | X | X | | | |
| 7 of 8 countries | | | | | | | | X |
| 6 of 8 countries | | | | | | X | X | |
| Random | | | | | | | | |
| Tukey's HSD | | | | | | .07 | .05 | .06 |

*Number in parenthesis shows rank from greatest (1) to least (8) social difference in score.

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TABLE 2

Cross-National Study of Coping Styles and Achievement

Sex Differences in Achievement

| Country | Sex | Aptitude | Standardized Achievement | | G.P.A. | Peer Behavior Ratings | | |
|---|---|---|---|---|---|---|---|---|
| | | Raven | Math. | Read. | | Acad. Work | Non-Acad. Work | Relations with Teachers |
| Sao Paulo | M | 50.6 (4)* | | 50.9 (4) | 48.6 (2) | 1.01 (7) | 1.01 (5) | .99 (5) |
| Brazil | F | 49.2 (-) | | 49.0 (-) | 51.5 | 1.07 | 1.04 | 1.07 |
| London | M | 49.7 (7) | | 49.9 (8) | 50.7 (6) | .97 (4) | .99 (7.5) | .96 (4) |
| England | F | 50.3 | | 50.1 | 49.3 (-) | 1.07 | .99 | 1.07 |
| Milan | M | 49.7 (8) | | 49.6 (6) | 49.4 (7) | 1.02 (6) | 1.00 (5) | 1.01 (6) |
| Italy | F | 50.1 | | 50.1 | 50.2 | 1.09 | 1.03 | 1.06 |
| Tokyo | M | 49.2 (2) | | 48.7 (1) | 48.9 (3) | 1.04 (4) | 1.01 (1) | 1.02 (7.5) |
| Japan | F | 51.0 | | 51.3 | 51.3 | 1.14 | 1.08 | 1.05 |
| Mexico City | M | 50.9 (1) | | 51.2 (2) | 50.0 (8) | 1.05 (8) | 1.03 (5) | 1.04 (7.5) |
| Mexico | F | 49.1 (-) | | 48.7 (-) | 49.9 (-) | 1.01 (-) | 1.00 (-) | 1.01 (-) |
| Chicago | M | 50.6 (3) | | 50.1 (7) | 48.9 (4) | .95 (2) | 1.04 (2) | .90 (2) |
| U.S.A. | F | 49.0 (-) | | 49.8 (-) | 50.8 | 1.13 | 1.00 (-) | 1.15 |
| Austin, Texas | M | 49.5 (6) | | 49.3 (5) | 48.2 (1) | .93 (1) | 1.02 (7.5) | .90 (1) |
| U.S.A. | F | 50.5 | | 50.6 | 51.6 | 1.16 | 1.02 | 1.16 |
| Ljubljana | M | 49.4 (5) | | 51.1 (3) | 49.3 (5) | 1.07 (4) | 1.02 (6) | .99 (3) |
| Yugoslavia | F | 50.6 | | 49.0 (-) | 50.8 | 1.17 | 1.04 | 1.19 |
| Universal | | | | | | | | |
| 7 of 8 countries | | | | | | X | | X |
| 6 of 8 countries | | | | | X | | | |
| Random | | X | X | X | | | X | |
| Tukey's HSD | | | | | | .07 | .05 | .06 |

No significant sex differences

*Number in parenthesis shows rank from greatest (1) to least (8) sex differences in .