

# Does Spearman's $g$ Decline at High IQ Levels? Some Evidence From Scotland

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IT WAS REPORTED by Detterman and Daniel (1989) that the average value of the intercorrelations of the subtests of the American Wechsler Intelligence Scale for Children—Revised (WISC-R) and the Wechsler Adult Intelligence Scale—Revised (WAIS-R) is greater among low-IQ subjects than among high-IQ subjects. This indicates that the  $g$  factor is more salient, or accounts for more of the variance, among low-IQ groups than among high-IQ groups. The causes of this effect are unclear, but it may have interesting implications for the theoretical understanding of the nature of Spearman's  $g$ . I therefore considered that it would be useful to determine whether the finding is generally valid and replicable.

The data examined for this purpose consisted of the Scottish standardization of the WISC-R. This standardization was carried out in the early 1980s on a sample of 1,369 socially representative Scottish children. The subtests were the same as those of the American test except for minor alterations in some of the verbal tests to make them more suitable for Scottish children. Also, the maze test was not given. The battery consisted of six verbal tests and five performance tests.

In their analysis of the American standardization sample, Detterman and Daniel first divided the sample into five ability groups on the basis of subjects' scaled scores on the vocabulary subtest. They then calculated the average intercorrelations of all the subtests in the five ability groups. These average

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*I am indebted to W. Graham Thorpe of the Scottish Council for Research in Education for making available the data reported in this article.*

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intercorrelations declined in size from low- to high-IQ groups. (Virtually identical results were found when the subjects were divided into the five groups on the basis of their scores on the information subtest.)

Adopting this method for the analysis of the Scottish data, I divided the sample into five ability groups of approximately equal numbers on the basis of subjects' vocabulary scaled scores. I then calculated the average intercorrelations of the subtests in the five groups. The resulting correlations, from low- to high-ability groups, were .44, .38, .17, .14, and .20. These are closely similar to the Detterman and Daniel correlations of .42, .29, .26, .21, and .22.

To determine the statistical significance of the differences in the size of the average intercorrelations in the five ability groups in the Scottish sample, I followed the method used by Detterman and Daniel. This consisted of using chi-square analysis to compare each correlation matrix with the other four, ascertain the number of correlations that were greater in one matrix, and test whether these were greater than chance. Of the 10 comparisons, 6 were statistically significant ( $p < .001$ ); 3 were not statistically significant; and 1 (the comparison between the two highest ability groups) was statistically significant in the reverse of the expected direction ( $p < .001$ ), that is, the average intercorrelation was higher in the highest ability group ( $r = .20$ ) than in the second highest ( $r = .14$ ). This curious reversal among the two highest ability groups was also present, but not statistically significant, in the Detterman and Daniel data.

The general significance of the results appears to be that they suggest the operation of some depressant acting on all cognitive abilities among low-ability groups. Such a depressant (e.g., suboptimal nutrition) would tend to bring all abilities into positive correlation or to increase the values of the intercorrelations. The precise theoretical implications of the phenomenon have yet to be worked out. The object of this study was to test whether the Detterman and Daniel finding could be replicated, and the close similarity between the American data and the Scottish data indicates that it can.

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*Received November 28, 1990*

