Do Ability and Reading Achievement Correlate?

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Vellutino, Scanlon, and Lyon (2000) have done an excellent job of discussing the use of IQ–achievement test discrepancy as a defining characteristic of children with learning disabilities. Their position is that the IQ discrepancy approach does not reliably differentiate poor readers from typical readers; they have emphasized their recent findings that IQ did not relate to children's response to remediation, and they have argued that IQ and achievement test scores are poorly correlated. Although I agree with many of their criticisms of traditional IQ tests and the use of the IQ–achievement discrepancy method (see Naglieri, 1999), I found some of their views to be inconsistent with available data, specifically concerning the relationship between IQ and achievement. In this brief commentary I will focus on the issue of the correlation between IQ and achievement for group and individual tests of intelligence.

Group Ability Tests

Vellutino et al. (2000) believed that correlations between intelligence and reading achievement tend to be low and variable, but their suggestion that the correlation between intelligence and reading achievement is low is inconsistent with published research. For example, Stanovich, Cunningham, and Freeman (1984) summarized the research on the relationship between intelligence and reading achievement and found correlations that ranged from .3 to .7. This seems to support the view that IQ and reading achievement may be weakly related at some ages and variable, but the research findings were based on sample sizes of less than 60, and they sampled only Grades 1, 3, and 5.

Carver (1990) used a larger sample ($N = 486$) and found an overall correlation between IQ and reading achievement of about .50 (range = .36–.68) for a sample of children from Grades 2 through 12, but his study also involved small samples at many ages. Naglieri (1996) followed this line of research and examined the relationship between intelligence and reading achievement with a sample of 2,125 students in Grades 2 through 9 who were representative of the U.S. population. He found consistent correlations between intelligence and reading achievement from Grades 2 through 9 ranging from .43 at Grade 2 to .58 at Grade 5. Overall, the average correlation between the nonverbal general measure of intelligence and reading achievement was .57 ($p < .001$), which can be described as large (Cohen, 1988).

Naglieri and Ronning (2000) further studied the relationship between intelligence and reading achievement for a large sample of children in Grades K through 12 ($N = 22{,}261$). Their sample closely represented the U.S. population on a number of demographic variables. Overall, they found a correlation of .56 between intelligence, measured using the Naglieri Nonverbal Ability Test (NNAT; Naglieri, 1997), and reading achievement, as measured by the Stanford Achievement Test–Ninth Edition (SAT; 1995). Correlations between SAT reading achievement and NNAT scores varied only slightly (.49–.61). The median correlations between the NNAT and SAT for the entire sample were .57, .52, and .56 for Total Reading, Word Reading/Vocabulary, and Sentence Reading/Reading Comprehension, respectively.

The studies just described all involved group-administered tests of intelligence. Stanovich et al. (1984) and Carver (1990) used Raven progressive matrices, and Naglieri (1996) and Naglieri and Ronning (2000) respectively used the Matrix Analogies Test–Short Form (Naglieri, 1985) and the NNAT (Naglieri, 1997), both of which are nonverbal progressive matrix tests very similar to the Raven test. The results of these studies clearly show that the larger the sample size, the less variable the correlation coefficient (an expected finding, given the nature of correlations) and that there is a sizable correlation between intelligence and reading achievement. This is in contrast to suggestions by Vellutino et al. (2000) that intelligence is poorly correlated with reading achievement.

Individual Ability tests

Vellutino et al. (2000) rightly noted that traditional IQ tests, such as the Wechsler Intelligence Scale for Children (WISC; Wechsler, 1991), contain subtests that are highly related to reading (e.g., Vocabulary) and that correlations between such a test and reading achievement can be considered contaminated. This would suggest that the correlations between ability tests and achievement are inflated due to content overlap or at least content contamination due to considerable shared variance. There are at least two possible solutions to this problem. First, to give a

completely nonverbal test, as was done by Naglieri and Ronning (2000) using the group-administered progressive matrix test NNAT. Second, to use an individually administered test of ability that does not include subtests (e.g., Vocabulary) that are obviously related to reading achievement. There are only two options if this is the goal: the Kaufman Assessment Battery for Children (K-ABC; Kaufman & Kaufman, 1983) and the Cognitive Assessment System (CAS; Naglieri & Das, 1997).

Kaufman and Kaufman (1983) provided good evidence that the K-ABC is significantly and highly correlated with reading achievement. They reported that the Mental Processing Composite correlated .63 with Passage Comprehension (N = 592). Similarly, Naglieri and Das (1997) reported correlations between the CAS and reading achievement that were substantial despite the fact that the CAS does not contain verbal achievement. Naglieri and Das (1997) reported that the CAS total test standard score correlated with the Woodcock-Johnson–Revised (WJ-R; Woodcock & Johnson, 1989) Broad Reading (.71), Basic Reading Skills (.69), and Reading Comprehension (.72) cluster scores. Correlations with individual achievement tests were slightly lower (owing to lower internal reliability coefficients of the subtests) but still large (Letter-Word Identification, .66; Passage Comprehension, .70; Word Attack, .62; and Reading Vocabulary, .67). These correlations were obtained for a sample of 1,600 children who were representative of the U.S. population on a number of key demographic variables. Naglieri (1999) suggested that the correlation between the CAS and reading achievement is the highest among all the individually administered intelligence tests.

Conclusions

There is excellent evidence that both group-administered and individually administered tests of ability are significantly and substantially correlated with reading achievement. Although variability has been found, it has typically been found with studies that involved small, nonrepresentative (e.g., restricted) samples of children. This is well illustrated by the data presented in Table 4 of the article by Vellutino et al. (2000), where they report correlations between IQ and reading achievement for samples of about 50. Their research, although certainly of importance, should not be used as a basis for the statement that IQ and reading achievement are poorly correlated, especially given the amount of evidence from the large-scale investigations I have summarized. Given the research presented here, the statement that "IQ scores did not predict reading achievement levels in the normally developing readers" (Vellutino et al., 2000, p. 236) should be considered a statement that is inconsistent with large-scale research findings. In point of fact, Naglieri and Das (1997) showed that Word Identification and Word Attack, both of which were included in the Vellutino et al. (2000) study, correlated substantially with ability as operationalized within a cognitive processing context (CAS).

There appears to be an important weakness in the argument presented by Vellutino et al. (2000) that IQ scores are not good predictors of reading achievement. Although their study, involving small and restricted samples, yielded low correlations, others who have used larger, less restricted samples have found strong relationships between ability and reading achievement. Readers should be aware that the concept of an ability/achievement discrepancy has limitations, but it is inconsistent with the literature to assume that these two constructs are not substantially correlated.

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