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Intelligence predicts scholastic achievement irrespective of SES factors: Evidence from Brazil

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Abstract

This study explores whether or not intelligence tests' scores predict individual differences in scholastic achievement irrespective of SES factors such parents' income and education. The variables of interest are analyzed considering three independent samples of participants comprising a total of 641 children. The participants belonged to a Brazilian School characterized by broad and representative ranges in intelligence, scholastic achievement, and SES factors. The results indicate that SES factors do not predict children differences in scholastic achievement, whereas children's intelligence tests' scores predict their scholastic differences. These results underscore personal intelligence as a *genuine* predictor of individual differences in scholastic achievement.

Keywords: Scholastic achievement; SES; Income; Education; Intelligence; Progressive Matrices Test; WISC-III

The available empirical evidence demonstrates that students with higher intelligence tests' scores show better scholastic achievement than students with lower intelligence tests' scores. Actually, it is usually argued that intelligence is the best single predictor of scholastic achievement (Gottfredson, 2002; Kuncel, Hezlett, & Ones, 2004). However, although the average correlation of intelligence with scholastic achievement is estimated at a value of .50 (Gustafsson & Undheim, 1996; Jensen, 1980; Neisser et al., 1996), it is well known that there is a relatively large systematic variation from one study to another in the correlation found between these factors.

Jensen (1980) summarizes several causes underlying the later fact. First, samples with high educational levels attenuate the correlation with intelligence scores (producing values between .30 and .40), whereas samples from elementary and high school produce the largest correlations (from .50 to .70) because of the greater restriction in range of ability at higher educational levels. Second, there is a problem related to the heterogeneity of the criteria employed to measure scholastic achievement. Admittedly, the use of teachers' grades or scores on objective achievement tests, produce sharply distinguishable results. The difference can be attributed to reliability differences between these measures, but also to teachers' bias in assigned grades (Schicke & Fagan, 1994). Third, the correlation between intelligence and scholastic achievement is higher for abstract academic subjects, like science and mathematics. Intelligence correlates better with academic subjects that are hierarchically ordered in complexity and in the sequence of cognitive skills and knowledge necessary to learn new knowledge and skills. Fourth, the correlations

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between intelligence and scholastic achievement is higher when there is uniformity of exposure to students to all of the topics sampled by a given achievement test. Fifth, achievement tests usually fail to sample a broad range of the academic subject at matter, which produces a range restriction of content that attenuates the correlation with intelligence. Finally, once the general factor of intelligence is partialed out, specific cognitive abilities show low correlations with scholastic achievement. Usually, verbal ability is the best single predictor among these specific abilities.

On the other hand, socioeconomic status (SES) usually correlates with both intelligence and scholastic achievement, giving room to the suspicion that SES could account for the correlation between intelligence and scholastic achievement (McClelland, 1973). The classical study by Kemp (1955) reported the results obtained from the analyses of fifty British schools. This researcher found correlations of .73 between intelligence and scholastic achievement, of .56 between SES and scholastic achievement, and of .52 between intelligence and SES. When intelligence was partialed out of the correlation between SES and scholastic achievement, the value dropped from .56 to .30, whereas when SES was partialed out of the correlation between intelligence and scholastic achievement, the value dropped from .73 to .62 only. Therefore, intelligence independently of SES correlates with scholastic achievement double than does SES independently of intelligence, but SES is still related to scholastic achievement.

Loehlin (2000) indicates that parents' occupation, income, and education could influence the home environment in which children grow up. Thus, perhaps children with higher SES parents have greater intelligence tests' scores than children with lower SES parents. This possibility gives room to the presumption that children from higher SES homes will show better scholastic achievement than children from lower SES homes, because the more favourable environment boosts IQ, which in turn boosts achievement.

However, considering data from the *Hawaii Family Study of Cognition* (HFSC), Nagoshi and Johnson (2004) have shown a picture that is not entirely consistent with this later presumption. The HFSC consisted of 949 families of two parents and one or more offspring at least 13 years of age of Caucasian descent, living in Hawaii between the years of 1972 and 1976, as well as 400 families consisting of two parents and one or more offspring of Japanese descent living in Hawaii during the same period of time. All the families were middle and upper class. The sample included 767 male Caucasian offspring, 735 female Caucasian offspring, 274 male Japanese offspring, and 267 female Japanese offspring. Their results indicated that parental education and occupational status do not have a significant influence on offspring intelligence (Johnson & Nagoshi, 1985). If this is indeed the case, then there is no reason to expect a significant correlation between SES and scholastic achievement.

The analyses by Thienpont and Verleye (2003) from data of the *National Child Development Study* (a longitudinal study of a British cohort born between 3 and 9 March 1958), reinforces this expectation. These researchers included the last follow-up (1999–2000) finding that social class of origin is a factor of non-importance to account for the relationships among SES, education, and intelligence. Furthermore, parental education was not an explaining variable either.

The present study explores the relationships among SES factors, intelligence, and scholastic achievement. This is done analyzing data registered in Belo Horizonte at the state of Minas Gerais (Brazil) for three independent samples. Importantly, the samples are characterized by a broad range in parents' income and education, as well as in their children's intelligence and scholastic achievement. The main hypothesis is that intelligence will predict scholastic achievement irrespective of home variables such parents' income and education.

1. Method

1.1. Participants

Three samples of participants comprising a total of 641 children are considered in the present study. The first sample consisted of 372 children (181 girls and 191 boys) with a mean age of 8.8 years (S.D. = 1.4 years, range: 7 to 11 years). The second sample included 100 children (43 girls and 57 boys) with a mean age of 11.8 years (S.D. = .76 years, range: 11 to 14 years). The third sample comprised 169 children (83 girls and 86 boys) with a mean age of 7.5 years (S.D. = .5 years, range: 7 to 8 years). All the students that participated in the study belonged to a public school located in the city of Belo Horizonte (Minas Gerais State, Brazil) characterized by the broad range of their students' social class of origin.

The school belongs to the *Universidade Federal de Minas Gerais* (UFMG) and there is no entrance fee. Children attending come from families of largely distinguishable social classes. Families' expectations about the education of their offspring are to have them attending the same University. However, these expectations are not always fitted given that some of them fail to pass the entrance examinations.