Personality and intelligence as predictors of academic achievement: A cross-sectional study from elementary to secondary school

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Abstract

General intelligence and personality traits from the Five-Factor model were studied as predictors of academic achievement in a large sample of Estonian schoolchildren from elementary to secondary school. A total of 3618 students (1746 boys and 1872 girls) from all over Estonia attending Grades 2, 3, 4, 6, 8, 10, and 12 participated in this study. Intelligence, as measured by the Raven's Standard Progressive Matrices, was found to be the best predictor of students' grade point average (GPA) in all grades. Among personality traits (measured by self-reports on the Estonian Big Five Questionnaire for Children in Grades 2 to 4 and by the NEO Five Factor Inventory in Grades 6 to 12), Openness, Agreeableness, and Conscientiousness correlated positively and Neuroticism correlated negatively with GPA in almost every grade. When all measured variables were entered together into a regression model, intelligence was still the strongest predictor of GPA, being followed by Agreeableness in Grades 2 to 4 and Conscientiousness in Grades 6 to 12. Interactions between predictor variables and age accounted for only a small percentage of variance in GPA, suggesting that academic achievement relies basically on the same mechanisms through the school years.
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1. Introduction

Success in school plays an important role in impacting students' future opportunities, making some choices more likely and eliminating others. A myriad of factors have been identified as being related to academic achievement, the two most fundamental of which will be addressed in the present paper: intelligence and personality (see Chamorro-Premuzic & Furnham, 2005). Many researchers agree that both cognitive and personality variables should be taken into account when predicting school performance (Chamorro-Premuzic & Furnham, 2005; Rindermann & Neubauer, 2001; Rothstein, Paunonen, Rush, & King, 1994), neither of them is sufficient on its own.

The prediction of academic success or failure has been the main objective of developing intelligence tests (Ackerman & Heggestad, 1997). An average correlation between IQ scores and grades is approximately 0.5 (Neisser et al., 1996), varying considerably depending on the measures used. The correlation between intelligence and academic achievement appears to decline with age, being highest in primary school and lower in middle school and college (Jensen, 1980, p. 319). As mentioned by Pind, Gunnarsdóttir, and Jóhannesson (2003), the decrease in the magnitude of this correlation is generally explained by the restriction of range that occurs as a result of fewer students being enrolled in the upper echelons of the educational system.

Although the direct relationship between school success and personality traits has also been extensively studied (for reviews, see Chamorro-Premuzic & Furnham, 2005; De Raad & Schouwenburg, 1996), the results are not as straightforward as they are for the relationship between intelligence and academic achievement. Using the Five-Factor personality model as a framework to organize previous research, Farsides and Woodfield (2003) concluded that empirical evidence is mixed concerning the role each of the five traits plays in determining academic success. They proposed several reasons for this discrepancy, among which are age specificity of the relationship (e.g., Neuroticism is positively related to academic achievement in middle school but negatively at college age; similarly, Extraversion predicts higher grades in middle school but lower grades at the college level, De Raad & Schouwenburg, 1996; Eysenck, 1996), small sample sizes, varying time lapses between the collection of predictor and criterion data, and the use of different personality measures and different criteria for academic success.

While a lot of research has been conducted with college students, few studies have related personality to academic achievement in adolescents and younger children. Barbaranelli, Caprara, Rabasca, and Pastorelli (2003) reported a negative correlation between academic achievement as measured by grade point average (GPA) and self-reported Energy as measured by the Big Five Questionnaire for Children, as well as positive correlations between GPA and Intellect/Openness and Conscientiousness in Elementary School and Junior High School children. Hair and Graziano (2003) analysed the correlations between high school GPA and Big Five traits assessed by bipolar adjective scales when the participants were in middle school. A significant positive correlation was found for all personality factors except Emotional Stability, which was insignificantly correlated to GPA. Heaven, Mak, Barry, and Ciarrochi (2002) examined how personality variables measured by the Junior Eysenck Personality Questionnaire (JEPQ) and adjective scales for Agreeableness and Conscientiousness were related to self-rated academic performance in adolescents of 14–16 years of age. They found a negative correlation with Psychoticism and positive correlations with Agreeableness and Conscientiousness. Another study (Maqsud, 1993) using the JEPQ in 14–15 year olds reported a negative relationship between Psychoticism and academic