



Personality is related to educational outcomes in late adolescence: Evidence from two large-scale achievement studies



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ABSTRACT

As no previous research has assessed personality in a large-scale study of student achievement, this study is the first to investigate the relation between personality traits and academic outcomes in adolescence. We used data from two independent Luxembourgish samples of students including a representative sample of 15-year-old students ($n = 898$) and a large heterogeneous sample of more than 2,000 ninth and tenth graders. We found a differentiated pattern of results concerning key educational outcomes: Conscientiousness was more closely related to grades, whereas Openness showed higher relations with achievement test scores. Possible mechanisms that may underlie the pathways from personality to educational success and the implications of using short inventories in the context of large-scale (educational) studies are discussed.

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1. Introduction

Education is one of the most important life outcomes. In modern knowledge-based economies, the role of education has evolved into a prerequisite for a professional qualification (e.g., vocational education and training) and successful occupational careers across the lifespan. In particular, the first educational stages in primary and secondary school form the most important basis for successful life paths (see Almlund, Duckworth, Heckman, & Kautz, 2011; Blossfeld, Roßbach, & von Maurice, 2011; Heckman, 2006). Therefore, it is essential to understand what factors contribute to an individual's education and how individual differences in academic outcomes can be explained (e.g., Jimerson, Egeland, & Teo, 1999; Schmidt & Hunter, 1998; Williamson, Appelbaum, & Epanchin, 1991).

It has been well established that cognitive resources such as intelligence (Gottfredson, 2002; Gustafsson & Undheim, 1996; Kuncel, Hezlett, & Ones, 2004) and prior knowledge (e.g., Baumert, Lüdtke, Trautwein, & Brunner, 2009; Hailikari, Nevgi, & Komulainen, 2007) are among the best single predictors of academic success. Yet, to gain further insights into individual differences in educational outcomes, a growing body of studies have focused on the contribution of noncognitive factors (see Chamorro-Premuzic, Harlaar, Greven, & Plomin, 2010; Steinmayr & Spinath, 2009). In

particular, the link between various components of students' achievement motivation and academic outcomes has been the subject of a large amount of educational research and seems well established for several constructs (e.g., academic self-concept and interest; see Gottschling, Spengler, Spinath, & Spinath, 2012; Schicke & Fagan, 1994; Spinath, Spinath, Harlaar, & Plomin, 2006).

In addition, students' personality has gained increasing attention for several reasons. First, personality is an important individual resource that is not only associated with important life outcomes such as subjective well-being, (mental) health (Ozer & Benet-Martínez, 2006; Roberts, Kuncel, Shiner, Caspi, & Goldberg, 2007), and career success (Sutin, Costa, Miech, & Eaton, 2009), but is also supposed to play a prominent role in explaining educational attainment and academic success (e.g., Poropat, 2009). Second, as we know from a large body of studies, the development of personality is a lifelong process (e.g., Roberts, Walton, & Viechtbauer, 2006; Roberts, Wood, & Caspi, 2008). Thus, educational processes at school during adolescence can play an important role in the development of personality by providing learning opportunities and situational demands that shape personality (see Bleidorn, 2012; Roberts, 2006; Roberts & Jackson, 2008).

To further expand the body of knowledge on noncognitive predictors of individual differences in students' educational success, research on personality during adolescence seems particularly important. In most countries, this developmental stage coincides with the end of compulsory education when far-reaching decisions about future educational pathways (e.g., entrance into tertiary education) are made. The large majority of previous

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personality research that included adolescent students was based on small or medium-sized student samples, college-bound students, or college students (e.g., Chamorro-Premuzic & Furnham, 2003; Corker, Oswald, & Donnellan, 2012; O'Connor and Paunonen, 2007). Although this line of research has provided important insights, little is known about the representativeness and generalizability of these results because only a subsection of the student body has been included. To significantly further our knowledge of the link between personality and education, it is thus necessary to cover the full heterogeneity of the student population. To this end, the present study capitalized on data from several thousand adolescent students who participated in a large-scale educational assessment program. In doing so, we were able to analyze how personality is related to general and domain-specific components of students' achievement motivation to learn about the extent of construct overlap. Moreover, we rigorously examined the role of personality in educational outcomes (i.e., grades and achievement tests).

2. Personality in (late) adolescence

A wide range of studies on personality have identified individual differences in five broad and distinguishable domains across the life span (Roberts & DelVecchio, 2000; Robins, Fraley, Roberts, & Trzesniewski, 2001; Soto, John, Gosling, & Potter, 2008): Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness—resulting in the Five Factor Model (FFM) of personality (McCrae & Costa, 1987). Rank-order stability and (mean-level) change as well as the factor structure of personality have been well established by a broad range of studies (Caspi, Roberts, & Shiner, 2005; Roberts & DelVecchio, 2000; Soto et al., 2008). Furthermore, empirical results suggest that even children are able to provide differentiated descriptions of their behavior (Roberts & DelVecchio, 2000). Further studies provide evidence for the five-factor structure since then from childhood (e.g., Spengler, Gottschling, & Spinath, 2012; Tackett, Slobodskaya, Mar, Deal, Halverson et al., 2012), towards young adulthood (Lüdtke, Trautwein, Nagy, & Köller, 2004; Roth, 2002). Although researchers have assumed the validity of the structure of personality in late adolescence/young adulthood, there is still a lack of studies that have focused on short measures of personality in that age group. To gain insights into the generalizability of the structure of personality (when it is assessed by these short measures) and its relations to educational outcomes in the full adolescent population, it is necessary to draw representative samples to ensure that the full range of the heterogeneity of the distribution of students' personality is covered. As conditions for the assessment of personality (and other complex psychological traits) have changed for economic reasons, researchers have developed and implemented very short measures. Interestingly, the applicability of such short scales in younger adolescent samples has not been studied so far.

3. Personality and academic achievement

It is very plausible that personality traits play an important role in learning and education (De Raad & Schouwenburg, 1996) although they were not explicitly constructed to predict academic outcomes (Ackerman & Heggestad, 1997). To account for the personality-performance relation, Caspi and colleagues have suggested several (causal) pathways (Caspi et al., 2005; see also De Raad & Schouwenburg, 1996; Roberts et al., 2007). Most relevant for the developmental transition during adolescence is the process of active niche picking (Caspi et al., 2005; Roberts et al., 2007). Students choose educational experiences and environments whose qualities match their own personalities (Lüdtke, Roberts,

Trautwein, & Nagy, 2011). In their review, De Raad and Schouwenburg (1996) provided an elaborated synopsis of the possible mechanisms behind these associations: Conscientiousness may be positively associated with academic outcomes because it is related to the will(ingness) to achieve, goal setting, and effort regulation (see Barrick, Mount, & Strauss, 1993; Bidjerano & Dai, 2007), which also contribute to academic outcomes (Steel, 2007). According to the process of niche picking, one would expect that conscientious students would be more likely to demand challenging tasks from their teachers. Vermetten, Lodewijks, and Vermunt (2001) showed that Agreeableness was associated with staying focused on learning tasks and effort, which may encourage learning processes and therefore positively influence academic outcomes. Moreover, agreeable students support the class climate with their good conduct. This may also lead to more support by their teachers and classmates. This in turn may also lead to higher achievement. Extraversion may have a positive impact on academic outcomes because extraverted pupils have an enhanced desire to learn because of their higher energy levels. De Raad and Schouwenburg (1996) also argued that neurotic individuals are more anxious and less self-efficient (see Judge & Bono, 2002), indicating a decrease in academic outcomes because of reduced attention to and concentration on school-related tasks. The positive association between Openness and academic outcomes may be explained by the fact that open individuals are resourceful and curious. Those capacities lead to more sophisticated critical thinking and higher learning motivation (Bidjerano & Dai, 2007; Tempelaar, Gijssels, van der Loeff, & Nijhuis, 2007).

Further, when it comes to the most prominent predictors Conscientiousness and Openness, a differentiated view of their predictive values for different academic outcomes (i.e., grades and achievement test scores) has evolved (see Gray & Watson, 2002; Lüdtke et al., 2004; Nofhle & Robins, 2007). Some aspects of Conscientiousness, namely, dutifulness and ability to persevere, are also skills that provide much support for the achievement of good grades (Gray & Watson, 2002; McCrae & Costa, 1999). This suggests that Conscientiousness might be more strongly related to grades than to achievement test scores. Further, sophisticated critical thinking is at the core of Openness. Importantly, critical thinking is associated with an effective use of learning strategies. Using learning strategies increases performance (Blickle, 1996), which may be more closely related to the kind of performance needed on achievement tests than the kind of performance that leads to good grades. Therefore, it seems plausible that Openness might be more strongly related to academic achievement test scores than to grades.

A growing body of studies have demonstrated the role of personality traits in learning- and performance-based contexts. In the last decade, several meta-analytical papers based on a wide range of personality measures have been published. Most of them suffer from methodological problems (e.g., absence of homogeneity; see Poropat, 2009, for a more detailed criticism) or cover only a restricted range of academic outcomes (such as postsecondary performance; Hough, 1992; O'Connor and Paunonen, 2007; Trapmann, Hell, Hirn, & Schuler, 2007). Most recently, Poropat (2009) provided a meta-analysis on the relation between the Five Factor model of personality and academic outcomes (i.e. grades), encompassing mainly studies from secondary and tertiary levels of education. He reported that Openness ($r = .12$), Agreeableness ($r = .07$), and Conscientiousness ($r = .22$), were significantly correlated with academic performance, with Conscientiousness being largely independent of intelligence.

Most studies that have been conducted since then have not uncovered a consistent pattern of results. Three major factors may be able to account for these inconsistencies. First, the age range varied significantly between the studies: The age ranges of

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