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THE BIG FIVE AT SCHOOL: THE IMPACT OF PERSONALITY ON EDUCATIONAL ATTAINMENT

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Abstract

We investigated the effects of the Big Five personality traits (extroversion, friendliness, conscientiousness, emotional stability, and openness) on educational attainment in the Netherlands, using data from the '1998 Family Survey Dutch Population'. All five basic personality traits have significant effects. Emotional stability, and especially openness, affect educational success positively, whereas extroversion, friendliness, and conscientiousness have negative effects. Generally, the effects of personality are equal for men and women, the only exception being the effect of openness, which is larger for men. As personality is not correlated with social background, the effects of social background were not overestimated in models without controls for personality traits.

Introduction

We investigated to what extent individual variation in educational attainment can be explained by personality traits. Sociologists of education usually explain differences in educational attainment using an elaborate set of socio-cultural, socio-economic, and demographic characteristics. In the Netherlands, the effects of social class, parental schooling levels, gender, birth cohort, and characteristics of schools and neighborhoods have been investigated extensively (De Graaf & Ganzeboom, 1993; Dronkers & Ultee, 1995; Peschar & Wesseling, 1995). The diminishing impact of parents' socio-economic background on

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children's educational success is one of the most interesting findings from these Dutch studies. It has become increasingly difficult to predict individual differences in educational attainment using family background indicators, which refer both to indirect indicators of parental resources like their level of education and occupation, and to direct indicators of parents' financial and cultural resources (De Graaf & De Graaf 2002). Although the absolute size of the effects of family background is still substantial and remains an important object of sociological research, the family of origin has lost much of its predictive power for children's educational careers.

We investigated to what extent personality traits are important in educational careers. In a society where educational decisions are no longer determined by the resources of the family of origin, individual characteristics may have become important determinants of children's careers. Personality, however, is a complicated phenomenon, which has proven to be difficult to investigate in survey research, primarily because measurement problems are large. Psychologists have worked persistently on the development of a standard taxonomy of personality. Following the pioneer studies of Cattell (1943) and Eysenck (1947), this research led to consensus in the 1980s (Digman, 1990; Goldberg, 1981; McCrae & Costa, 1999). It was found that five basic personality traits, referred to as the *Big Five*, suffice to describe an individual's personality. These five traits are extroversion, friendliness, conscientiousness, emotional stability, and openness to experience. There is also a large degree of agreement regarding the substantial interpretation of these five traits, with the exception of openness to experience, which has also been interpreted as resourcefulness, creativity, intellect, culture, or autonomy. Note that emotional stability can also be referred to as neuroticism, which is the opposite pole of this trait. The relevance and validity of the *Big Five* taxonomy of personality have been demonstrated in highly diverse societies such as the United States of America, Germany, Israel, Japan, and the Philippines (Digman, 1990; see also Salgado, Moscoso & Lado, 2003). In short, we can assume that the *Big Five* personality traits offer an adequate description of the basic elements of human personality.

Personality characteristics affect not only people's psychological functioning, but also their conduct in different social domains such as career choices, leisure activities, cultural development, and health (Van den Berg & Feij, 1993; Caspi, 1997; Kraaykamp, 2001; De Raad & Schouwenburg, 1996). However, sociological research into inequality of life chances has made little use of the concept of personality. It has been investigated whether personality correlates with pupils' thriving at school or the professional functioning of workers, but not whether personality is related to final educational attainment or occupational status. In our view, especially since the impact of social background has decreased significantly, it is important to determine to what extent individual characteristics have become the main predictor variables of educational attainment.

A second argument for investigating the impact of personality on schooling is that, to some extent, the effects of social background might be interpreted by personality, or might be spurious. The effects of social background are interpreted when personality is affected by socializing experiences that depend directly on social background (e.g. Kohn, 1989; Ranchor, Bouma & Sanderman, 1996). For example, when children of advantaged social origins are more conscientious than children of less advantaged origins, and when conscientiousness affects success at school, part of the relationship between social class and educational attainment is interpreted by personality. The effects of social background are spurious when parental personality is related to social background and has a direct effect on the personality traits of the children that, in turn, affect the children's educational attainment. The fact that personality has a genetic component may thus mean that highly educated parents raise highly educated children partly because of intergenerational similarity in personality, e.g., openness or emotional stability. Only data in which both parental social class and personality are included are appropriate for use in assessing such causal schemes.

Theory and hypotheses

The impact of personality traits on the educational career

The psychological literature suggests that especially conscientiousness and openness to experience are important predictors of educational success. *Conscientiousness* is strongly related to perseverance and the will to achieve (Zhang, 2003). Meticulousness and being systematic are clearly convenient qualities for people who want to do well at school (Wolfe & Johnson, 1995). *Openness to experience* is akin to intelligence and bears on intellectual curiosity and commitment to assignments (McCrae & Costa, 1997). Creativity and resourcefulness are aspects of openness that are also positively related to scholastic achievement.

The relevance of *extroversion* is less obvious. Goff and Ackerman (1992) have shown that, until the age of 12, extrovert children achieve better school results than their introverted peers. Later in the educational career, however, the introverts are more likely to get the better grades. This might be explained by the notion that when young children are oriented towards the outside world, they tend to be more eager to learn (Yates, Yates & Lippett, 1995), whereas extroverted teenagers would rather spend their energy on social activities such as going out, sports, and sex (Eysenck, 1992).

The theoretical impact of *friendliness* on educational success is not unequivocal either. Friendliness concerns interpersonal skills and, therefore, has hardly been considered in relation to schooling. The indirect evidence that is available (partly through use of instruments other than the *Big Five*) suggests that some degree of friendliness (or social adaptation) enhances educational achievement, if only because it helps pupils to get along with their classmates and teachers, or

makes them less likely to skip classes (Farsides & Woodfield, 2003). Children who are very withdrawn or very aggressive achieve poorer school results than their peers with better social skills (Vandell & Hembree, 1994). On the other hand, friendly people tend to be less competitive, which can be a drawback when striving for good grades.

Emotional stability (with *neuroticism* as its opposite) seems to be positively related to scholastic achievement. Emotional stability enables one to deal with challenges and adversities in a non-stressful manner. A strong degree of self-regulation, which facilitates making and executing study plans, is closely related to this trait. A number of researchers point out that the relation between scholastic achievement and neuroticism increases with age (Eysenck, 1992), possibly because the ability to organize one's study behavior autonomously is called upon more and more as the educational career advances.

The above-mentioned findings (selected from a large range of studies) do not imply that it is already clear which personality traits affect the level of education people attain. Most previous research focused on the impact of personality on performance in specific subjects (e.g., mathematics) or on study-related qualities such as perseverance (Gottfredson, 1982; Lounsbury, Sundstrom, Loveland & Gibson, 2003; Rothstein, Paunonen, Rush & King, 1994). In addition, most of this research was carried out among pupils from a certain type of school, if not among pupils from a single classroom, i.e., samples that showed minimal variance in age and schooling level. Nevertheless, it is conceivable that personality characteristics affect certain scholastic abilities within a certain school type or year group, while having hardly any impact on final educational achievement. For example, conscientious pupils might do better than less accurate pupils within a type of school, but that does not imply that conscientious pupils are over-represented in the higher school levels. Pernickety pupils may be enrolled in junior vocational education while notorious slobs might land an academic title. The latter are likely to get lower grades than their more conscientious fellow students, but they are certainly not destined to receive lower credentials only because of their relative carelessness. Because it is also possible that a personality trait is hardly related to outcomes within schools while nevertheless affecting the highest level of schooling attained, it is interesting to examine to what extent personality affects the entire educational career.

Highest schooling level attained and transitions

In addition to investigating the effects of personality on the highest level of educational attainment, we also assessed personality effects on specific transitions during the educational career. In the first step of our analyses, we used the *Big Five* to predict the highest schooling level attained, and in the second step our focus was on school transitions. We have indicated that there are some theories of variation in the effects of emotional stability and extroversion during the educational career. It has been argued that the positive impact of emotional

stability increases during the career, as discipline and self-regulation become more important when students enroll at higher levels. The negative impact of extroversion is thought to increase as well, because of the growing focus of extroverted students on non-intellectual activities. We expected such trends in personality effects across the educational career to become visible when we examined these effects separately for school transitions made during subsequent phases of the educational career.

Is personality stable over the life-course?

Personality is affected by genetic heritage and by the social environment. The relative weights of heredity and the environment can be assessed by comparing personality correlations between different types of twins. Four types of twins can be distinguished: monozygotic and dizygotic twins raised apart or together. The estimated total genetic variance in personality varies between 12 and 41 percent in such studies. Extroversion and emotional stability, showing 41 and 31 percent of genetic variance, respectively, have rather strong hereditary components (Pedersen, Plomin, McLearn & Friberg, 1988). This finding confirms that these dimensions represent relevant aspects of a person's temperament, which is determined more by biological than by environmental factors. Openness to experience (40% hereditary) and conscientiousness (29%) are also strongly dependent on genetic endowment, but friendliness (12%) is not (Bergeman, Chipuer, Plomin, Pederson, McClearn, Nesselrode, Costa Jr. & McCrae, 1993).

The environmental impact can be broken down further into a component that is shared by siblings and a component that is unique to each sibling within the family. Friendliness is the only trait for which a substantial impact of the shared environment (21%) has been found. For emotional stability and conscientiousness, this proportion amounts to 10 percent, for extroversion it is 7 percent, and for openness it is even less. Since the impact of the shared environment (family, neighborhood) on personality seems limited, environmental characteristics that are not shared by brothers and sisters are very important in the development of personality. Note, however, that a large part of the non-shared environment also exists within the family. Brothers and sisters evoke different reactions from their parents (and each other), thereby creating, in a sense, their own environment within the family (Hoffman, 1992). For personality development, differences *within* families may be as relevant as differences *between* families (Dunn & Plomin, 1991). It is not so much the absolute quality and quantity of parental care that is essential, but rather the relative care compared to what is given to one's siblings. In any family, children may perceive themselves as advantaged or disadvantaged because (they feel) they are given a box on the ear more often, get less parental attention, or are given more expensive toys.

Although personality development is substantially affected by the social environment, at some point stability sets in. Maximum stability is reached from

about the age of thirty onwards (Caspi, 1997; Costa & McCrae, 1994; Soldz & Vaillant, 1999). This is not to say that personality is definitely established among people aged 30 and over, but that further changes are marginal. In the data used here, personality was measured at the time of the interview, which means that the causal direction of the relation between personality and educational attainment could not be determined. In line with previous research in this area (see De Raad & Schouwenburg for a review), we argue that effects of personality on educational achievement are more likely, and better theorized, than an effect of the educational career on personality. Although it is conceivable that the school environment affects children's personality, there is little reason to assume that the highest schooling *level* attained affects personality. Nevertheless, we accept that our research design was more likely to lead to an overestimation of the impact of personality than to an underestimation.

Differences between men and women

In general, studies of gender differences in personality show that women score lower on emotional stability and openness to experience (Feingold, 1994; Costa, Terracciano & McCrae, 2001). Extroversion yields mixed results, because women score higher on the sociability subscale while men have higher scores for assertiveness. For friendliness, the only substantial difference found is for the tendermindedness subscale, on which women score higher. Our data did not allow for such a breakdown of the *Big Five* into subscales, so on balance we expected to find only small gender differences in extroversion and friendliness. Differences in conscientiousness are also small, but they do consistently point towards a somewhat higher score for women. When only the basic *Big Five* dimensions are used, gender differences in friendliness, extroversion, and conscientiousness are typically small (Goldberg, Sweeney, Merenda, & Hughes Jr., 1998). Although we will not elaborate on the causes of the gender differences reported in the literature, we were definitely interested in their potential consequences for our research question. If men and women have different personalities, this might affect their educational success.

We also tested whether the effects of the *Big Five* on education differ between the sexes. For women, enrolling in higher education was an unlikely option for long, because of their ascribed role as spouse and mother. Until only a few decades ago, women were not supposed to choose an educational career that matched their talents and their personal interests. Thus, differences in intelligence or personality did not lead to corresponding differences in educational careers. We therefore expected to find that, in general, the impact of personality on educational attainment was larger for the men than the women in our adult sample. Since we had no specific expectations for the different *Big Five* traits, we did not formulate hypotheses on this issue.

Summary of the hypotheses

Firstly, we expected that conscientiousness and openness to experience would be positively related to the likelihood of making the transition to a subsequent level of schooling. A negative effect was expected for extroversion. According to the literature, extroversion has a positive impact on scholastic achievement during elementary school, but the first decision regarding the educational career is not taken until pupils are twelve years of age, which led us to suppose that the negative impact of extroversion, which is thought to emerge at puberty, would get the upper hand if the entire educational career was considered. Friendliness was expected to have a positive effect, because this trait makes a person's school time more pleasant from a social point of view. Pupils who feel better achieve better. Emotional stability was also expected to have a positive effect on the chance of making the transition to a higher schooling level.

Hypothesis 1: Friendliness, conscientiousness, emotional stability, and openness to experience have a positive effect on the highest schooling level attained and on the likelihood of moving on to higher schooling levels at relevant transition points. The effect of extroversion is negative.

During the educational career, the impact of emotional stability is expected to increase because self-regulation is increasingly called upon as the educational career progresses. The impact of extroversion becomes more negative during the educational career, because the first transition takes place directly before puberty and the later transitions occur after puberty. The effects of the other dimensions of the Big Five do not systematically decrease or increase during the educational career.

Hypothesis 2: The positive effect of emotional stability and the negative effect of extroversion will increase during the educational career.

Data and methods

We used the Dutch Family Survey 1998 (De Graaf, De Graaf, Kraaykamp & Ultee, 1999). This consists of a sample of 2029 respondents and is representative of the Dutch population aged between 18 and 70. The net response rate was 49.5 per cent (54.4 per cent of the respondents that could be contacted). Oral interviews were conducted at respondents' homes and, in addition, the respondents filled out a written survey. We selected respondents older than 25, as it was required that they had finished their educational careers. Table 1 provides an overview of the variables and how they were measured. All subsequent analyses are based on 1735 respondents who had valid scores on all variables.

The respondents' highest levels of educational attainment were measured in ten categories:

1. Primary education (6 years of schooling)
2. Junior vocational training (10 years of schooling)
3. Junior secondary general education (10 years of schooling)
4. Two years of senior vocational training (11 years of schooling)
5. Three years of senior vocational training (12 years of schooling)
6. Senior secondary general education (11 years of schooling)
7. Pre-university education (12 years of schooling)
8. Vocational college (15 years of schooling)
9. University (17 years of schooling)
10. Post-university education (20 years of schooling)

The minimum number of years needed to attain a certain level of schooling (minimum 6, maximum 20) was used in order to recode educational attainment into an interval variable. The mean number of years of schooling was 12.64 for men and 11.92 for women.

In addition to this continuous measure, we examined a number of educational transitions. In the Dutch school system there are several important moments when a person has to decide whether to continue to a higher schooling level, or to settle with the qualifications attained thus far. We ascertained the effects of personality on three of these educational transitions. At each transition point, only the respondents who were eligible to pass it because they met the educational prerequisites were included in the analysis. This procedure allowed us to determine whether the impact of personality, controlled for differences in scholastic aptitude related to previous decisions in the educational career, differs at specific educational transition points. The design was based on an educational transition model of Mare (1981), who found that, in the United States, the impact of social background declined the further advanced students' educational careers were. The following three educational transition points were constructed:

1. Transition to junior secondary education (attainment levels 3 through 10 versus levels 1 or 2). All respondents were eligible for this transition and most made it successfully: 91 percent of the men and 89 percent of the women in our sample.
2. Transition to senior secondary education (attainment levels 5 through 10 versus levels 3 and 4). Only respondents who successfully completed the first transition were eligible for this transition. About 78 percent of the eligible men and 71 percent of the eligible women successfully made this transition.
3. Transition to tertiary education (attainment levels 8 through 10 versus levels 5 through 7). Only respondents who were successful in the second transition were included in the analysis of this transition. Half of the men and 43 percent of the women 'survived' this third transition.

Note that these transitions need not be made in the exact order we defined them. In the Dutch educational system, the routes people take during their educational careers vary substantially. For example, the first transition (from primary education and junior vocational education to secondary general education) was skipped by respondents who chose to follow senior vocational education or a higher level of education immediately after having finished primary education. Nevertheless, those eligible for a certain transition always need to have attained a certain level that is either testified by a diploma or is based on the school's evaluation of their scholastic abilities as sufficient to warrant the transition to a higher schooling level. Therefore, the three transitions offer an adequate representation of a person's educational career in the Netherlands (De Graaf & Ganzeboom, 1993).

Table 1: *Descriptives of all variables in the analysis*

	men		women		test of sex difference
	mean	s.d.	mean	s.d.	
Educational attainment ^a	12.70	3.18	11.93	3.08	**
Extroversion ($\alpha=0.86$) ^b	4.69	1.10	4.82	1.06	*
Friendliness ($\alpha=0.84$) ^b	5.41	0.72	5.51	0.68	**
Conscientiousness ($\alpha=0.88$) ^b	4.98	1.07	5.11	1.03	**
Emotional stability ($\alpha=0.82$) ^b	4.90	0.94	4.47	0.95	**
Openness to experience ($\alpha=0.80$) ^b	4.60	0.99	4.35	1.02	**
Education father ^d	9.67	3.56	9.57	3.54	n.s.
Education mother ^d	8.56	2.77	8.59	2.76	n.s.
Occupational status father ^c	44.47	12.46	44.57	12.49	n.s.
Year of birth ^d	53.89	12.46	54.59	16.44	n.s.
Number of respondents	870		865		

Source: Family Survey Dutch Population 1998, selection of 1735 individuals aged 25-70 with valid information on all variables

* Sign. $p < 0.05$; ** $p < 0.01$; n.s. not significant, $p > 0.05$

^a coded in years of education completed with minimum 6 and maximum 20.

^b mean of six items with minimum 1 and maximum 7; α is Cronbach's reliability coefficient.

^c International Socio-Economic Index (ISEI) with minimum 2 and maximum 90.

^d Year of birth - 1900; minimum is 28, maximum is 73.

Personality was measured using a Dutch version of a standardized, condensed scale for the *Big Five* (Gerris, Houtmans, Kwaaitaal-Roosen, Schipper, Vermulst & Janssens, 1998). This instrument consisted of 30 items (six for each personality trait) that respondents were asked to score on a seven-point scale according to the degree they considered each item to provide an accurate description of themselves. Grouped per dimension, the following items were used (items with an asterisk were inverted to create the scale):

<i>extroversion:</i>	<i>friendliness:</i>	<i>conscientiousness:</i>	<i>emotional stability:</i>	<i>openness to experience:</i>
withdrawn*	pleasant	sloppy*	anxious*	creative
quiet*	helpful	organized	irritable*	complex
reserved*	kind	systematic	touchy*	imaginative
talkative	cooperative	thorough	nervous*	artistic
introvert*	agreeable	neat	fearful*	deep
bashful*	sympathetic	careful	high-strung*	innovative

The final score for each scale consisted of the means of the six items: Cronbach's α 's showed that these scales were highly reliable. Moreover, the scales correlated strongly with Goldberg's original measurement, in which 20 items were used for each trait (Goldberg, 1992; Gerris et al., 1998). Table 1 shows the reliability coefficients of the five personality traits and the average scores of men and women. Men had significantly higher scores on emotional stability and openness. Women scored significantly higher on extroversion, friendliness, and conscientiousness. The largest gender differences were found for emotional stability and openness, which is in accordance with the earlier results of Feingold (1994) and Goldberg et al. (1998).

Respondents' social background was measured using both parents' educational attainment and the father's occupational status. Parents' educational attainment was measured using the same scale as used for the respondents. The father's occupational status was coded using the International Socio-Economic Index (ISEI; Ganzeboom, De Graaf & Treiman, 1992). Year of birth was added as a control variable. All results will be presented for men and women separately.

The hypotheses were tested using (a) OLS regression analysis for the highest level of schooling attained, and (b) logistic regression analysis for the school transitions. In both analyses, we investigated whether the five personality traits affected the respondents' educational success after social background was controlled for. As mentioned above, we did not expect personality to be closely related to social background, but this expectation was also tested.

Results

The relation between social background and personality

Before investigating the impact of personality on educational success, we first examined the relationship between a person's personality and his or her social background. Table 2 shows to what extent each of the personality traits can be predicted by social background, year of birth, and sex. Given our initial aim of improving the explanatory power of models predicting the educational career by incorporating personality, we expected the impact of social background on personality to be limited. This expectation was sustained: only two out of the fifteen effects of parental education and occupation reported in Table 2 are statistically significant. Openness is positively affected by both the father's educational attainment and occupational status. This corresponds to the idea that openness is associated with intellectual curiosity and creativity. It is important to note that the effects of the father's and the mother's levels of schooling do not differ significantly ($p > .10$). When constrained to be equal, the effects of the father's and the mother's educational attainment are $b = .017$ ($p < .01$).

The weak relationship between social background and personality implies that the relationship between social background and educational attainment is not caused by their mutual dependence on personality. Therefore, it is not possible that the effect of social background on educational attainment is spurious.

Table 2: *The effects of social background, sex, and year of birth on personality for Dutch men and women (aged 25–70; unstandardized effects)*

	extro- version	friend- liness	conscien- tiousness	emotional stability	openness to experience
Education father (6–20)	.006	.005	-.011	.008	.024**
Education mother (6–20)	.006	-.008	-.030	.013	.007
Occupational status father (10–90)	-.001	.001	.000	.000	.004*
Sex (0=female, 1=male)	-.120*	-.090**	-.130**	.433**	.246**
Year of birth (28–73)	.006*	.012**	-.002	-.002	.011**
Constant	4.423	4.830	5.570	4.393	3.289
R ² adjusted	.006	.041	.014	.050	.054

Source: Family Survey Dutch Population 1998, selection of 1735 individuals aged 25-70 years with valid information on all variables

Sign. * $p < 0.05$; ** $p < 0.01$

Year of birth had significant effects on personality in three out of five cases. Among the younger cohorts, respondents reported being more extroverted, friendly and open. Given the cross-sectional design of the data, it is not clear whether these are effects of age or effects of cohort. Based on earlier results, we suspect that people, today, consider themselves to be more extroverted, friendly and open than in the past (cohort effect). Furthermore, there were some significant differences between men and women. Women reported being more conscientious, extroverted and friendly than men, whereas men reported being more open to experiences and emotionally stable.

Given the small effect of social background characteristics and year of birth (age), it is not surprising that the proportions of explained variance of the personality traits are low. Friendliness and conscientiousness, the traits that might be substantially affected by the shared environment according to the literature, can only be explained for 4.1 and 1.4 percent, respectively, by our social background indicators plus year of birth and sex (with the effects of birth year and sex being the most important determinants of friendliness). Openness can be explained for 5.4 percent. For emotional stability, this percentag = 5.0.

Educational attainment

Table 3 shows the effects of the *Big Five* personality traits on final educational attainment, measured in years of education completed. Model A is the base model including only the three social background variables plus year of birth and sex. In model B, the five personality traits are added to this model. Both models were estimated for men and women together, and for men and women separately. Model A shows familiar effects: parents' educational attainment and occupational status have strong effects on children's educational attainment. The effects of social background are equal for men and women. The only effect in Model A that is significantly different for men and women is the cohort effect, which is larger for women than for men. This has to do with the emancipation of educational opportunities.

Model B for men and women together shows that all five personality traits significantly affect educational attainment. Extroversion and friendliness have negative effects, whereas the effects of conscientiousness, emotional stability, and openness are positive. The only effect that goes against the hypothesis is the negative effect of friendliness. The effects of personality are equal for men and women, with one exception: the effect of openness to experience is more than twice as large for men as for women.

Table 3: *The effects of personality on educational attainment for Dutch men and women aged 25–70*

	All		Men		Women		Test ^a
	b	β	b	β	b	β	
Model A							
Education father (6–20)	.211**	.24	.224**	.25	.206**	.24	n.s.
Education mother (6–20)	.157**	.13	.156**	.13	.152**	.14	n.s.
Occupational status father (10–90)	.020**	.10	.018*	.09	.021**	.11	n.s.
Sex (0=female, 1=male)	.788**	.12					
Year of birth (28–73)	.039**	.14	.010	.04	.068**	.25	**
Constant	5.585		7.836		4.010		
R2 adjusted	.218		.166		.269		
Model B							
Education father (6–20)	.203**	.23	.201**	.22	.208**	.24	n.s.
Education mother (6–20)	.154**	.13	.159**	.13	.147**	.13	n.s.
Occupational status father (10–90)	.018**	.09	.016*	.08	.021**	.11	n.s.
Extroversion (1–7)	-.191**	-.07	-.190	-.07	-.246**	-.08	n.s.
Friendliness (1–7)	-.301*	-.07	-.388*	-.09	-.167	-.04	n.s.
Conscientiousness (1–7)	.154**	.05	.210*	.07	.075	.03	n.s.
Emotional stability (1–7)	.287**	.09	.231*	.07	.391**	.12	n.s.
Openness to experience (1–7)	.420**	.14	.613**	.19	.224*	.07	**
Sex (0=female, 1=male)	.531**	.08					
Year of birth (28–73)	.040**	.14	.011	.04	.070**	.26	**
Constant	4.380		6.130		2.914		
R2 adjusted	.241		.201		.286		
N	1735		870		865		

Source: Family Survey Dutch Population 1998, selection of 1735 individuals aged 25–70 with valid information on all variables

Sign. * $p < 0.05$; ** $p < 0.01$; n.s. not significant, $p > 0.05$

^a Significance of differences in the effects of men and women.

Most effects of personality on educational attainment may be statistically significant, but are they also substantial? Table 3 also reports standardized effects (β coefficients). For men, the two largest effects are those of the father's education ($\beta = 0.22$) and openness to experience ($\beta = 0.19$). The standardized effects for the other personality traits range between -0.09 and 0.07 . Openness is thus the most influential personality trait, probably due to its relation with resourcefulness

and intelligence, but the other dimensions of the *Big Five* are also important for men. When educational attainment is explained using only the three social background indicators plus year of birth and sex, the proportion of explained variance is 16.6 percent (*adjusted R*²). Adding the *Big Five* personality traits increases this percentage to 20.1 percent. The most influential personality trait for women, emotional stability ($\beta=0.12$), is about as important for their educational attainment as the father's occupational status ($\beta=0.11$) and the mother's schooling level ($\beta=0.13$). The father's educational attainment ($\beta=0.24$) and birth year ($\beta=0.26$) are more decisive for women. For women, the proportion of explained variance in the basic model A is 26.9 percent, while the proportion in model B is only slightly higher, at 28.6 percent. Parental characteristics, but especially year of birth, are better predictors of women's educational attainment than personality.

In addition, we examined the effects of personality on the three most relevant transitions in a person's educational career in the Netherlands. The results of the logistic regression analyses (not reported) demonstrate that the breaking down of the educational career into a set of transitions does not improve our understanding of the impact of personality on educational success. The results of a *Chi*²-test conducted in order to assess whether the effects of the *Big Five* personality traits differ at the three transition points, show that there are no significant differences (*Chi*²=9.7 for men and *Chi*²=6.5 for women, with 10 degrees of freedom). We conclude, therefore, that the effects of personality traits on the highest schooling level are stable across the entire educational career.

Conclusions and discussion

The results of our analyses demonstrate that the *Big Five* personality traits have a substantial impact on educational attainment. All five basic personality traits have significant effects on educational attainment, and they are equal for men and women, with only one exception: openness seems to have a larger effect for men. The effects of personality traits on the educational career are largely in agreement with theoretical predictions. Conscientiousness, emotional stability, and openness to experience have positive effects, extroversion and friendliness have negative effects. The negative effect of friendliness for men was not expected and cannot be explained easily. The items used to indicate friendliness (kind, cooperative, sympathetic, pleasant, agreeable, helpful) seem to indicate nothing but good things. Nevertheless, it is possible that friendly people are less achievement-oriented, or that people who achieve less develop higher levels of friendliness to compensate for their relative lack of skills or status. These are, of course, post hoc arguments and further research is needed to interpret this effect properly. Openness has the strongest effect, which comes as no surprise given the close relation of the concept with creativity, resourcefulness, and intelligence. The positive effects of conscientiousness and emotional stability, as well

as the negative effect of extroversion, are in accordance with the psychological research literature.

A more detailed analysis, in which we assessed at which phase of the educational career the impact of personality is largest, did not yield additional insights. The impact of personality emerges most clearly if the highest level of schooling attained is examined and it does not differ significantly at the subsequent stages of the educational career.

As stated earlier, the causal interpretation of the relation between personality and educational attainment is problematic. For those who claim that higher education enhances emotional stability, openness, or conscientiousness, our findings might be considered useful. The weakest link here might be openness, which is the trait with the largest impact on educational success. The items indicating openness (being creative, innovative, and imaginative) are more readily appropriated by people who are well educated. Otherwise, we believe that the causal direction from personality to educational success is more likely, but our analysis offered no decisive results regarding this point.

Irrespective of these questions of causality, it is interesting that the effects of personality on educational attainment in no way bias the impact of socio-economic background. This is because the relationship between personality and family background is weak. The more traditional studies of educational inequality therefore do not suffer from the fact that personality was typically not taken into consideration. The inclusion of personality traits in the model increased the proportion of explained variance, especially for men, but it did not help us with the interpretation of the impact of social background. For an explanation of the impact of social background on educational success, we recommend focusing on (a) relevant parental resources, (b) hereditary intelligence, and (c) the way decisions made by parents and children during the educational career are affected by socio-economic position.

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