

Personality and Educational Attainment

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Very preliminary – comments highly welcome!

Abstract

This paper investigates the importance of personality traits for educational outcomes using a broad range of personality measures (Big Five, locus of control, reciprocity) and several educational outcomes. Using data from the German Socio-Economic Panel Study (SOEP) with Structural Equation Models (SEM) it shows that personality is associated with educational attainment, and that personality traits have different effects on educational success for individuals from different family backgrounds. Men from disadvantaged families have the greatest benefit from openness to experience and internal locus of control, while for males from high-SES families personality traits are not equally important in determining graduation from high school or university. Women in the highest SES-group benefit from being open to experience and from having a high internal locus of control, a low external locus of control respectively. In contrast, there is not such a clear pattern of the ideal set of personality for obtaining a university-entrance degree and graduating from university for women from families with a low socio-economic status. The results for Germany are in line with findings on disadvantaged young males in the United States, but do not support previous findings on advantaged children.

JEL codes: I24, I21

Keywords: Educational Attainment, Big Five, Locus of Control, Reciprocity

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1. Introduction

Research on intergenerational mobility over the last few decades has revealed that economic status of parents is strongly transmitted from parents to children. As stated by Gary Solon in the Handbook of Labor Economics (1999), “Now that we know parental income is a fairly strong predictor of offspring's earnings, it becomes that much more important to find out which of the causal processes [...] are mainly responsible for the empirically observed intergenerational associations of earnings.” Education is an important channel by which economic status is linked across generations (Hertz et al. 2007). However, although there is vast evidence from the literature that parental education determines educational outcomes of their offspring, it is much less clear how educational attainment is transmitted from parents to children.

This paper contributes to the discussion on which mechanisms can explain the intergenerational transmission of educational inequality by investigating the relationship between personality and educational outcomes. Although personality traits were for a long time not considered particularly relevant by economists, the pioneering work of James Heckman and co-authors since the 2000s and newly available data on psychological traits has led to an increasing attention to the role of personality in economics. Personality traits, which are often referred as non-cognitive skills, have been found to be important predictors of economic behaviors and outcomes (e.g. Heckman, Stixrud, and Urzua, 2006) and to be correlated between parents and their children (e.g. Anger, 2012). Furthermore, there is evidence that children from disadvantaged families have less favorable personality traits (Duncan and Magnuson 2011). By affecting educational attainment, personal traits may help to explain how socio-economic status is linked across generations. Hence, the effect of non-cognitive skills on socio-economic outcomes and the role of parents and educational institutions in skill formation are an

important issue in intergenerational mobility research. Family background is of particular importance as it may affect both children's skills and the environment in which these skills are developed (Lundberg 2012). Using data from the National Longitudinal Study of Adolescent Health (Add Health), Lundberg (2012) shows that the interaction between children's environment and their skills are in fact important for college graduation in the United States.

This paper explores the research question whether personality matters for educational success using a broad range of personality measures with repeated measurements and several educational outcomes. Using data from the German Socio-Economic Panel Study (SOEP), it investigates which personal traits (Big Five, locus of control, reciprocity) are most important for years of education in general, and more specific, for obtaining a university-entrance degree (equivalent to high school degree) and graduating from university. Investigating different educational outcomes is important as the returns to personality may differ across attainment levels. Moreover, this paper examines the question as how returns to personality traits differ by socio-economic background. The dataset provides a wide range of family background variables, including information on parental personality, which allow comparing the relative importance and the interaction effect of personal traits and other determinants for educational success. Finally, results of this study will be compared with previous findings for other countries, in particular the United States (Lundberg 2012).

Cross-national comparisons between Germany and the United States are particularly interesting for at least two reasons. First, both countries differ strongly in their educational systems, e.g. with respect to early childhood education, school tracking, and tuition fees. Any differences in the relationship between personality and educational attainment may point to the importance of particular attributes of the

educational system in preventing or fostering educational inequality. Second, there is a striking difference in social mobility between Germany and the United States, the latter being known as providing less equal opportunity. Hence, one could infer from cross-national comparisons which institutions are important to enhance educational mobility.

2. Previous literature

Over the last few years, research on intergenerational mobility has turned its focus to exploring causal processes, which drive the strong link of economic status across generations (Black and Devereux 2011). Education is considered as important channel by which economic status is passed from parents to their offspring. There is vast evidence that parental education determines educational outcomes of their children (e.g. Hertz et al. 2007). In modern societies, years of schooling completed by parents and their children's schooling are correlated between 0.14 and 0.45 (Mulligan, 1999). Couch and Dunn (1997) report a father-son correlation of 0.24 for Germany. This is clearly below that of the United States, where correlations for all of the parent-child pairs are greater than 0.4. Hence, intergenerational correlations of education are clearly higher in the United States than in Germany. However, it is much less clear how educational attainment is transmitted from parents to children, and it may be promising to investigate the link between personality and educational outcomes as one of the underlying mechanisms of educational mobility.

There are a growing number of studies that show that personality is associated with educational outcomes. Of the Big Five, conscientiousness predicts overall attainment and achievement (e.g. Lleras, 2008), whereas openness determines school

attendance or the difficulty of selected courses (for an overview, see Almlund et al. 2011). Furthermore, there is evidence that personal traits and motivation affects performance on achievement tests (Golsteyn, Heckman, and Humphries, 2011). Almlund et al. (2011) present associations between years of schooling and the Big Five from three nationally representative samples from Germany using the SOEP, Netherlands, and the United States. Their results show that conscientiousness and emotional stability are positively associated with years of education in Germany, and that the link is stronger than in the United States. In contrast, openness to experience, which is the most important personal trait in the U.S., does not seem to play a role in their German sample. This cross-national comparison provided by Almlund et al. (2011) gives interesting first insights. However, the models used include only a small number of controls (age, sex, and gender), and lack information on childhood environment and parental background, which may be crucial in predicting educational achievement.

Another branch of the literature focuses on other educational outcomes, for example the selection of more difficult classes or school attendance. Moreover, Almlund et al. (2011) provide an extensive overview of the existing research showing that facets of conscientiousness and of emotional stability predict successful high school graduation in the United States. Almlund et al. (2011) also summarize studies on the associations between locus of control and high school graduation from nationally representative samples from Australia and the United States. In both countries, educational attainment is similarly affected by locus of control. This result supports findings from Coneus, Gernandt, and Saam (2011) who show that locus of control predicts dropout probability in Germany. Cunha, Heckman, and Schennach (2010) find that 12% of the variation in educational attainment of adolescents can be attributed to personality, compared to 16% to cognitive skills. Lundberg (2012) investigates the relationship between Big Five

personality traits and college graduation in the U.S. and shows that the ideal set of personality traits differs by socio-economic status of the family. While conscientiousness has a significant impact on college graduation for advantaged children, openness to experience is an important predictor for disadvantaged young men.

In sum, there are several recent studies that indicate that personality matters for educational outcomes, and that there are differences across family backgrounds in the personality traits that determine graduation in the U.S. . This paper adds to this literature by providing a greater variety of personality measures and educational outcomes beyond years of schooling, and by taking into account not only family background, but also childhood environment and intergenerational relationships.

3. Data and Methods

This study is based on the German Socio-Economic Panel Study (SOEP), which is a representative household panel survey that started in 1984 (Wagner et al., 2007). The SOEP conducts annual personal interviews with all household members aged 18 and above, and provides rich information on socio-demographic characteristics, family background, and childhood environment. In more recent years, a Youth Questionnaire was implemented for adolescents at age 17. The sample consists of respondents aged 24 and above who have successfully answered the personality items in 2005, 2009, or 2010. Overall, there are 9,959 men and 11,032 women in the sample.

With respect to educational outcomes, the SOEP includes information on years of schooling, educational degrees, and course grades, and provides a detailed educational

biography. In this study, we use years of education, university-entrance diploma, and university degree as outcomes variables.

Socio-Economic Background

In line with Lundberg (2012) we construct four groups of socio-economic status (SES) based on maternal education and family disruption. Mothers' education is considered to be high if they have at least 12 years of schooling. Furthermore, children are considered to have grown up in a disrupted family if they have spent less than their entire childhood (the first sixteen years in their life) with both biological parents. The first SES group consists of children of highly educated mothers who have grown up in an intact family and is hence the most advantaged category. The second group has highly educated mothers, but come from non-intact families. The third group includes individuals with low maternal education from intact families, and the fourth group is the most disadvantaged with low educated mothers and non-intact families. Graph 1 shows that a university-entrance diploma and a university degree are much more often obtained by children with highly educated mothers. Among the children with highly educated mothers, the incidence of divorce or any other type of family disruption is not related to lower educational attainment. The same is true for the group of children with low-educated mothers.

Furthermore, additional socio-economic characteristics will be included in the analysis to control for family background and childhood environment at the time when schooling decisions are taken. Specifically, we control for age migration background, family size, and childhood area. For a subsample of the individuals, measures of cognitive abilities are available, since short IQ tests (coding speed, verbal ability) have

been conducted with those respondents with a computer-assisted interview in 2006 (for details, see Anger, 2012).

Personality Traits

Measures of personality for adult respondents are available for 2005 (Dehne and Schupp (2007)), and were repeated in 2009 and 2010. The personality measures in 2005 include self-rated measures that were related to the Five Factor Model (McCrae et al. (1999)) and comprise the five basic psychological dimensions – openness to experience, conscientiousness, extraversion, agreeableness, neuroticism (Big Five) – which are each measured with 3 items. In addition, self-rated measures of locus of control (10 items) and reciprocity (6 items) are included in 2005. Locus of control is the extent to which an individual believes that she controls the event that affects her. Psychologists differentiate between external locus of control, i.e. individuals believe that events are mainly the result of external effects, and internal locus of control, i.e. individuals believe that events are the results of their own action. Reciprocity measures the extent to which an individual is willing to respond to positive or negative behavior. One can distinguish positive reciprocity, i.e. the extent to which individuals respond positively to positive actions and negative reciprocity, i.e. the extent to which individuals respond negatively to negative behavior. All items related to the personality traits are answered on 7-point Likert-type scales (1 – “disagree completely” to 7 – “agree completely”). The scores are summed up to create an index ranging from 1 to 7, and standardized. In 2009, respondents were repeatedly asked to rate their personality according to the dimensions of the Five Factor Model. Self-ratings of locus of control and

of reciprocity were repeated in 2010. For those individuals who provided information on their personality traits in two years, we calculate the average score.

Table 1 shows the mean values and the number of observations for measures on personality traits (locus of control, reciprocity, Big Five). Although all self-rated measures are answered on identical 7-point Likert-type scales, the average scores differ very much, ranging from 2.54 for internal locus of control to 5.78 for positive reciprocity. Hence, standardized values should be used in the analysis to have comparable measures.

While personal traits are considered to be quite malleable during early childhood (Heckman et al. 2010), they are considered to be relatively stable over the lifespan of an individual. Early longitudinal studies suggest that personality predicts significant life-cycle events, but not the reverse (Magnus et al., 1993). More recent longitudinal studies in psychology show that personality is very stable during adult age (Roberts and DelVecchio, 2000). Furthermore, there is evidence from twin studies that personality is strongly heritable, with the genetic component being able to explain 40-60 percent of the total variation in personality (Bouchard and Loehlin, 2001). Recent research based on the SOEP shows that personality is related to specific events in an individual's life, with a stronger relationship at young and old ages, but no clear patterns are found (Specht et al. 2011). According to another recent study by Cobb-Clark and Schurer (2012) based on data from the Australian Household, Income, and Labour Dynamics Survey (HILDA), individual-level personal traits are relatively stable over the adult lifespan, and there is little evidence that individual life events in employment, family, and health affect self-rated personal traits. To the best of our knowledge, there is currently no research showing that personality is endogenous with respect to educational outcomes.

Table 1 provides evidence that the personality measures do not change in the overall population over time, as the average values in 2005 and 2009 (2010) are virtually identical. Furthermore, Table 2 shows for the Big Five personality traits on the individual level that personality is quite stable over time.

Graph 2 shows self-rated Big Five personality traits by socio-economic background.¹ More advantaged children – with mothers who are highly educated – score higher on openness, are more extraverted, and more emotionally stable (reverse neuroticism). Again, for children with highly educated mothers, there is no significant difference between children who grew up in intact and non-intact families. However, for children with low-educated mothers, in particular for women, family disruption is associated with being emotionally very unstable. Graph 3 shows the self-rated personality traits Locus of control and reciprocity according to family background. It is striking that negative reciprocity is more pronounced for children from disrupted families, independent of maternal education. In contrast, locus of control is clearly associated with maternal education. Children with highly educated mothers have a much lower external locus of control.

Latent Variable Model

The main challenges for the analysis of the effects of personality on educational attainment are potential measurement error in personality traits² and endogeneity. As some traits may be affected by schooling, contemporaneous measures of personality and

¹ The graph displays only the personality traits which showed a difference between the SES groups. For the other personality traits, the personality scores were very similar for all family background groups.

² This arises from personality traits being self-reported and from using short-form personality inventories.

educational attainment are especially problematic.³ However, employing early measures of personality to predict later outcomes is not always possible, as is partially the case in our data. As remedy, Heckman and co-authors offer Factor Structure Models (e.g. Heckman et al. 2006), in which cognitive and non-cognitive skills are captured by latent factors. They take into account influences of family background on skill measures and the effect of schooling on personality.

In this paper, we use Structural Equation Models (SEM), which are in the same vein (e.g. Marsh et al. 2005). In the latent variable model, the responses to each personality item on the personality measures are treated as noisy indicators of underlying unobserved personality traits. Each of the relevant items associated with a personality trait X_j of an individual j is assumed to be:

$$x_{ij} = \alpha_{ij} + X_j \beta_{ij} + \varepsilon_{ij} \quad \text{for } i=1,\dots,t. \quad (1)$$

Since the personality traits X_j differ in their number of relevant items, t equals three for all of the Big Five personality traits, t equals four (six) for internal (external) locus of control, and three for both positive and negative reciprocity. We assume that the errors are independent and that the latent variables have mean zero and standard deviation one. As mentioned above, the observed independent variables are standardized.

We estimate models for years of schooling, obtaining a university-entrance diploma, and graduation from high school as a function of the latent personality traits and the controls, and use linear probability models for the binary outcomes variables

³ Almlund et al. (2011) face the same problem. They admit that “this complicates the interpretation of the estimated effects of personality on schooling in older samples.” (Almlund et al., 2011 p.91)

(university-entrance degree, university degree).⁴ Estimates are conducted separately for each of the four SES groups, and separate by gender.⁵

4. Results

Table 3 – Table 6 display results for the two binary outcomes, obtaining a university-entrance diploma and graduating from university, separately for men and women. The effects of the Big Five personality traits and of the other personality traits are estimated in separate models, since these personality measures are available in different years.

University-Entrance Diploma

Table 3 displays the effects of the Big Five personality traits on obtaining a university-entrance diploma and shows that the impact of personality on educational attainment in fact differs between SES groups. Openness to experience is associated with a higher probability of obtaining a university-entrance diploma only for men from families with relatively low SES, with the effect being strongest for men from non-intact families. For this group, a one-standard deviation higher openness is associated with a 8 percentage points higher likelihood of obtaining a university-entrance degree.

Neuroticism and conscientiousness have a negative effect only for men from the most disadvantaged households, but at the same time these males benefit from higher word fluency. In contrast, there is no relationship between personality traits and high school graduation for men from families with highly educated mothers. The same is true for women independent of their SES background, with the exception of extraversion, which

⁴ Logit models will be estimated as a robustness check.

⁵ We use the Maximum likelihood version of the structural equation modeling (SEM) package in Stata 12.

has a negative effect on graduation for the most advantaged and a positive effect for the most disadvantaged women.

Effects of locus of control and reciprocity on the probability of obtaining a university-entrance degree are displayed in Table 4. The only personality trait that predicts educational attainment of men is negative reciprocity, which has a negative impact on the probability of graduating from high school for men with low-educated mothers, the effect being stronger for those from non-intact families. For women, negative reciprocity has only a negative effect for those with highly educated mothers but from non-intact families. The most advantaged women benefit from having a high internal locus of control, while the most disadvantaged suffer from having a high external locus of control. A one-standard deviation higher external locus of control is associated with a 7 percentage points lower probability of graduation from high school for these women.

University Degree

Table 5 displays the effects of the Big Five personality traits on obtaining a university degree. Openness to experience matters for university graduation for men from all SES groups, with stronger effects for men from more advantaged families. The biggest effect occurs for males with high-educated mothers but from non-intact families, for whom a one-standard deviation higher openness is related to a 13 percentage points higher probability of finishing a university degree. In contrast, almost all SES groups suffer from being more extraverted and from being emotionally unstable, which is associated with an up to 8 percentage points lower probability of university graduation per standard deviation of neuroticism. The impact of conscientiousness on educational attainment differs between SES groups in as much only SES groups 2 and 3 show a

negative association. Among women, higher openness is rewarded with a higher probability of obtaining a university degree only for the most advantaged. With the exception of neuroticism, which has a negative effect on education only for SES group 2, the other personality traits are not related to educational attainment.

Effects of locus of control and reciprocity on the probability of obtaining a university degree are displayed in Table 6. Internal locus of control has a positive impact on the probability of obtaining a university degree only for men with low-educated mothers. In particular, men from disrupted families benefit strongest from having a high internal locus of control, a one-standard deviation increase raising the probability of university graduation by 6 percentage points. External locus of control has a negative effect only for men from intact families, regardless of maternal education. In contrast, negative reciprocity is negatively associated with graduating from a university for the most advantaged and the most disadvantaged group of men. For women from non-intact families, there is no relationship between personality and educational attainment. In contrast, for women from intact families with highly educated mothers, there is a positive effect of positive reciprocity on educational attainment, whereas the effect of negative reciprocity and external locus of control is negative. Women from intact families with low educated mothers have a lower probability of graduating from university if they score high on negative reciprocity and on (internal and external) locus of control.

5. Conclusion

This paper explores the research question whether personality matters for educational success using a broad range of personality measures with repeated

measurements and several educational outcomes. Using data from the German Socio-Economic Panel Study (SOEP), it investigates which personal traits (Big Five, locus of control, reciprocity) are most important for educational attainment, and whether the returns to personality traits differ by socio-economic background. Estimates of Structural Equation Models (SEM) show that personality is associated with educational outcomes and that personality traits have different effects on educational success of individuals from different family backgrounds. Men from disadvantaged families have the greatest benefits from openness to experience and internal locus of control, while for men from high-SES families, personality traits are not equally important in determining graduation from high school or university. For women, there is not such a clear pattern of the ideal set of personality traits for attaining a high school or a university degree. These results are in line with findings on disadvantaged young males in the U.S., where openness to experience plays a crucial role for college graduation of low SES males (Lundberg 2012). However, the estimates for Germany not support findings on advantaged children, for whom conscientiousness is most important in the U.S. (Lundberg 2012).

The major concern of this study remains reverse causality because personality is measured after educational attainment for many individuals. Hence, the correlation between personality and education may be partially due to the influence of education on personality. However, there is no obvious solution to this problem, since even personality traits that are measured at younger ages (before obtaining any educational degree) may be affected by the educational process. Hence, no indicator of personality can be treated as pre-determined. However, recent research on stability of personality does not support the reverse causality hypothesis. In addition, twin studies show that a high fraction of variance is genetic.

Another issue is the definition of SES groups, which only use crude measures of children's environments, maternal education and family structure. However, personal traits that are relevant for educational success are likely to depend on more environmental factors (e.g. school quality, peer group). Hence, future research aims at using alternative definitions of family background based on more precise information.

Another refinement of the study is the inclusion of parental personality traits and parental cognitive skills in the regressions. This may be important as parental personality and cognitive abilities may have a direct effect on child school outcomes, an effect which is so far not isolated in the models. Finally, an important objective is to examine heterogeneous effects by migration background.

By refining the analysis, it should become evident how personality traits determine educational outcomes, and how the effects of personality on educational attainment differ between socio-economic groups. By changing certain features of the educational system and by promoting certain non-cognitive skills during early childhood – especially of those children from disadvantaged backgrounds – decision makers could reduce educational inequality in the long run.

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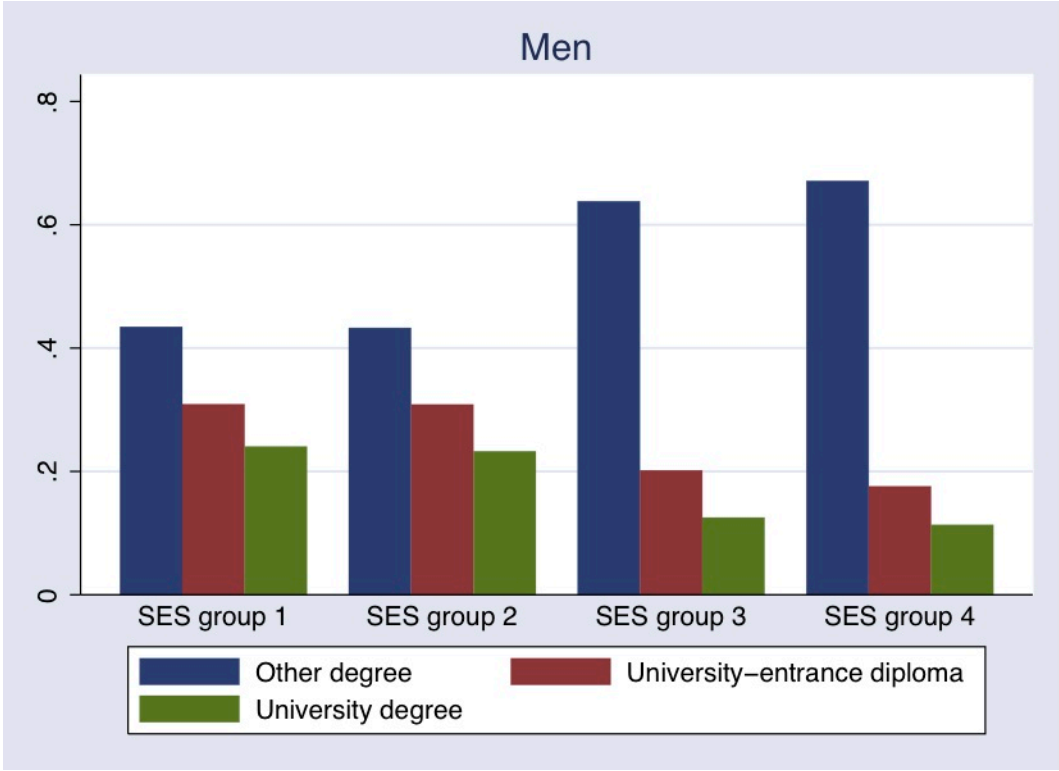
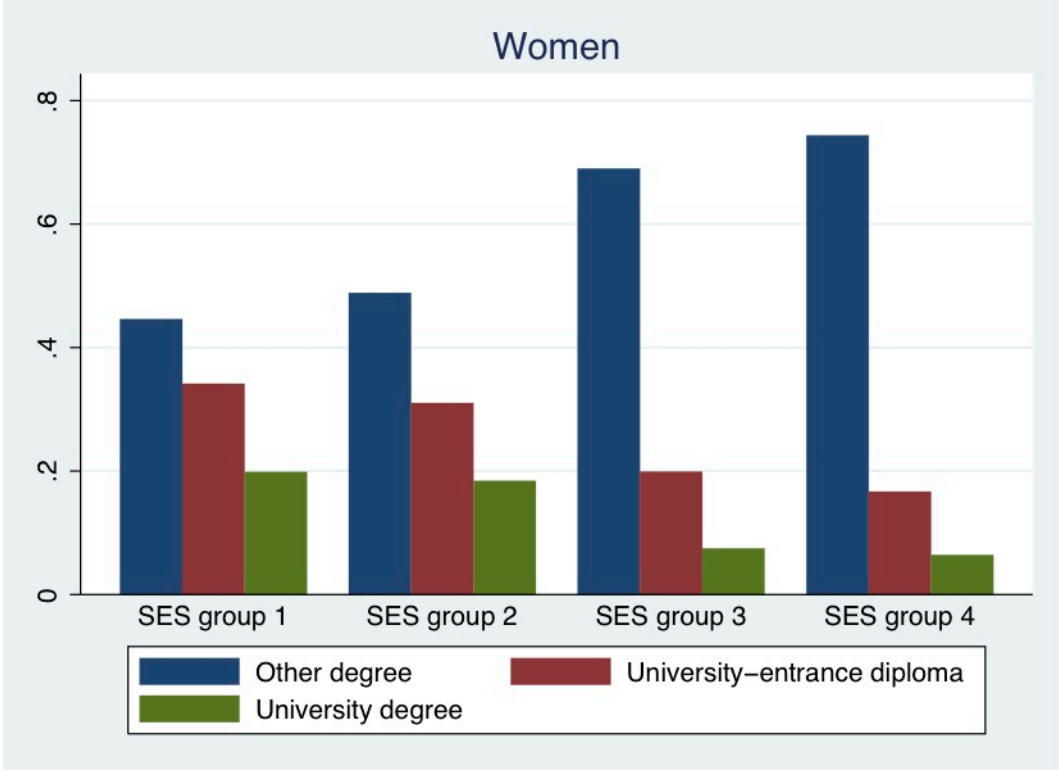
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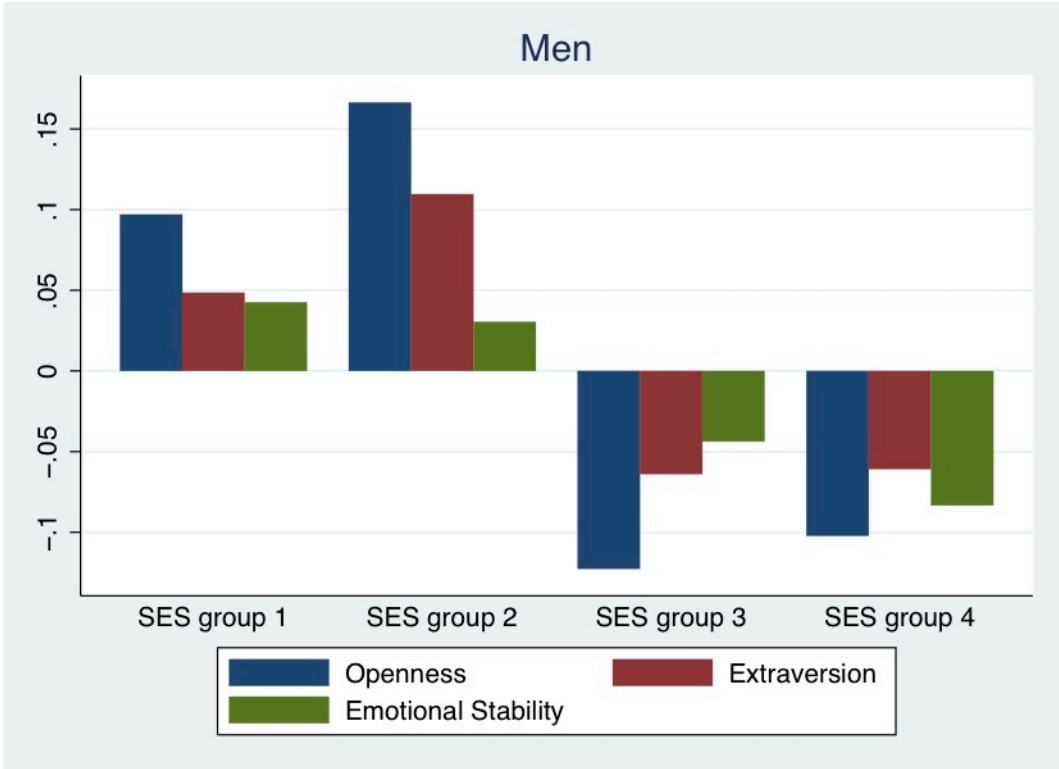
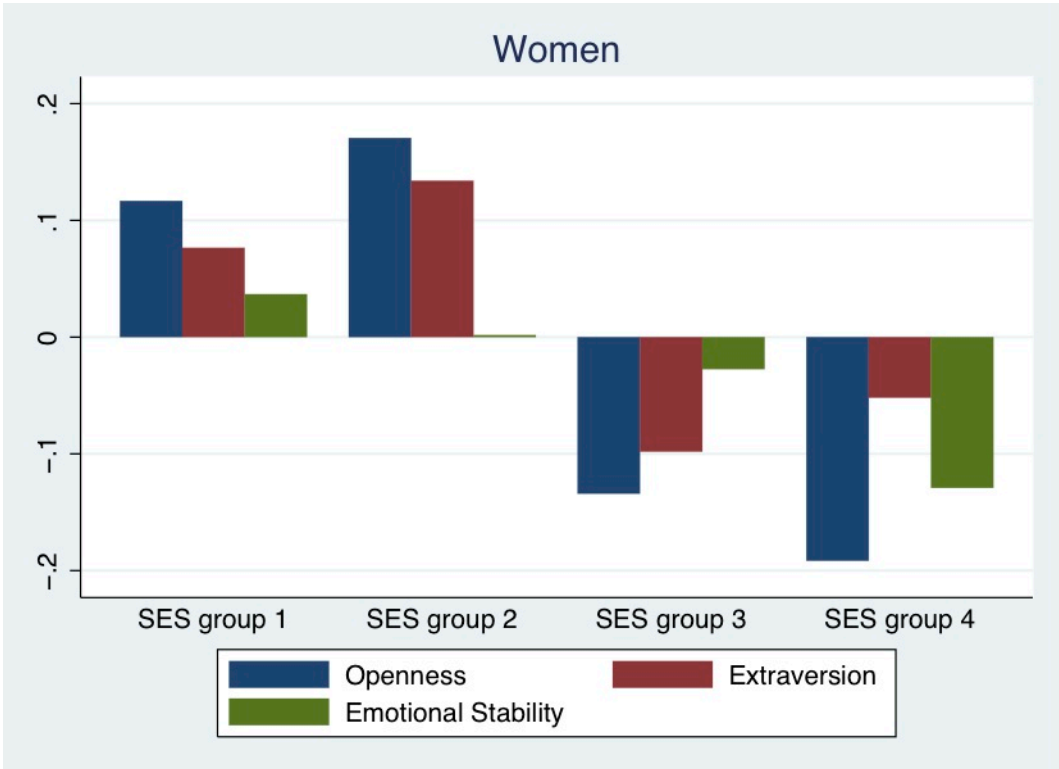
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Graphs and Tables

Graph 1: Educational Attainment by Family Background



Graph 2: Big Five Personality Scores by SES Group (Standardized Scores)



Graph 3: Reciprocity and Locus of Control by SES Group (Standardized Scores)

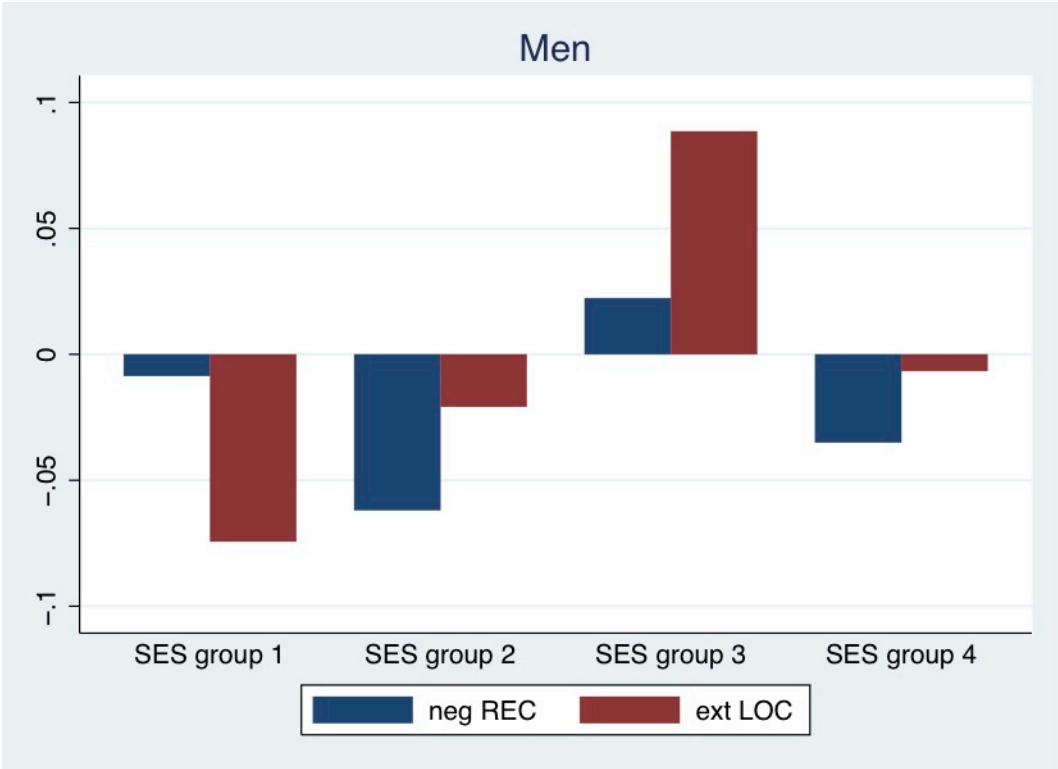
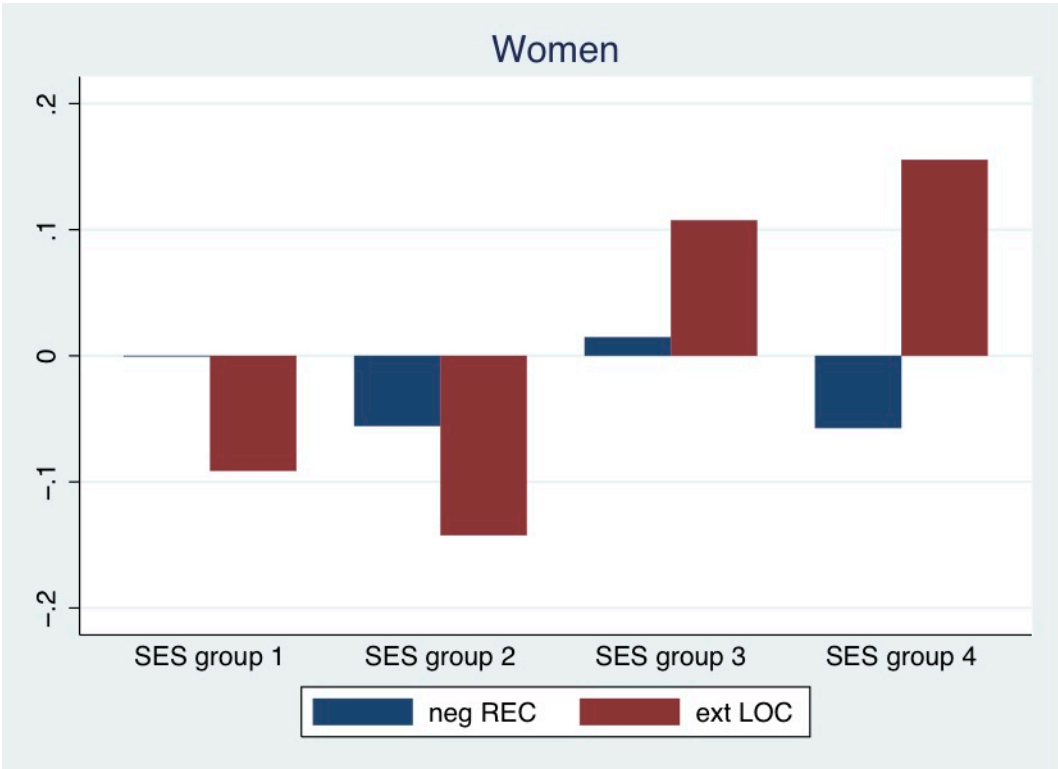


Table 1: Descriptives Statistics – Non-Cognitive Skills

Year	Ext. LoC	Int. LoC	Recip (p)	Recip (n)	B5 O	B5 C	B5 E	B5 A	B5 N
2005	3.44	2.54	5.78	3.39	4.61	5.62	4.94	5.37	3.83
2009					4.49	5.54	4.89	5.27	3.76
2010	3.37	2.63	5.77	3.24					

Note: Given are mean test scores and number of observations for measures on external and internal locus of control, positive and negative reciprocity and Big Five personality traits measures. Source: SOEPv28 (2005-2010).

Table 2: Stability of the Non-Cognitive Skill Measures

Big Five	O	C	E	A	N
Difference 2009-2005	-.16 (1.09)	-.09 (0.91)	-.11 (1.00)	-.14 (0 .96)	-.12 (1.15)
Correlation 2009, 2005	0.58	0.52	0.60	0.51	0.56

Note: Includes only SOEP respondents who provide self-reported measures on personality traits in 2005 and 2009.

Table 3: University-Entrance Diploma: LPM with Big Five Personality Traits

	Men			
	SES 1	SES 2	SES 3	SES 4
Openness	0.0271 (0.019)	0.00995 (0.044)	0.0431*** (0.014)	0.0779** (0.031)
Conscientiousness	-0.0106 (0.017)	-0.00566 (0.047)	0.0122 (0.015)	-0.0579* (0.030)
Extraversion	-0.00762 (0.018)	0.0291 (0.047)	-0.0298** (0.015)	-0.0390 (0.031)
Agreeableness	0.0121 (0.017)	-0.0341 (0.044)	-0.0221 (0.014)	0.0217 (0.033)
Neuroticism	-0.0105 (0.017)	-0.0300 (0.046)	-0.00335 (0.013)	-0.0652** (0.028)
Speed test	0.00341 (0.023)	0.0845 (0.060)	0.0184 (0.020)	-0.0408 (0.046)
Word fluency	0.0182 (0.022)	-0.0244 (0.057)	0.0216 (0.020)	0.0793** (0.039)
N	4,737	580	4,210	432
	Women			
	SES 1	SES 2	SES 3	SES 4
Openness	0.0203 (0.018)	0.00428 (0.041)	0.00650 (0.014)	0.0175 (0.033)
Conscientiousness	0.0200 (0.017)	-0.0474 (0.042)	0.0225 (0.014)	0.0283 (0.031)
Extraversion	-0.0323* (0.018)	0.0475 (0.043)	-0.00818 (0.014)	0.0706** (0.033)
Agreeableness	-0.0178 (0.016)	0.0122 (0.040)	-0.0152 (0.014)	-0.0496 (0.032)
Neuroticism	-0.00352 (0.017)	0.0279 (0.037)	-0.00812 (0.013)	0.0358 (0.029)
Speed test	0.0749*** (0.024)	0.187*** (0.054)	0.00968 (0.019)	0.0384 (0.048)
Word fluency	-0.0497** (0.023)	-0.0995** (0.048)	0.0117 (0.019)	-0.0186 (0.048)
N	5,122	706	4,736	468

Outcome variable: University-entry diploma. All models include age, migration background of the mother, number of siblings, and childhood area.

*** p<0.01, ** p<0.05, * p<0.1

Table 4: University-Entrance Diploma: LPM with Reciprocity and Locus of Control

	Men			
	SES 1	SES 2	SES 3	SES 4
Pos.REC	0.0220 (0.018)	0.0262 (0.043)	0.00461 (0.014)	0.0279 (0.030)
Neg.REC	-0.0112 (0.017)	-0.0261 (0.044)	-0.0276** (0.014)	-0.0484* (0.029)
Internal LOC	0.00906 (0.019)	0.0474 (0.049)	0.0165 (0.015)	-0.0229 (0.031)
External LOC	-0.00795 (0.018)	0.00229 (0.048)	-0.0139 (0.015)	-0.0293 (0.029)
Speed test	0.00938 (0.023)	0.102* (0.059)	0.0240 (0.020)	-0.0220 (0.044)
Word fluency	0.0204 (0.022)	-0.0158 (0.054)	0.0213 (0.020)	0.0554 (0.038)
N	4,737	580	4,210	432
	Women			
	SES 1	SES 2	SES 3	SES 4
Pos.REC	-0.0175 (0.017)	0.0104 (0.033)	-0.00873 (0.013)	0.0566 (0.035)
Neg.REC	0.00162 (0.016)	-0.0818** (0.037)	-0.0160 (0.013)	0.0260 (0.031)
Internal LOC	0.0331* (0.018)	-0.0152 (0.043)	0.00250 (0.014)	-0.0394 (0.035)
External LOC	-0.00686 (0.018)	-0.00837 (0.039)	-0.0216 (0.014)	-0.0695* (0.036)
Speed test	0.0752*** (0.024)	0.162*** (0.054)	0.00122 (0.020)	0.0313 (0.050)
Word fluency	-0.0443* (0.023)	-0.0908* (0.049)	0.0117 (0.020)	-0.0508 (0.048)
N	5,122	706	4,736	468

Outcome variable: University-entry diploma. All models include age, migration background of the mother, number of siblings, and childhood area.

*** p<0.01, ** p<0.05, * p<0.1

Table 5: University Degree: LPM with Big Five Personality Traits

	Men			
	SES 1	SES 2	SES 3	SES 4
Openness	0.108*** (0.017)	0.131*** (0.038)	0.0754*** (0.013)	0.0489* (0.027)
Conscientiousness	0.00500 (0.016)	-0.0691* (0.040)	-0.0344** (0.014)	0.0425 (0.026)
Extraversion	-0.0506*** (0.016)	-0.0441 (0.041)	-0.0294** (0.014)	-0.0493* (0.027)
Agreeableness	-0.00671 (0.016)	-0.0384 (0.038)	0.00673 (0.013)	0.0178 (0.029)
Neuroticism	-0.0507*** (0.015)	-0.0768* (0.040)	-0.0225* (0.012)	-0.0361 (0.024)
Speed test	-0.0156 (0.021)	-0.0643 (0.052)	0.0119 (0.019)	0.0804** (0.040)
Word fluency	0.0429** (0.020)	0.0116 (0.049)	0.0391** (0.018)	-0.0445 (0.034)
N	4,737	580	4,210	432
	Women			
	SES 1	SES 2	SES 3	SES 4
Openness	0.0709*** (0.016)	0.0411 (0.034)	0.0144 (0.010)	-0.000602 (0.018)
Conscientiousness	-0.0242 (0.015)	0.0352 (0.035)	-0.00380 (0.010)	-0.00939 (0.018)
Extraversion	-0.00669 (0.016)	-0.0193 (0.036)	0.00382 (0.010)	0.00667 (0.019)
Agreeableness	0.000322 (0.015)	-0.0474 (0.034)	0.00346 (0.010)	0.00178 (0.018)
Neuroticism	-0.0157 (0.015)	-0.0758** (0.031)	-0.000434 (0.009)	-0.0192 (0.016)
Speed test	-0.0596*** (0.022)	-0.164*** (0.045)	-0.0268** (0.013)	-0.0141 (0.027)
Word fluency	0.0756*** (0.021)	0.163*** (0.040)	0.0485*** (0.014)	0.0319 (0.027)
N	5,122	706	4,736	468

Outcome variable: University degree. All models include age, migration background of the mother, number of siblings, and childhood area.
 *** p<0.01, ** p<0.05, * p<0.1

Table 6: University Degree: LPM with Locus of Control and Reciprocity

Men				
	SES 1	SES 2	SES 3	SES 4
Pos.REC	-0.0198 (0.016)	-0.118*** (0.039)	0.00883 (0.014)	0.0334 (0.026)
Neg.REC	-0.0828*** (0.016)	-0.0182 (0.040)	-0.0184 (0.013)	-0.0476* (0.025)
Internal LOC	0.0247 (0.018)	0.0314 (0.043)	0.0358** (0.014)	0.0637** (0.027)
External LOC	-0.0309* (0.017)	-0.0433 (0.043)	-0.0236* (0.014)	-0.00602 (0.025)
Speed test	-0.0237 (0.021)	-0.0182 (0.052)	0.00529 (0.019)	0.0842** (0.038)
Word fluency	0.0551*** (0.020)	-0.0106 (0.048)	0.0549*** (0.019)	-0.0483 (0.033)
N	4,737	580	4,210	432
Women				
	SES 1	SES 2	SES 3	SES 4
Pos.REC	0.0313** (0.015)	0.00354 (0.029)	0.00388 (0.009)	0.00658 (0.021)
Neg.REC	-0.0391*** (0.014)	-0.00737 (0.033)	-0.0237*** (0.009)	0.00132 (0.019)
Internal LOC	-0.0164 (0.016)	-0.0284 (0.038)	-0.0163* (0.010)	0.0147 (0.021)
External LOC	-0.0409** (0.016)	-0.0464 (0.035)	-0.0194** (0.010)	-0.0152 (0.021)
Speed test	-0.0714*** (0.022)	-0.148*** (0.048)	-0.0302** (0.014)	-0.0364 (0.030)
Word fluency	0.0812*** (0.021)	0.161*** (0.043)	0.0477*** (0.014)	0.0560* (0.029)
N	5,122	706	4,736	468

Outcome variable: University degree. All models include age, migration background of the mother, number of siblings, and childhood area.

*** p<0.01, ** p<0.05, * p<0.1