



Does it pay to be nice? Personality and earnings in the UK

Guido Heineck
University of Erlangen-Nuremberg

(October 2007)

LASER Discussion Papers - Paper No. 3

(edited by A. Abele-Brehm, R.T. Riphahn, K. Moser and C. Schnabel)

Correspondence to:

Dr Guido Heineck, Lange Gasse 20, 90403 Nuremberg, Germany, Phone: +49-911-5203-260, Fax:
+49-911-5203-178, Email: guido.heineck@wiso.uni-erlangen.de.

Abstract

There is a small economic literature suggesting that some part of the variation in earnings can be attributed to individuals' psychological attributes. Using data from the BHPS for the first time, all basic traits from the Five Factor Personality Inventory are employed to examine the relationship between personality traits and wages. The estimates indicate no clear patterns for openness, conscientiousness and extraversion. The results however suggest wage penalties for neuroticism and agreeableness for both male and female workers in the UK, i.e. being nice does not pay.

Zusammenfassung

Ergebnisse ökonomischer Studien weisen darauf hin, dass ein Teil der Variation in Verdiensten zurückgeführt werden kann auf psychologische Attribute von Personen. Die vorliegende Arbeit nutzt in diesem Kontext erstmals Daten des BHPS und untersucht den Zusammenhang zwischen Persönlichkeit und Löhnen auf Basis des Fünf-Faktoren Modells zur Beschreibung der Persönlichkeit. Die Schätzergebnisse lassen keine Muster für die Persönlichkeitsattribute Offenheit für Erfahrungen, Gewissenhaftigkeit und Extraversion erkennen. Gleichwohl deuten die Resultate auf Lohnabschläge für Neurotizismus und Verträglichkeit für erwerbstätige Männer wie Frauen im Vereinigten Königreich. Nett zu sein zahlt sich demnach nicht aus.

Copyright statement

Please do not quote without permission from the authors. Only the final version that will be accepted for publication should be cited. This document has been posted for the purpose of discussion and rapid dissemination of preliminary research results.

1. Introduction and background

Research on the relationship between individual characteristics and labor market outcomes traditionally focussed on ‘hard-wired’ human capital aspects such as education, experience or job-specific training. There however is also a growing literature that additionally incorporates psychological and/or behavioral components in analyses on labor market success. The bigger part of this research addresses the relationship between cognitive abilities and earnings arguing that ability differentials may result in job performance or productivity differences which then consequently may lead to earnings differentials. This type of research is partly driven by data availability: there is a range of mostly UK or US surveys providing indicators that are based on standardized general aptitudes tests such as the Armed Services Vocational Aptitude Battery (ASVAB) test in the US from which the Armed Forces Qualification Test (AFQT) can be derived or the General Ability Test (GAT) in the UK and other Commonwealth nations. Scores from such tests are then typically used to approximate individuals’ cognitive abilities (for a summary of evidence see Cawley et al., 2001).

In addition, there is an even smaller literature on the link between non-cognitive traits and labor market outcomes. While this type of research is well-established in industrial and organizational psychology (e.g. Tett et al., 1991; Barrick and Mount, 1991; Salgado, 1997; Tokar et al., 1998) research by economists is scarce. Early work on such questions by both economists and sociologists dates back to the 1970s (Bowles and Gintis, 1976; Jencks, 1979), but it again is data-driven that there is only a small literature because indicators on individuals’ personality were mainly not available in large-scale surveys until recently.

Furthermore, there is a variety of psychometric measures on personality which needs some familiarity with the relevant psychological literature which usually is not the case for the mainstream trained economist.

Yet, similar to cognitive skills, non-cognitive traits may also result in job performance differentials. It is common knowledge that behavioral characteristics such as perseverance or

trustworthiness are traits that may be helpful in both employer-employee and customer relationships while other traits such as aggression or passivity might not be rewarded or might even be punished. Bowles et al. (2001a) for example argue in what they call an incentive-enhancing framework that employers may reward employee characteristics that enable them to elicit effort at low costs. Mueller und Plug (2006) as well as Heckman et al. (2006) argue that differences in skills and differences in preferences may exert direct and indirect effects on productivity: Directly, personality – and thereby implicitly assuming its effects on behavior – might be thought of as part of an individual’s set of productive traits such as general or specific education or job-related training. Individuals’ personality may furthermore affect labor market success indirectly through e.g. the type of schooling and occupation chosen. It consequently is unsurprising that the existing evidence suggests a non-trivial relationship between individuals’ non-cognitive traits and labor market success as measured by earnings. The magnitude of this association is comparable to or even greater as the effects of cognitive abilities (Bowles et al., 2001a; Heckman et al., 2006; Mueller and Plug, 2006).

This study adds to the literature updating evidence on the UK using BHPS data for the first time. While previous research employs single personality dimensions such as self-esteem (Goldsmith et al., 1997), aggression-withdrawal (Osborne, 2005), or challenge-affiliation (Semykina and Linz, 2007), the BHPS provides indicators that allow using the Five Factor Model (FFM) (McCrae and Costa, 1996, 1999) as unifying framework to describe an individual’s personality. According to the FFM, personality traits can be linked to one of the following five basic characteristics: openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism. Judge et al. (1999) point to a consensus in the organizational psychology literature that out of these five traits conscientiousness, extraversion, and neuroticism are most relevant to career success.¹

One problematic issue in analyses on the relationship between personality and earnings is endogeneity. Previous research on the one hand suggests that an individual’s personality is

partially inherited (Jang et al., 1996) and fairly stable for adults (Costa and McCrae, 1988, 1994). Treating personality traits as exogenous may on the other hand be misleading: Heckman et al. (2006) show for a sample of young individuals that parental background and the schooling level at the date of the test may affect test scores of both cognitive and non-cognitive abilities. Furthermore, while Costa and McCrae (1988, 1994) suggest that personality traits stop changing at age 30, recent research by Srivastava et al. (2003) show that an individual's (social and job) environment affects personality traits also in early and middle adulthood. In the context of earnings it may well be that there is a feedback of either low or high earnings on personality which then again may affect earnings through productivity differences by personality dimension. Consequently, empirical research that attempts to examine causal effects of personality on labor market outcomes has to deal with the issue of reverse causality. In this paper, the possible endogeneity of schooling and personality should not matter much because of the age structure of the sample (see below).² The possible interdependency between earnings and personality however is to some extent taken into account. Measurement error as another problem that plagues this type of research is also corrected for. The results presented should nevertheless be understood more from an exploratory point of view which in light of the yet scarce economic literature has its own value. Even more so since, to the best knowledge, there so far is only the work of Osborne Groves and co-authors who use large-scale survey information for women from the UK (Bowles et al., 2001a, 2001b; Osborne Groves, 2005).

2. Previous findings and expectations

A (selective) review of more recent research³ provides clear evidence that some personality traits are rewarded on the labor market while others are punished. Using Rotter's Locus of Control Scale (Rotter, 1966), Bowles et al. (2001a) and – providing more details on the early analyses – Osborne Groves (2005) show for US females that externality – i.e. the individual's

belief that outcomes are the result of fate or luck rather than hard work – is negatively related to earnings. In particular, a one standard deviation increase in the Rotter scale score is associated with a seven percent decrease in wages which is comparable in magnitude to the seven percent increase in wages they find for an additional year of education. Using NCDS data for British women, aggression and withdrawal is also penalized, with decreases in wages of about eight and three percent respectively.

Also employing the Rotter internal-external taxonomy, Semykina and Linz (2007) use Russian data and find a positive association between an internal locus of control and the earnings of females. They also employ a composite indicator for challenge, which might be thought of as a proxy for motivation, and affiliation which they associate with “getting along”. Their results suggest that only females’ earnings are positively affected by greater preferences for challenge rather than affiliation.

Goldsmith et al. (1997) use NLSY data and provide evidence for a positive and statistically significant relationship between self-esteem as measured by the Rosenberg self-esteem taxonomy (Rosenberg, 1965) and concurrent earnings.⁴ Murnane et al. (2001) also use NLSY data and show that a one standard deviation increase in self-esteem of teenagers and young adults is related to future wages that are about four percent higher than average. A somewhat different approach is chosen by Heckman and Rubinstein (2001): They compare the returns of cognitive abilities for high school dropouts, GED participants and high school graduates. Since the GED exam is a second chance program for dropouts they argue that these three states may work as signal for the individual’s personality with respect to persistence and self-discipline. Their findings accordingly suggest that controlling for measured cognitive ability and although dropouts who take the GED test are as smart as ordinary high school graduates, GED participants earn less than other dropouts because, as they put it, they “are “wise guys”, who lack the abilities to think ahead, to persist in tasks, or to adapt to their environments” (Heckman and Rubinstein, 2001, p. 146).

Two recent studies that employ the FFM taxonomy of personality are by Nyhus and Pons (2005) and by Mueller and Plug (2006). Nyhus and Pons base their analyses on Dutch data from the DNB Household Survey (DHS). The DHS include the FFPI (Five Factor Personality Inventory) developed by Hendriks et al. (1999) which is a shorter version than the original inventory by Costa and McCrae (1985). The personality dimensions covered are either similar or equivalent to what is used in the following analyses. The similar traits are conscientiousness, extraversion, and agreeableness. Autonomy is another trait covered in the DHS which is to some extent comparable to openness to experience used below. The fifth trait included in their study is emotional stability which is comparable to obverse neuroticism. Their findings suggest that emotional stability is positively associated with wages of both males and females but that agreeableness is negatively related to females' wages.

Furthermore, men benefit from conscientiousness at the beginning of an employment relationship but from autonomy as tenure increases.

The results of Mueller and Plug (2006), who use data from the Wisconsin Longitudinal Study (WLS), indicate that non-agreeableness, openness, and to a somewhat lesser extent emotional stability (i.e. obverse neuroticism) are positively related to men's earnings. Furthermore, women receive a wage premium for being more conscientious and open. Their findings also suggest that returns to non-agreeableness or (as they put it) antagonism are quite different for males and females.

With regard to expectations for the following analyses, it should have become clear from the above noted evidence that, first, personality matters. Second, because of the variety of the psychometrical measures it is not quite clear a priori which personality traits are more relevant for earnings and which are not. Focussing on the two studies that employ the FFM taxonomy (Nyhus and Pons, 2005; Mueller and Plug, 2006), it might be expected that

- openness and conscientiousness are rewarded, though there might be differences by gender,

- extraversion is not related to earnings, and
- agreeableness and neuroticism are negatively associated with earnings, again with possible gender differences.

3. Data and methods

The data used are derived from the British Household Panel Survey (BHPS) which is nationally representative for the UK (Taylor et al., 2001). Having started in 1991, the BHPS provides detailed information on individual and household related characteristics on an annual basis. For 2005, the questionnaire includes a set of questions intended to give a psychological profile of the respondent. The items in particular relate to the Five Factor Model (McCrae and Costa, 1996; 1999) which postulates that an individual's personality can be described along five basic psychological dimensions: As mentioned above, these are openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism. Since extensive psychological questioning is not feasible in large-scale surveys,⁵ the BHPS provides a set of fifteen questions (listed in the Appendix) of which three each are to capture the respective personality dimensions. The questions are to be answered on a 7-point scale ranging from 1 – “does not apply” to 7 – “applies perfectly”. The measures used here then are generated by adding the scores from the dimension-specific questions resulting in a scale with a minimum of 3 and a maximum of 21.⁶

The variability in the resulting personality dimensions might arise from measurement error. To quantify this, and to later correct it, Cronbach's alpha reliabilities (Cronbach, 1951) are calculated: openness 0.68; conscientiousness 0.57, extraversion 0.59, agreeableness 0.56, and neuroticism 0.69. These reliability coefficients are low compared to what is typically found in the literature (John and Srivastava, 1999), ranging between 0.75 and 0.90. However, Mueller and Plug (2006) show that the reliability ratios increase with an increasing number of items.

Given that only three items per trait are available in the BHPS, the ratios found are satisfactory.

Table 1 provides the raw mean scores and correlations by gender to give a first descriptive impression of the data. With the exception of being open to experience, women are more conscientious, extraverted, agreeable, but also more neurotic than men. While the – statistically significant – differences for the first four dimensions are rather small, the difference of 2 points in average score on the neuroticism dimension is remarkable.

(Table 1 about here)

The unadjusted correlations between the dependent variable examined in this study – the (natural logarithm of the) gross hourly wage – and the five personality dimensions suggest for a positive association between openness and conscientiousness, but for a negative relationship between extraversion, agreeableness and neuroticism (Table 1). All correlations are statistically significant at the 5% level or better except the correlation between females' conscientiousness and earnings which is not different from zero. These first descriptive statistics therefore imply that the association between personality and earnings might be considered small. Furthermore, they do not take into account other wage-determining factors. To do so, Mincer-type earnings regressions are augmented including indicators of individuals' personality. Let y_i be individual i 's gross hourly wage, x_i worker characteristics, and c_i a vector of personality dimension indicators. The specification of the earnings regression is

$$\ln y_i = x_i\beta + c_i\gamma + u_i,$$

where x is a vector of individual characteristics known to affect earnings, c is the vector that includes the respondent's personality trait scores, β and γ are the related parameter vectors to be estimated, and u_i denotes the idiosyncratic error term. Accounting for sample selection bias, Heckman's correction procedure is employed (Heckman, 1979). The exclusion restriction to estimate the Inverse Mills Ratio (IMR) are the individual's number of children, whether her parents were not working when she was fourteen years old, a dummy on whether

the father's occupation was managerial, professional or skilled non-manual and one dummy on whether the respondent has been unemployed in the past.

As outlined above and similar to Semykina and Linz (2007), the endogeneity of schooling and personality should not be problematic here since the respondents' mean age is 39 so that interdependency between concurrent schooling level and test scores is not given.⁷ It however is taken into account that an individual's personality is different by gender and might change with age. Adapting the approach of Nyhus and Pons (2005) and Osborne Groves (2005), each personality trait is regressed on gender, age (also squared) and terms interacting gender and the both age variables. In addition, parental background and individuals' unemployment history is included in these auxiliary regressions.⁸ The residuals from these regressions then are free from age and gender effects as well as from other background characteristics. While far from perfect, this may to some extent also pick up possible feedback-effects of an individual's job (and other social) environment on her personality.

Another set of regressions corrects for the measurement error problem noted above by imposing the reliability ratios calculated in order to adjust both parameter estimates and standard errors.

Sensitivity of the results is examined using a variety of specifications: First, base specifications include standardized personality dimension scores, i.e. have zero mean and unit variance. The socio-economic control variables used in these base regressions are: age and age squared, a set of dummy variables indicating the respondent's highest educational attainment, a dummy on whether she is married, one dummy on whether she is currently smoking, another dummy on whether she is non-white, and twelve regional dummies.

The second set of specifications includes further employment-specific characteristics. These are: current job tenure (also squared), dummy variables capturing whether individual *i* works for a non-private employer, whether she is part-time or non-permanently employed, and two firm size dummies. The third specification then additionally includes eight industry dummies

and eight occupation dummies. Following Mueller and Plug (2006), this third set is helpful since it might plausibly be assumed that an individual's personality may also affect selection into certain jobs (cf., e.g., Filer, 1986 or Jackson, 2006).⁹

Also following Mueller and Plug (2006), additional regressions are estimated in order to examine non-linearities in the relationship between personality and earnings. This is because using linear scores may push the estimated average returns to zero if for example only moderate openness is rewarded on the labor market but both being too open or not being open at all is punished. Finally, as outlined above, all estimations include the IMR to account for selection into employment.¹⁰ The final sample comprises 6,614 observations from employed individuals in working age (20-60 years).

4. Results and discussion

The estimates from earnings equations that include standardized FFM personality trait indicators are mainly in line with expectations although gender differences in the returns to personality are not as distinct as might have been expected from prior research (Table 2).¹¹ First, agreeableness is negatively associated with log wages. The coefficients in particular indicate about 3% higher wages for males by a one standard deviation increase in agreeableness (columns 4 to 6). For females, the inclusion of occupational and industry dummies reduces the wage penalty of agreeableness of 3% to almost 2%. While this finding might be counterintuitive at first, it is in line with the results of for example Mueller and Plug (2006). As Judge et al. (1999, p. 625) note, it may well be that "extremely agreeable individuals may sacrifice their success in pleasing others".

Less surprising is the negative relationship between neuroticism and wages: a one standard deviation increase in neuroticism is associated with wages that are some 2% (females) to 3% (males) lower. As Suls et al. (1998) show individuals who score high on neuroticism are more

likely affected by negative life events and to have bad mood lingers. Such individuals may then be more likely to have a lower productivity which returns in lower wages.

[Table 2 about here]

There further are no clear patterns for openness to experience: for both males and females, the coefficient in the specifications that include only socio-demographic characteristics first point to 2% higher wages for women and about 1.5% higher wages for men (columns 1 and 4). However, including job-related attributes and particularly the SIC and SOC variables, the coefficients decrease in magnitude and are not statistically significant anymore (columns 3 and 6). Again, the results are similar to those of Mueller and Plug (2006)¹² who argue that individuals may self-select into occupations on the basis of personality profiles so that the loss of significance may arise from a mediating effect of including occupation and industry dummies. While extraversion is not related to both women's and men's wages, conscientiousness interestingly turns (weakly) statistically significant in males' earnings equations once the SIC/SOC variables are included. So, net of the type of job hold by men, conscientiousness is rewarded. This however has a priori been expected since conscientiousness has been shown in the psychological literature to be one of the most relevant factors in job performance (Judge et al., 1999). Here, the coefficient indicates that a one standard deviation increase is related to about 1.5% higher wages.

As outlined above, that data are prone to measurement error which leads to attenuated coefficients if it is not taken into account. Corrected coefficients and standard errors are therefore estimated using the calculated reliability ratios and the results are provided in Table 3. As might be expected, the coefficients increase in magnitude and there are a few changes in statistical significance. The wage penalty for agreeableness increases from about 2-3% to 6.5% percent for females (column 3) and about 7.5% for males (column 6).¹³

[Tables 3 about here]

The increase in coefficients is less pronounced for neuroticism but again points to 2-3% lower wages for individuals who are less emotionally stable. Similar to the base specifications shown above, openness to experience loses statistical significance when including industry and occupation dummies. Conscientiousness however gains most from measurement error correction: there now is evidence that the individual's degree of self-control – which shines through in this personality dimension – is related to almost 5% higher wages for both men and women (columns 3 and 6).¹⁴

While the results from the measurement error corrected estimations improve on the findings outlined in Table 2, both sets of estimates do not take into account that there might be an interrelationship between an individual's environment and her personality over time.

Therefore, following Osborne Groves (2005) as well as Nyhus and Pons (2005), estimates that are based on residualized FFM personality trait scores should at least to some extent be free of age- and other environment-effects. The results of these additional regressions presented in Table 4 suggest that the effect of conscientiousness on earnings is the least robust. There now is no statistically significant difference from zero. Again, this might be unexpected but corresponds to the findings of Nyhus and Pons (2005). However, similar to the results above, both agreeableness and neuroticism are penalized. The estimates once more suggest some 2% lower wages by a one standard deviation increase in either personality trait.

[Table 4 about here]

Estimates that account for possible non-linearities do not suggest for big differences compared to assuming only a linear gradient in the relationship between personality and earnings the (Table 7), though as expected the findings are more differentiated. Referring to the specifications that include the controls for occupation and industry (columns 2 and 4) the results again indicate that openness to experience is neither rewarded nor punished irrespective of scoring very low or very high. Complementary to the wage advantage of being conscientious presented above, scoring in the bottom 25% of the conscientiousness

dimension, i.e. being sloppy, is related to some 4% lower wages for females and about 3% lower wages for males.

[Table 5 about here]

As for both agreeableness and neuroticism, the estimates suggest that in line with Mueller and Plug (2006, p. 15) using “a linear representation is a fairly accurate approximation of the overall relationship”. The coefficients in particular indicate that males who score low in agreeableness earn some 3% more and further that wages of high scoring males are 4% lower compared to employees who score in the middle 50%. While the monotonic relationship also shows for females, neither indicator is statistically significant. There further are similar findings for the neuroticism-wages link: The coefficients suggest that emotionally stable women earn about 3% more while emotionally unstable women earn 3% less. For men, there is 4% wage penalty for those who score in the top 25% of neuroticism.

Extraversion is somewhat exceptional: While the above findings in line with prior expectations do not indicate an association between extraversion and earnings, the estimates now provide evidence that individuals who score in the top 25% of the extraversion dimension earn 4-5% less compared to their middle 50% counterparts. A possible explanation for this is that moderate extraverts tend to be more sociable which likely is helpful in interpersonal relationships but that a high level of extraversion is associated with dominance and being ambitious (Watson and Clark, 1997) which may result in lower productivity for example by negatively affecting teamwork.

5. Summary and conclusions

This study contributes to the scarce literature on the relationship between individuals' personality and earnings using BHPS data for the UK for the first time. The analysis is based on the Five Factor Model as a comprehensive framework of individuals' personality including the dimensions openness to experience, conscientiousness, agreeableness, extraversion and

neuroticism. In line with prior research for other countries and with the few economic studies that are based on the FFM, there is evidence that personality traits matter on the labor market. A variety of specifications are estimated and possible interdependencies between individuals' background, environment and their personality as well as non-linearities in the personality-earnings relationship and measurement error are taken into account. Across all specifications, the results indicate that agreeableness and neuroticism are penalized. The findings further suggest wage advantages of conscientiousness and wage penalties for being highly extraverted, although these estimates are not as robust. Openness to experience is positively associated in regressions that do not include industry and occupation indicators. Once these covariates are included, openness turns statistically insignificant which suggests that individuals self-select into occupations on the basis of personality profiles.

One limitation of this paper is that the data used are cross-sectional so that reverse causality cannot be ruled out. However, both Heckman and Rubinstein (2001, p. 149) as well as Mueller and Plug (2006, p. 19) point out that there is too little understood yet so that exploratory studies like this have its own value and improve the understanding of the role of personality in the labor market. Moreover, the specifications that include residualized personality trait scores which are based on regressions of personality traits on the individual's age and background should to some extent pick up some of the interdependency between earnings and personality. Another seemingly limitation is that the data do not provide direct indicators for individuals' cognitive abilities. It however is noteworthy in this context that the results presented mainly correspond to the findings of Mueller and Plug (2006) who use both the FFM personality trait scores and scores from a test on general mental ability.

Further, there are no direct policy implications arising from these findings although Heckman and Rubinstein (2001) argue in favor of for example social policies that might support children from disadvantaged environments in strengthening non-cognitive traits such as self-discipline or motivation. And despite the rather small quantitative effects of personality traits,

it becomes clear from the growing literature on the relationship between individuals' personality and earnings that focussing on advancing cognitive abilities only might take too narrow a view. Future research with at best longitudinal data is justified and needed to further the understanding of the effects of personality on labor market outcomes.

Acknowledgement

The BHPS data were made available through the ESRC Data Archive and were originally collected by the ESRC Research Centre on Micro-social Change at the University of Essex. Neither the original collectors of the data nor the Archive bear any responsibility for the analyses or interpretations presented here.

References

- Barrick, M. R., & Mount, M. K. (1991). The Big Five Personality Dimensions and Job Performance: A Meta-Analysis. *Personnel Psychology*, 44, 1-26.
- Bowles, S., & Gintis, H. (1976). *Schooling in Capitalist America: Educational Reform and the Contradictions of Economic Life*. New York: Basic Books.
- Bowles, S., Gintis, H., & Osborne, M. (2001a). The Determinants of Earnings: A Behavioral Approach. *Journal of Economic Literature*, 39(4), 1137-76.
- Bowles, S., Gintis, H., & Osborne, M. (2001b). Incentive-enhancing preferences: Personality, behavior and earnings. *American Economic Review Papers and Proceedings*, 91(2), 155-158.
- Cawley, J., Heckman, J. J., & Vytlačil, E. J. (2001). Three observations on wages and measured cognitive ability. *Labour Economics*, 8(4), 419-442.
- Costa, P. T., Jr., & McCrae, R. R. (1985). *The NEO personality inventory manual*. Odessa, FL: Psychological Assessment Resources.
- Costa, P. T., Jr., & McCrae, R. R. (1988). Personality in adulthood: A six-year longitudinal study of self-reports and spouse ratings on the NEO Personality Inventory. *Journal of Personality and Social Psychology*, 54, 853-863.
- Costa, P. T., Jr., & McCrae, R. R. (1994). Set like plaster: Evidence for the stability of adult personality. In T. F. Heatherton, & J. L. Weinberger (Eds.), *Can personality change?* (pp. 21-40). Washington, DC: American Psychological Association.
- Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16(3), 297-334.
- Farkas, G. (2003). Cognitive skills and noncognitive traits and behaviors in stratification process. *Annual Review of Sociology*, 29, 541-562.

- Goldsmith, A. H., Veum, J. R., & Darity, W. (1996). The impact of labor force history on self-esteem and its component parts, anxiety, alienation and depression. *Journal of Economic Psychology*, 17, 183-220.
- Goldsmith, A. H., Veum, J. R., & Darity, W. (1997). The impact of psychological and human capital and wages. *Economic Inquiry*, 35(4), 815-829.
- Filer, R. K. (1986). The role of personality and tastes in determining occupational structure. *Industrial and Labor Relations Review*, 39(3), 412-424.
- Heckman, J. J. (1979). Sample Bias as a Specification Error. *Econometrica*, 47, 153-161.
- Heckman, J. J., & Rubinstein, Y. (2001). The importance of noncognitive skills: Lessons from the GED program. *American Economic Review Papers and Proceedings*, 91(2), 145-149.
- Heckman, J. J., Stixrud, J., & Uzara, S. (2006). The effects of cognitive and noncognitive abilities on labor market outcomes and social behavior. *Journal of Labor Economics*, 24(3), 411-482.
- Jackson, M. (2006). Personality traits and occupational attainment. *European Sociological Review*, 22(2), 187-199.
- Jang, K. L., Livesly, W. J., & Vernon, P. A. (1996). Heritability of the Big Five personality dimensions and their facets: A twin study. *Journal of Personality*, 64, 577-591.
- Jencks, C. (1979). *Who gets ahead?* New York: Basic Books.
- John, O. P., & Srivastava, S. (1999). The Big Five Trait Taxonomy: History, measurement, and theoretical perspectives. In L. A. Pervin, & O. P. John (Eds.), *Handbook of Personality: Theory and Research* (pp. 102-138). New York: Guilford.
- Judge, T. A., Higgins, C. A., Thoresen, C. J., & Barrick, M. R. (1999). The Big Five Personality traits, general mental ability, and career success across the life span. *Personnel Psychology*, 52, 621-652.

- McCrae, R. R., & Costa, P. T., Jr. (1996). Toward a new generation of personality theories: Theoretical contexts for the five-factor model. In J. S. Wiggins (Ed.), *The five-factor model of personality: Theoretical perspectives* (pp. 51-87). New York: Guilford.
- McCrae, R. R., & Costa, P. T., Jr. (1999). A Five-Factor Theory of Personality. In L. A. Pervin, & O. P. John (Eds.), *Handbook of Personality: Theory and Research* (pp. 139-153). New York: Guilford.
- Mueller, G., & Plug, E. (2006). Estimating the effects of personality on male and female earnings. *Industrial and Labor Relations Review*, 60(1), 3-22.
- Murnane, R. J., Willett, J. B., Jay Braatz, M., & Y. Duhaldeborde (2001). Do different dimensions of male high school students' skills predict labor market success a decade later? Evidence from the NLSY. *Economics of Education Review*, 20(4), 311-320.
- Nyhus, E. K., & Pons, E. (2005). The effects of personality on earnings. *Journal of Economic Psychology*, 26, 363-384.
- Osborne Groves, M.A. (2005). How important is your personality? Labor market returns to personality for women in the US and UK. *Journal of Economic Psychology*, 26, 827-841.
- Rosenberg, M. (1965). *Society and The Adolescent Self-image*. Princeton, NJ: Princeton University Press.
- Rotter, J. (1966). Generalized expectancies for internal versus external control of reinforcement. In *Psychological Monographs*, 80 (Reprinted in Rotter et al. (1972). *Applications of a social learning theory of personality* (pp. 260-295). New York: Holt, Reinhart and Winston, Inc.
- Salgado, J. F. (1997). The five factor model of personality and job performance in the European Community. *Journal of Applied Psychology*, 82(1), 30-43.
- Semykina, A., & S. J. Linz (2007). Gender differences in personality and earnings: Evidence from Russia. *Journal of Economic Psychology*, 28, 387-410.

- Srivastava, S., John, O. P., Gosling, S. D., & Potter, S. (2003). Development of personality in early and middle adulthood: Set like plaster or persistent change? *Journal of Personality and Social Psychology*, 85(5), 1041-1053.
- Suls J., Green P., & Hillis S., (1998). Emotional reactivity to everyday problems, affective inertia, and neuroticism. *Personality and Social Psychology Bulletin*, 24, 127-136.
- Taylor, M. F., (Eds.), Brice, J., Buck, N., & Prentice-Lane, E. (2002). *British Household Panel Survey User Manual Volume A: Introduction, Technical Report and Appendices*. Colchester: University of Essex.
- Tett, R. P., Jackson, D. N., & Rothstein, M. (1991). Personality measures as predictors of job performance: A meta-analytic review. *Personnel Psychology*, 44, 703-742.
- Tokar, D. M., Fischer, A. R., & Subich, L. M. (1998). Personality and vocational behavior: A selective review of the literature, 1993-1997. *Journal of Vocational Behavior*, 53, 115-153.
- Watson D., & Clark L. A. (1997). Extraversion and its positive emotional core. In R. Hogan, J. Johnson, & S. Briggs (Eds.), *Handbook of personality psychology* (pp. 767-793). San Diego, CA: Academic Press.

Table 1: Average personality dimension scores and correlation with wages

	Females	Males	
	Average score	Average score	Difference
Openness	13.5	13.9	-0.4 ***
Conscientiousness	16.5	15.8	0.7 ***
Extraversion	13.8	13.3	0.5 ***
Agreeableness	16.8	15.8	1.0 ***
Neuroticism	11.9	9.9	2.0 ***
Correlations	ln(wage)	ln(wage)	
Openness	0.138***	0.062***	
Conscientiousness	0.026	0.038**	
Extraversion	-0.047***	-0.073***	
Agreeableness	-0.060***	-0.035**	
Neuroticism	-0.047***	-0.054***	
<i>N</i>	3531	3083	

Notes: Statistical significance levels *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: BHPS, 2005.

Table 2: Selection-corrected estimates of earnings regressions on standardized FFM personality trait scores

	Females			Males		
	(1)	(2)	(3)	(4)	(5)	(6)
Openness	0.0216*** (0.0082)	0.0218*** (0.0079)	0.0033 (0.0071)	0.0152* (0.0091)	0.0130 (0.0089)	0.0011 (0.0081)
Conscientiousness	0.0138 (0.0086)	0.0098 (0.0083)	0.0095 (0.0074)	0.0123 (0.0090)	0.0112 (0.0087)	0.0139* (0.0080)
Extraversion	0.0002 (0.0084)	-0.0016 (0.0081)	-0.0002 (0.0072)	-0.0018 (0.0089)	0.0006 (0.0087)	0.0020 (0.0079)
Agreeableness	-0.0325*** (0.0084)	-0.0302*** (0.0081)	-0.0184** (0.0073)	-0.0286*** (0.0082)	-0.0270*** (0.0080)	-0.0262*** (0.0073)
Neuroticism	-0.0208*** (0.0074)	-0.0195*** (0.0072)	-0.0151** (0.0064)	-0.0313*** (0.0085)	-0.0289*** (0.0083)	-0.0249*** (0.0076)
Individ./HC/Region/IMR	+	+	+	+	+	+
Empl. attributes	-	+	+	-	+	+
SIC/SOC	-	-	+	-	-	+
<i>N</i>	3531	3531	3531	3083	3083	3083
Adj. R ²	0.282	0.338	0.479	0.287	0.323	0.439

Notes: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Source: BHPS, 2005.

Table 3: Estimates of earnings regressions on FFM personality trait scores, corrected for measurement error

	Females			Males		
	(1)	(2)	(3)	(4)	(5)	(6)
Openness	0.0401** (0.0159)	0.0417*** (0.0154)	0.0077 (0.0140)	0.0317* (0.0188)	0.0263 (0.0185)	0.0031 (0.0171)
Conscientiousness	0.0735** (0.0290)	0.0627** (0.0286)	0.0493* (0.0263)	0.0457* (0.0265)	0.0438* (0.0260)	0.0497** (0.0240)
Extraversion	-0.0068 (0.0217)	-0.0105 (0.0210)	-0.0022 (0.0189)	-0.0072 (0.0248)	-0.0003 (0.0243)	0.0082 (0.0224)
Agreeableness	-0.1059*** (0.0278)	-0.0967*** (0.0273)	-0.0644** (0.0252)	-0.0770*** (0.0224)	-0.0737*** (0.0220)	-0.0742*** (0.0204)
Neuroticism	-0.0296*** (0.0109)	-0.0285*** (0.0105)	-0.0222** (0.0094)	-0.0436*** (0.0142)	-0.0403*** (0.0139)	-0.0332*** (0.0127)
Individ./HC/Region/IMR	+	+	+	+	+	+
Empl. attributes	-	+	+	-	+	+
SIC/SOC	-	-	+	-	-	+
<i>N</i>	3531	3531	3531	3083	3083	3083
<i>R</i> ²	0.297	0.352	0.490	0.300	0.337	0.454

Notes: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Source: BHPS, 2005.

Table 4: Estimates of earnings regressions on residualized FFM personality trait scores

	Females			Males		
	(1)	(2)	(3)	(4)	(5)	(6)
Openness	0.0190** (0.0078)	0.0191*** (0.0074)	0.0027 (0.0066)	0.0093 (0.0087)	0.0091 (0.0085)	-0.0005 (0.0077)
Conscientiousness	0.0095 (0.0082)	0.0065 (0.0078)	0.0071 (0.0069)	0.0051 (0.0086)	0.0052 (0.0083)	0.0088 (0.0075)
Extraversion	0.0021 (0.0081)	0.0006 (0.0077)	0.0009 (0.0068)	0.0055 (0.0086)	0.0074 (0.0083)	0.0070 (0.0076)
Agreeableness	-0.0322*** (0.0083)	-0.0297*** (0.0079)	-0.0182** (0.0071)	-0.0269*** (0.0082)	-0.0259*** (0.0079)	-0.0255*** (0.0072)
Neuroticism	-0.0202*** (0.0071)	-0.0191*** (0.0068)	-0.0146** (0.0060)	-0.0280*** (0.0082)	-0.0258*** (0.0079)	-0.0218*** (0.0072)
Individ./HC/Region/IMR	+	+	+	+	+	+
Empl. attributes	-	+	+	-	+	+
SIC/SOC	-	-	+	-	-	+
<i>N</i>	3531	3531	3531	3083	3083	3083
Adj. R ²	0.238	0.314	0.464	0.229	0.282	0.413

Notes: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Source: BHPS, 2005.

Table 5: Testing for non-linearities in the earnings-personality relationship employing bottom 25% and top 25% indicators

	Females		Males	
	(1)	(2)	(3)	(4)
Openness: Bottom 25%	-0.0572*** (0.0176)	-0.0125 (0.0149)	-0.0183 (0.0204)	0.0049 (0.0179)
Openness: Top 25%	-0.0036 (0.0194)	0.0012 (0.0164)	0.0070 (0.0204)	0.0002 (0.0180)
Conscientiousness: Bottom 25%	-0.0544*** (0.0183)	-0.0421*** (0.0154)	-0.0419** (0.0182)	-0.0341** (0.0160)
Conscientiousness: Top 25%	-0.0136 (0.0181)	-0.0155 (0.0153)	0.0158 (0.0220)	0.0215 (0.0194)
Extraversion: Bottom 25%	-0.0161 (0.0174)	-0.0082 (0.0147)	-0.0108 (0.0180)	-0.0069 (0.0158)
Extraversion: Top 25%	-0.0714*** (0.0181)	-0.0491*** (0.0153)	-0.0605*** (0.0222)	-0.0365* (0.0195)
Agreeableness: Bottom 25%	0.0181 (0.0175)	0.0201 (0.0148)	0.0223 (0.0176)	0.0261* (0.0154)
Agreeableness: Top 25%	-0.0543*** (0.0182)	-0.0242 (0.0154)	-0.0534** (0.0233)	-0.0399* (0.0205)
Neuroticism: Bottom 25%	0.0265 (0.0173)	0.0277* (0.0146)	0.0238 (0.0169)	0.0234 (0.0149)
Neuroticism: Top 25%	-0.0544*** (0.0180)	-0.0306** (0.0152)	-0.0760*** (0.0270)	-0.0418* (0.0238)
Individ./HC/Region/IMR	+	+	+	+
Empl. attributes	-	+	-	+
SIC/SOC	-	+	-	+
<i>N</i>	3531	3531	3083	3083
<i>R</i> ²	0.246	0.467	0.232	0.413

Notes: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Source: BHPS, 2005.

Appendix Table A1: BHPS questions and FFM personality traits

Variable label	FFM personality trait
Resp. is original, come up with ideas	Openness to Experience
Resp. values artistic, aesthetic experie	Openness to Experience
Resp. has an active imagination	Openness to Experience
Resp. does a thorough job	Conscientiousness
Resp. tends to be lazy (<i>reversed</i>)	Conscientiousness
Resp. does things efficiently	Conscientiousness
Resp. is talkative	Extraversion
Resp. is outgoing, sociable	Extraversion
Resp. is reserved (<i>reversed</i>)	Extraversion
Resp. is sometimes rude to others (<i>reversed</i>)	Agreeableness
Resp. has a forgiving nature	Agreeableness
Resp. considerate & kind	Agreeableness
Resp. worries a lot	Neuroticism
Resp. gets nervous easily	Neuroticism
Resp. is relaxed, handles stress well (<i>reversed</i>)	Neuroticism

Appendix Table A2: Descriptive statistics

Variable	Mean	Std. Dev.
<i>Five Factor Model traits</i>		
FFM trait score: Openness to experience	13.7337	(3.2297)
FFM trait score: Conscientiousness	16.2313	(2.8947)
FFM trait score: Extraversion	13.5833	(2.6247)
FFM trait score: Agreeableness	16.3333	(2.8450)
FFM trait score: Neuroticism	11.0078	(3.7319)
<i>Individ./HC/Region</i>		
Male	0.4661	(0.4988)
Age (in years)	38.9826	(11.0009)
Is married	0.5467	(0.4978)
Is smoker	0.2543	(0.4355)
Is non-white	0.0195	(0.1382)
Education: none or missing	0.0908	(0.2959)
Education: below O levels	0.0533	(0.2247)
Education: O levels	0.1598	(0.3664)
Education: A levels	0.1342	(0.3409)
Education: further qualification	0.3483	(0.4764)
Education: higher degree	0.2133	(0.4096)
Region: Inner/Outer London	0.0019	(0.0442)
Region: South East	0.1164	(0.3207)
Region: South West	0.0592	(0.2361)
Region: East Anglia	0.0278	(0.1644)
Region: East Midlands	0.0545	(0.2271)
Region: West Midlands	0.0482	(0.2142)
Region: North West	0.0689	(0.2533)
Region: Yorkshire & Humberside	0.0559	(0.2298)
Region: North incl. Tyne & Wear	0.0365	(0.1877)
Region: Wales	0.1564	(0.3633)
Region: Scotland	0.1840	(0.3875)
Region: Northern Ireland	0.1436	(0.3507)
<i>Employment attributes</i>		
Experience in current job (in years)	4.6241	(5.8981)
Is part-time employed	0.2018	(0.4014)
Has non-permanent job	0.0453	(0.2081)
Has non-private employer	0.3664	(0.4818)
Firm size: 1-24	0.3395	(0.4736)
Firm size: 25-199	0.3542	(0.4783)
Firm size: 200 or more	0.2948	(0.4560)
<i>SOC / SIC</i>		
SOC: Missing	0.0288	(0.1674)
SOC: Managers & administrators	0.1273	(0.3333)
SOC: Professional occ.	0.1247	(0.3304)
SOC: Assoc. prof. & technical occ.	0.1430	(0.3501)
SOC: Clerical & secretarial occ.	0.1502	(0.3573)
SOC: Craft & related occ.	0.0904	(0.2867)
SOC: Personal & protective service occ.	0.0884	(0.2839)
SOC: Sales occ.	0.0752	(0.2638)
SOC: Plant & machine operatives	0.0743	(0.2624)

SOC: Other occupations	0.0972	(0.2962)
SIC: Missing	0.0066	(0.0812)
SIC: Manuft. (food, textile, leather)	0.0329	(0.1785)
SIC: Manuft. (wood, chemicals, metal.)	0.0718	(0.2582)
SIC: Manufacturing (Machinery)	0.0436	(0.2044)
SIC: Power/construction	0.0580	(0.2338)
SIC: Wholesale/Retail/Hotels	0.1812	(0.3852)
SIC: Transport/Financial intermediation	0.1011	(0.3015)
SIC: Real estate/Comp./Public Admin.	0.1959	(0.3969)
SIC: Education/Health	0.2537	(0.4351)
SIC : Service/Private Households	0.0547	(0.2274)
<i>Other personal background information</i>		
Was unemployment in the past	0.2180	(0.4129)
Mother was not working when R was 14	0.3283	(0.4696)
Father was not working when R was 14	0.0297	(0.1700)
Father held higher occ. when R was 14	0.3123	(0.4634)

Notes: $N = 6614$.

Source: BHPS 2005.

¹ The authors also summarize how each personality trait may affect job performance.

² Furthermore, as for the schooling-personality link, one approach is to regress earnings equations without individuals' schooling indicators. Another approach is to run analyses separately by schooling level. Here, additional analyses by schooling level – which result in imprecisely estimated coefficients – as well as without schooling variables qualitatively yield the same findings as those presented in the paper.

³ As outlined above, there is an established literature in industrial and organizational psychology on the impact of personality traits on job performance. Summarizing this is beyond the scope of this paper, but see e.g. Tett et al. (1991), Barrick and Mount (1991) and Tokar et al. (1998) for an overview.

⁴ Note that they attempt to solve for the endogeneity problem by employing self-esteem scores that are predicted by - among other factors - locus of control scores.

⁵ Note that the full inventory, the NEO PI-R, comprises 240 questions (Costa and McCrae, 1985).

⁶ Additional analyses that employ averaged indicators qualitatively yield the same results and are thus not presented here.

⁷ Note again that regressions without schooling indicators and by schooling level did not yield in substantially different results.

⁸ The latter is to capture the effects of unemployment on self-esteem which has, for example, been documented by Goldsmith et al. (1996).

⁹ Additional regressions by occupation are estimated to further examine this. There are only a few non-trivial findings quite likely because of sample size restrictions. However, where statistically significant, the results correspond to the findings presented below.

¹⁰ All equations have in addition been estimated without the IMR and yield almost identical results. The estimates are therefore not presented but available upon request.

¹¹ Note that only the FFM covariates are presented and discussed. Full estimation results are however available upon request.

¹² Note however that their openness coefficients remain (weakly) statistically significant.

¹³ While not shown in detail, note that this is comparable to the loss in earnings when holding a part-time job.

¹⁴ Note that this corresponds to the effect of another five years of job tenure on the current job.