

Personality traits and earnings: evidence from Finland

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Abstract

This study contributes to the literature how personal characteristics are rewarded in the labor market by examining the impacts of personality traits on earnings. Our study follows the spirit of Bowles et al. (2001a, b), Osborne Groves (2005), Nyhus and Pons (2005), and Semykina and Linz (2007) who present arguments and empirical evidence for the inclusion of psychological characteristics in earnings equations. Our results, based on the data drawn from a longitudinal study, suggest that extraversion has a significant positive effect on earnings when gender, education, work experience and unemployment history, measured accurately from the longitudinal data, are controlled for.

Keywords: personality traits, work career, earnings equation

JEL Classification: J24.

1 Introduction

The psychological literature suggests that different personality traits, such as neuroticism, extraversion, agreeableness, conscientiousness, and openness to experiences, have specific associations with different indices of vocational behavior.¹ For example, extraversion seems to have a positive correlation with entrepreneurial and social interests, openness with artistic and investigative interests and conscientiousness with conventional interests. Persons high in neuroticism seem to choose routine, less complex and less independent occupations. Extraversion and conscientiousness, on the other hand, seem related to managerial career path preferences, whereas conscientiousness and more openness predict entrepreneurial preferences. Furthermore, there is some evidence that adaptive child and adolescent social behavior, indicated by high emotional self-control, may precede a high level of adult achievement, including a high level of education, high occupational status and stable full-time employment. Personal and other individual characteristics, assessed as early as in childhood, might thus matter when it comes to success in working life and earnings.²

In this study we examine the effects of personality traits on earnings. In economics, the use of measures of this kind is scarce, although the importance of unobserved personal characteristics as determinants of earnings has received attention since Griliches (1977). Typically, the existing empirical research has focused more on cognitive abilities, and earnings equations have been augmented, for example, with IQ proxies and aptitude test scores; see e.g. Blackburn & Neumark (1992), Card (1999), Uusitalo (1999), Heckman & Vytlačil (2001), Tobias (2003). The importance of personality on earnings has recently gained more attention. The research has been inspired by the studies of Bowles, Gintis and Osborne (2001a, b) that survey the literature and examine the role of psychological

¹ See Tokar, Fischer & Subich (1998) for a comprehensive survey, and Bowles, Gintis & Osborne (2001a,b) of arguments for the inclusion personality variables into the earnings equations.

² See Pulkkinen, Feldt, & Kokko (2006). Other qualities might matter as well. Hamermesh and Biddle (1994) find that the 'beauty premium' exists even after controlling for many observable characteristics such as work experience. In other words, beautiful people seem to earn more, suggesting that employers consider beauty as an indicator for work performance and productivity. Also obesity (see e.g. Cawley 2007) and height (see e.g. Case and Paxton 2006) are found to be related to earnings.

characteristics on earnings in terms of incentive-enhancing properties. The latest work along this line include Nyhus and Pons (2005) using Dutch data, Semykina and Linz (2007) using Russian data and Osborne Groves (2005) utilizing the UK and US data. Heckman, Stixrud & Urzua (2006) is another important contribution in this field, presenting evidence of how both cognitive and noncognitive abilities are related to a number of labour market outcomes such as wages, schooling decisions, and occupational choice.

This study contributes to this literature by providing evidence from Finland. The study uses data drawn from the Jyväskylä Longitudinal Study of Personality and Social Development (JYLS) (Pulkkinen 2006). This unique dataset, gathered by different data collection methods (e.g. questionnaires, interviews, archives) over a time span of almost 40 years, provides information on each sample individual's schooling, training, and work experience. The data allows us to estimate the traditional Mincerian wage equation augmented with measures of personality traits. Personality traits have been measured by using the Big Five personality factors; see Costa & McCrae (1985).

An issue that merits special attention in our data concerns the measurement of educational and work career variables. The longitudinal data allows us to calculate the actual years of both schooling and working experience, as well as measures for the stability of the work career, duration of unemployment and number of employment contracts over the work career with reasonable accuracy. This is a significant improvement on many previous studies, which typically rely only on information on the highest level of education achieved and age as a proxy to work experience.³

The remainder of this paper is organized as follows. Section 2 reports the data in detail, providing descriptive statistics on income, socioeconomic status, personality traits, school achievement and work careers by level of education. Section 3 reports the estimation results, indicating that extraversion has a significant positive effect on earnings. Section 4 provides conclusions.

³ See Card (1999: 1806-1808) for a discussion about the appropriate measure of education.

2 Longitudinal data on personality traits, school achievement, and work career

The longitudinal data used in the empirical part of this study is the Jyväskylä Longitudinal Study of Personality and Social Development (JYLS). This study began in 1968 when 12 entire school classes from the Jyväskylä⁴ area were selected to the sample; the initial attrition rate was zero. At that time the participants were in the second grade and thus 8 years old (Pitkänen 1969; Pulkkinen 2006). Since 1968, data have been gathered at ages 14 (in 1974), 20 (1980), 27 (1986), 33 (1992), 36 (1995), and 42 (2001). At ages 8 and 14, the main methods of data collection were teacher ratings and peer nominations, whereas questionnaires and personal interviews have been used in adulthood. Information about GPA at age 14 was collected from school archives and earnings at age 43 (in 2002) from tax authority registers. The dataset provides information, among other things, on educational attainment, work experience, socioeconomic status, school achievement, and personality.

Although the sample has suffered from attrition over the years, comparison of the participants and non-participants at age 42 revealed that the participants continued to represent the original random sample in socioemotional behavior in childhood and school achievement in adolescence (Pulkkinen 2006). Furthermore, they were representative of the Finnish age-cohort born in 1959 with respect to, for example, marital status, number of children, employment, and unemployment when the statistics provided by Statistics Finland were used as the data source. In length of education, the male participants did not differ from their age cohort group; female participants in turn had a vocational college education (e.g., nurse, ISCED level 5B) slightly more often than females in their age cohort group. Both in the age cohort group and the present sample, women had a higher level of education than men.

⁴ Jyväskylä is a medium-sized town (population 85 000) in Central Finland.

Table 1 presents some descriptive statistics drawn from the data by the highest level of education completed by the participants. As Table 1 indicates, most have completed a vocational course only or a programme of vocational education (161). Women appear to dominate the higher levels of education: among those with a university degree 63 per cent are women. Similarly, 72 per cent of those with upper vocational education are women. Higher family socioeconomic status, measured from 1 (low) to 3 (high), seems to be positively correlated with the participants' post-comprehensive education. Finally, average annual earnings increase with educational level. In 2002 the average annual earnings among people with only a vocational course were 19 100 euros while among those with a university degree the average was 39 800 euros.

Table 1: Descriptive statistics by the highest level of education completed.

Level of post-comprehensive education	N	Women's share, %	Socio-economic status of the family in 1968	Average years of education ⁵	Average annual earnings (€)
Vocational course	58	31.0 %	1.22 (.53)	10.7 (2.3)	19 100 (9 900)
Vocational education (ISCED level 3)	103	29.1 %	1.22 (.44)	13.0 (2.5)	20 900 (10 400)
Upper vocational education (ISCED level 5B)	79	72.1 %	1.43 (.63)	15.3 (2.6)	24 700 (14 800)
University education (levels 5A and 6)	44	63.6 %	1.80 (.85)	20.8 (4.4)	39 800 (29 600)

Standard deviations are shown in parentheses.

In the JYLS dataset, personality traits were measured at ages 33 and 42 by the Big Five Personality Inventory (Pulver, Allik, Pulkkinen & Hämäläinen 1995), which is an authorized adaptation of the NEO Personality Inventory, and has 180 items (Costa & McCrae 1992; Costa & McCrae 1985) of which about one-quarter are substitutes for the original American items. In personality psychology, a consensus exists on the hierarchical structure of personality traits and the number of core personality traits, represented in the five-factor model of personality (Goldberg 1993; McCrae & John 1992; McCrae & Costa 2003). The five personality traits are neuroticism, extraversion,

⁵ In Finland comprehensive education, which is compulsory for all Finnish people, normally lasts for 9 years (ISCED level 2). A vocational education represents 12 years of education, an upper vocational education 14 years, and a university education 17 years.

agreeableness, conscientiousness, and openness to experiences. The traits are measured on a five-point scale (1-5), where 1 indicates a low and 5 a high score in the trait in question. Adjectives like anxious, self-pitying, tense, and worrying describe an individual high in neuroticism; active, assertive, enthusiastic, and outgoing an individual high in extraversion; generous, kind, sympathetic, and trusting an individual high in agreeableness; organized, planful, reliable, and responsible an individual high in conscientiousness; and artistic, curious, imaginative, and wide interests an individual high in openness to experience (Caspi 1998, p. 317). Each of these factors consists of a number of more specific traits. The JYLS dataset also includes information on each sample individual's GPA at age 14. This information can be used to evaluate the impact of school achievement on earnings.

In order to provide an overall impression of the differences in personality traits and school achievement between individuals with different educational backgrounds, Table 2 reports the mean scores to different personality traits and GPA by the highest level of education completed. In most cases the information about personality traits was obtained at the time the sample individual was 42 years old. Where observations are missing, the data has been imputed, if possible, by using personality trait information obtained at the age of 33. Since personality traits in adulthood seem highly stable (Rantanen, Mestäpelto, Pulkkinen, Feldt & Kokko 2006), this should not impair the validity of the results.

Four findings are worth noting here. First, GPA tends to rise with educational level, being highest in the most educated group. At the lowest level of vocational education the average GPA is 6.9 and at the highest level 8.2. Second, more educated individuals seem to be more open to new experiences, the score rising from 3.0 (vocational course only) to 3.7 (university education). Third, the second group (vocational education) appears to score higher on neuroticism (score 2.6) and lower on extraversion (score 3.1) than the other educational groups (2.2-2.4 for neuroticism and 3.3-3.4 for extraversion). The more educated seem also have somewhat higher scores in conscientiousness. None of these differences in the personality traits, however, are statistically significant. In addition,

there are no significant differences in agreeableness between the different educational levels.

An advantage of the JYLS dataset is that it documents well-recorded and accurate information on individuals' schooling and work status over the years. Thus we are not restricted to only the highest level of education as a measure of educational attainment or age as a proxy of work experience. Instead we can calculate the actual years of schooling and the years of work experience for each sample individual. Table 3 reports the average years of education by the highest level of education completed. The years of education also include vocational courses. The average of years of education doubles from 10.7 to 20.8 when we move from the lowest education group (vocational course only) to the highest group (university degree).

Table 2: Description of personality traits and school achievement by highest completed level of education.

	N	GPA ⁶	Neuroticism	Extraversion	Agreeableness	Conscientiousness	Openness to new experiences
Vocational course	58	6.9 (.69)	2.4 (.54)	3.3 (.52)	3.6 (.46)	3.6 (.53)	3.0 (.55)
Vocational education (ISCED level 3)	103	6.9 (.71)	2.6 (.76)	3.1 (.60)	3.5 (.55)	3.6 (.51)	3.2 (.52)
Upper vocational education (ISCED level 5B)	79	7.5 (.78)	2.2 (.70)	3.4 (.53)	3.7 (.48)	3.7 (.53)	3.4 (.61)
University education (ISCED levels 5A and 6)	44	8.2 (.68)	2.2 (.50)	3.4 (.63)	3.5 (.70)	3.8 (.55)	3.7 (.57)

Standard deviations are shown in parentheses.

Table 3 also presents the average number of years of work experience, duration of unemployment, information about the stability of work careers and the average number of employment contracts by level of education. There is a clear tendency towards a more stable work career as the level of education rises. Also the average duration of unemployment decreases from 26 to 3.2 months as we move from the lowest education group to the highest. Since more educated people have fewer spells of unemployment and

⁶ The grades range between 4 to 10, 4 meaning failed and 10 indicating the highest possible grade.

more stable work careers, the differences in years of work experience are rather small at the age of 42, despite substantially more years spent in school by the more educated people. On average those with only a vocational course have 19.9 years of work experience, while the average years of work experience among university graduates is 18.1.

Table 3: Description of work-related variables by the highest level of vocational education completed.

	Years of education	Years of work experience	Duration of unemployment (months)	Stability of work career			Number of employment contracts
				Stable	Varying	Unstable	
Vocational course	10.7 (2.3)	19.9 (6.3)	26.0 (38.1)	62.1 %	10.3 %	27.6 %	5.4 (4.9)
Vocational education (ISCED level 3)	13.0 (2.5)	19.7 (5.3)	17.4 (34.5)	75.7 %	2.9 %	21.4 %	5.2 (3.9)
Upper vocational education (ISCED level 5B)	15.2 (2.6)	18.0 (3.9)	7.7 (11.6)	75.9 %	10.1 %	13.9 %	5.1 (2.6)
University education (ISCED levels 5A and 6)	20.8 (4.4)	18.1 (3.5)	3.2 (6.3)	79.5 %	15.9 %	4.5 %	5.9 (3.6)

Standard deviations are shown in parentheses.

3 Wages, education, personality, and work careers: empirical results

We illustrate and examine the role of personal characteristics on earnings using Mincer's (1974) human capital earnings function. In Mincer's model the log of individual earnings are regressed on education and work experience. The basic model is of the form

$$(1) \quad \log y = \alpha_0 + \alpha_1 S + \alpha_2 X + \alpha_3 X^2 + \varepsilon,$$

where y refers to annual earnings, S is years of schooling, X is years of work experience and ε is a random error term. In Equation (1) the parameter α_1 is interpreted as the return to education. The return to education indicates the percentage increase in subsequent wages of an additional year of schooling. The hypothesis behind this interpretation is that each additional year of schooling has the same proportional effect on earnings.

We begin with a specification where the log of annual earnings is regressed on years of education, gender and work experience; see column 1 of Table 4. Both the years of education and work experience are measured as actual years. In the second specification (column 2) we extend the wage equation to include other variables related to work and career. The third specification (column 3) extends the wage equation further with measures of personality traits and school achievement. The fourth specification (column 4) reports the results of the most parsimonious specification.

The results in column (1) indicate that the return to education is approximately 5 per cent when detailed career experience and differences in personality traits and school achievement are not controlled for. This coefficient is at the lower end of those of earlier studies using Finnish data where the return to education is usually between 5 and 9 percent; see Government Institute for Economic Research (2007), Kruhse-Lehtonen (2007), Asplund (2001) and Uusitalo (1999).⁷ The explanatory power of the baseline specification is modest and, contrary to many previous findings, there is no sign of gender differences in wages. In addition, the work experience variable indicates substantial increases in wages per annum (8 per cent⁸).

When the career-related variables are included in the regression (column 2) the explanatory power of the model increases significantly. Now the gender wage gap is about 16 per cent. This is a typical estimate when occupations or industries are not controlled for. In this specification the schooling coefficient falls to three per cent. This

⁷ See Ichino and Winter-Ebmer (1999) for estimation methods and upper and lower bounds for the returns to education estimates.

⁸ For a discussion on the interpretation of the coefficients of dummy variables when the dependent variable is log-transformed see Halvorsen & Palmquist (1980) and Kennedy (1981).

suggests that ignoring career differences leads to a slight overestimation of the average return to education. As a whole the career variables are important. An unstable work career implies a drop of about 50 per cent in annual earnings. Similarly, experienced unemployment reduces annual earnings by about 30 per cent.

In column (3), the baseline model is augmented with measures of personality traits and school achievement. The overall contribution of these variables on earnings is weak. The F-test indicates that the personality trait variables as a whole are not statistically different from zero, whereas the GPA measure enters the specification with a significant coefficient. We also tested for interaction effects between personality traits and gender but the effects were not statistically significant. It is worth emphasizing that the exclusion of the work career-related variables impairs the fit of the specification and, as in the baseline model, the estimate for the work experience proxy is again implausibly high. This indicates the importance of detailed measures of the work career, at least in small samples such as we have in this study.⁹

Column 4 reports the results of the specification obtained by the general to simple approach (Hendry 1995). The estimate on the return to education is approximately 4.5 per cent and the gender wage gap is 13 per cent. The work career variables are important. An unstable or varying work career reduces annual earnings by about 40 per cent, whereas experienced unemployment implies a drop of about 25 per cent in annual earnings. Extraversion is the only personality trait which enters the specification with a statistically significant estimate. As before, an interaction effect between extraversion and gender is not statistically significant.¹⁰ Overall, when it comes to the sign and size of the explanatory variables, the results are in line with a priori assumptions and previous studies.

⁹ However, the results indicate that the ability bias may not be substantial, the return to education estimate being approximately of same magnitude as in column (1).

¹⁰ We also examined how the fact that some people drop out from school affects the results. This was done by adding a dummy-variable to the parsimonious model specification which equals one if the person has dropped out of education of some sort. The results indicate that dropping out of school has a clear negative, although not statistically significant, impact on earnings.

As mentioned earlier, despite attrition in the sample over the years, the data is reasonably well representative of the Finnish age-cohort born in 1959. However, missing information adds to the attrition in this study. This explains why the sample size, for instance in column 4, is smaller than the total sample. We tested the randomness of this attrition by the Kolmogorov-Smirnov test and t-test.¹¹ The results support the hypothesis of equal distributions and means. The only variables that indicate some non-randomness in attrition are the variables describing the stability of the work career: there are slightly more people with a stable work career in the data used in the estimations compared to the initial data.¹²

¹¹ The K-S test is used to determine whether two distributions differ in the case of continuous variables. With dichotomous variables we used the t-test to test the equality of sample means. Rejection of the null hypothesis would indicate that the attrition is not random.

¹² The data provides no information on the industry in which each individual is working, and a proxy indicating whether the person is working in the private or public sector turned out to be insignificant.

Table 4: OLS results; the dependent variable is log annual earnings.

	(1) Baseline	(2) Work and career experience	(3) Personality traits and GPA	(4) Final
Intercept	8.00*** (.37)	9.81*** (.20)	7.69*** (.89)	9.21*** (.31)
Years of education	.049*** (.01)	.031*** (.01)	.044*** (.01)	.04*** (.01)
Gender (male)	-.022 (.09)	-.17** (.08)	-.05 (.11)	-.14 (.09)
Years of work experience	.07* (.04)		.08* (.05)	
Years of work experience²	-.0008 (.001)		.001 (.001)	
Stability of work career (stable)				
- Varying		-.30 (.18)		-.40** (.20)
- Unstable		-.66*** (.13)		-.60*** (.14)
Number of employment contracts (1)				
- 2-5		-.06 (.14)		
- 6 or more		.17 (.14)		
Missing		-.35 (.47)		
Duration of unemployment in months (0)				
1-12		-.27*** (.10)		-.24** (.10)
more than 12		-.38*** (.13)		-.29** (.14)
Neuroticism			-.13 (.09)	
Extraversion			.13 (.11)	.15* (.08)
Openness to experiences			-.13 (.10)	
Agreeableness			-.06 (.10)	
Conscientiousness			.02 (.10)	
GPA			.013* (.007)	
Adj. R-squared	0.16	0.25	0.16	0.23
N	241	243	213	227

Standard deviations are shown in parentheses. Significant at * 10 %, ** 5 %, *** 1 % level.

Finally, we examine the robustness of the OLS-results by treating schooling as an endogenous variable.¹³ Two alternative family background variables were used as instruments that can be excluded from the earnings equation. The first one indicates the social status of the sample individual's family at age 8. The socioeconomic status of the family was coded on the basis of the father's occupation (mother's occupation if she was a sole provider) on a five-point scale.¹⁴ The second alternative is the sample individual's report on her family's socioeconomic status at age 27 but referring to the main parental occupation. Both variables measure the same thing, as the correlation between the variables shows (.72). Although the asymptotic efficiency increases with the number of instruments, so also does the finite sample bias. Since the number of observations in our data is rather small, it is preferable to have a small number of instruments. Table 5 tabulates the two-stage least-squares (2SLS) results. The model specified is the parsimonious model of the last column of Table 4. Along with the IV regression results, Table 5 also presents the re-estimated OLS coefficients in column (1) using only the observations with non-missing family background variables. Thus the differences between the OLS and IV estimates are not caused by sample selection. The family background instruments in column (2) and column (3) are obtained at ages 8 and 27, respectively. In column (4) we use both family background instruments in the IV estimation.

The OLS estimate (.043) is very close to the corresponding estimate of Table 4. In column (2), where the set of instruments includes the sample individual's social status based on information obtained at the age of 8, the return to education estimate is somewhat higher (.077). In column (3), where the instrument is based on information given by the sample person at the age of 27, the estimate is, in turn, lower (.026). The Cragg-Donald (1993) statistics that test the weakness of instruments are encouraging. In

¹³ Osborne Groves (2005) pays attention to the possibility that also personality traits might be endogenous. This would be the case if personality is shaped by success or failure in the labour market. However, personality traits seem highly stable in adulthood (Rantanen, Metsäpelto, Feldt, Pulkkinen & Kokko 2006) and it is thus unlikely that experiences in the labour market would generally have a significant effect on these traits. Consequently, we focus on the endogeneity of education which is a well known potential problem in wage equations.

¹⁴ The classification is based on the work of Rauhala (1966) with the difference that here the number of categories is five instead to nine.

columns (2) and (3) the statistics exceed the critical values reported by Stock and Yogo (2005) and thus the instruments seem to be strong. In column (4) both social status indicators are used as instruments. In this case the return to education estimate (.045) is very close to the OLS estimate. The over-identification tests (Sargan 1958 and Basman 1960) do not reject the null hypothesis of exogeneity of the instruments at the 5 per cent level of significance. However, it is possible that the model suffers from the problem of weak instruments, as suggested by the Cragg-Donald statistics. In this case that the 2SLS estimates may be biased towards the OLS estimates.

Table 5: 2SLS results; the dependent variable is log annual earnings.

	(1) OLS	(2) 2SLS ¹⁵	(3) 2SLS ¹²	(4) 2SLS
Intercept	9.12*** (.32)	8.69*** (.62)	9.34*** (.57)	9.10*** (.55)
Years of education	.043*** (.01)	.076* (.04)	.026 (.04)	.045 (.04)
Gender (male)	-.18* (.09)	-.22** (.11)	-.16 (.10)	-.18* (.10)
Stability of work career (stable)				
- Varying	-.39** (.20)	-.46** (.22)	-.36* (.21)	-.39* (.21)
- Unstable	-.45*** (.15)	-.41** (.16)	-.47*** (.16)	-.45*** (.16)
Duration of unemployment in months (0)				
-1-12	-.28*** (.11)	-.25** (.11)	-.29*** (.11)	-.27** (.11)
-more than 12	-.38*** (.14)	-.36** (.14)	-.39*** (.14)	-.38*** (.14)
Extraversion	.17** (.08)	.15* (.08)	.17** (.08)	.17** (.08)
Adj. R-squared	0.23	0.20	0.23	0.23
N	215	215	215	215
Cragg-Donald statistics¹⁶		18.598	22.044	12.125
Over-identification tests¹⁷:	-	-	-	
-Sargan's (1958) statistic				Chi2(1)= 2.843 p=0.0918
-Basmann's (1960) statistic				Chi2(1)= 2.760 p=0.0966
Excluded instruments	-	Teacher's assessment of the family's social status at the age of 8.	Own assessment of the family's social status at the age of 27.	Teacher's and own assessments of the family's social status at the ages of 8 and 27.

Standard deviations are shown in parentheses. Significant at *** 1 % ** 5 % * 10 % level.

¹⁵ In order to satisfy the order condition for identification we need at least as many excluded exogenous variables (instruments) as there are included endogenous explanatory variables in the structural equation. Since in this case the number of instruments equals the number of endogenous explanatory variables, the equations are exactly identified and the order condition is satisfied.

¹⁶ We have used the Cragg-Donald (1993) statistic to test whether the used instruments are weak; the H_0 : Equation is weakly identified. Weak identification arises when the excluded instruments are correlated only weakly with the endogenous regressors.

¹⁷ These are tests of the joint null hypothesis that the excluded instruments are valid instruments, i.e. they are uncorrelated with the error term and correctly excluded from the estimated equation. If the tests reject the null hypothesis then the validity of the instruments is doubtful.

4 Conclusions

In this article we studied the impact of personality traits on earnings. The empirical analysis was based on the Jyväskylä Longitudinal Study of Personality and Social Development (JYLS), which provides annual data on individual's schooling, training, work experience, personality traits, and school achievement from age 15 to 42. The JYLS study began in 1968 when 12 complete school classes were selected to the sample. Although some attrition has occurred in the sample over years, comparison of the participants and non-participants at age 42 in 2001 indicated that the participants were representative of the original random sample and the Finnish age-cohort of 1959.

The JYLS database showed a number of interesting features. First, certain, although relatively small differences emerged in personality traits between the educational groups. In particular, the more educated seem to be more open to new experiences, whereas those with only a vocational education appear to score higher on neuroticism and less on extraversion than the other groups. Second, there were significant differences in school achievement, the more educated individuals having higher GPAs in the 8th grade. Third, there were significant differences in individuals' unemployment and work histories. In particular, less educated individuals were more likely to have unstable work careers and they also confronted unemployment more frequently than those with more education. As a consequence, the differences in the years of work experience were rather small at age 42.

The results indicate that previous work and unemployment history has a significant influence on an individual's earnings. An unstable or varying work career reduces annual earnings by about 40 per cent. An extensive unemployment history, in turn, implies a drop of about 25 per cent in annual earnings. Of all five personality traits only extraversion turned out to have a significant impact on earnings. According to the results a rise in an extraversion score by one point is associated with an increase of about 17 percent in wages. A person high in extraversion is typically outgoing, enthusiastic, active, and assertive. The results thus suggest that these characteristics are valuable in the labor

market. Somewhat surprisingly, conscientiousness turned out to have no effect on earnings after gender, years of education and work experience along with career-related variables were controlled for (see Tokar et al. 1998). As conscientiousness can be described by adjectives such as responsible, reliable and organized, it might be expected that more conscientious workers would have higher earnings. However, according to our results this is not the case. In addition, we found no gender differences in personality traits and earnings.

In line with previous studies this article shows that personality traits matter when it comes to success in working life. The results indicate that extraversion has a positive impact on wages after several background variables have been controlled for. It would be interesting though to see whether this result holds if we did the analysis for different occupational groups. It might be that in each occupation somewhat different personality traits are valued. With this data, we were, however, unable to test this possibility.

References

- Asplund, R. (2001). Koulutus, palkkaerot ja syrjäytyminen. ETLA keskustelualoitteita No 777. (in Finnish)
- Basman, R. L. (1960). On finite sample distributions of generalized classical linear identifiability test statistics. *Journal of the American Statistical Association* 55, 650–659.
- Blackburn, M. L., & Neumark, D. (1992). Observed ability, efficiency wages and inter-industry wage differentials. *The Quarterly Journal of Economics* 107(4), 1421–1436.
- Bowles, S., Gintis, H., & Osborne, M. (2001a). Incentive-enhancing preferences: Personality, behavior, and earnings. *American Economic Review* 91(2), 155–158.
- Bowles, S., Gintis, H., & Osborne, M. (2001b) The determinants of earnings: A behavioral approach. *Journal of Economic Literature* 39(4). 1137–1176.
- Card, D. (1999). The causal effect of education on earnings. In Ashenfelter, O. & Card, D. (Eds.) *Handbook of Labor Economics*. Amsterdam: Elsevier, 1801–1863.
- Case, A., & Paxton, C. (2006). Stature and status: Height, ability, and labor market outcomes. NBER Working Paper No. 12466.
- Caspi, A. (1998). Personality development across the life course. In W. Damon (Series Ed.) & N. Eisenberg (Vol. Ed.), *Handbook of child psychology: Vol. 3. Social, emotional, and personality development* (5th ed.) New York, NY: Wiley, 311–388.
- Cawley, J. (2007). The labour market impact of obesity. In Z. Acs and A. Lyles (eds.) *Obesity, business, and public policy* (Edward Elgar Publishers, Northampton), Forthcoming.
- Costa, P. T., Jr., & McCrae, R. R. (1992). Revised NEO Personality Inventory (NEO-PI-R) and NEO Five-Factor Inventory (NEO-FFI) professional manual. Odessa, FL: Psychological Assessment Resources.
- Costa, P. T. Jr., & McCrae, R. R. (1985). *The NEO Personality Inventory Manual*. Odessa, FL: Psychological Assessment Resources.
- Cragg, J.G., & Donald, S.G. (1993). Testing identifiability and specification in instrumental variable models. *Econometric Theory* 9, 222–240.
- Goldberg, L. R. (1993). The structure of phenotypic personality traits. *American Psychologist* 48, 26–34.

- Government institute for economic research (2007). Finnish economy: Structural indicators 2006. http://en.vatt.fi/file/vatt_publication_pdf/finnisheconomy2006.pdf 22.1.2007.
- Griliches, Z. (1977). Estimating the returns to schooling: Some econometric problems. *Econometrica* 45, 1–22.
- Halvorsen, R., & Palmquist, P. (1980). The interpretation of dummy variables in semi-logarithmic equations. *American Economic Review* 71(3), 474–475.
- Hamermesh, D. S., & Biddle, J. E. (1994). Beauty and the labor market. *The American Economic Review* 84(5), 1174–1194.
- Heckman, J. J., Stixrud, J., & Urzua, S. (2006). The effects of cognitive and non-cognitive abilities on labor market outcomes and social behavior. *Journal of Labor Economics* 24(31), 411–482.
- Heckman, J., & Vytlacil, E. (2001). Identifying the role of cognitive ability in explaining the level of and change in the return to schooling. *Review of Economics and Statistics* 83, 1–12.
- Hendry, D. (1995). Dynamic econometrics. Advanced text in econometrics. Oxford University Press.
- Ichino, A., & Winter-Ebmer, R. (1999). Lower and upper bounds of return to schooling: An exercise in IV estimation with different instruments. *European Economic Review* 43, 889–901.
- Kennedy, P. E. (1981). Estimation with correctly interpreted dummy variables in semi-logarithmic equations. *American Economic Review* 71(4), 801.
- Kruhse-Lehtonen, U. (2007). Empirical studies on the returns to education in Finland. Acta Universitatis oeconomicae Helsingiensis. A-289.
- McCrae, R. R., & Costa, P. T., Jr. (2003). Personality in adulthood: A five-factor theory perspective. New York, NY: The Guilford Press.
- McCrae, R. R., & John, O. P. (1992). An introduction to the Five-Factor model and its applications. *Journal of Personality* 60, 175–215.
- Mincer, J. (1974). Schooling, Earnings and Experience. New York: Columbia University Press.
- Nyhus, E. K., & Pons, E. (2005). The effects of personality on earnings. *Journal of Economic Psychology* 26, 363–384.
- Osborne Groves, M. (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.
- Pitkänen, L. (1969). A descriptive model of aggression and nonaggression with applications to children's behaviour. Jyväskylä Studies in Education, Psychology and Social Research, Nr. 19, University of Jyväskylä, Finland.

- Pulkkinen, L. (2006). The Jyväskylä Longitudinal Study of Personality and Social Development. In L. Pulkkinen, J. Kaprio, & R. J. Rose (Eds.), *Socioemotional development and health from adolescence to adulthood*. New York: Cambridge University Press, 29–55.
- Pulkkinen, L., Feldt, T., & Kokko, K. (2006) Adaptive behavior in childhood as an antecedent of psychological functioning in early middle age: Linkage via career orientation. *Social Indicators Research* 77, 171–195.
- Pulver, A., Allik, J., Pulkkinen, L., & Hämäläinen, M. (1995) A Big Five personality inventory in two non-Indo-European languages. *European Journal of Personality* 9, 109–124.
- Rantanen, J., Metsäpelto, R.-L., Feldt, T., Pulkkinen, L., & Kokko, K. (2007). Long-term stability in the Big Five personality traits in adulthood. Manuscript in press in *Scandinavian Journal of Psychology*.
- Rauhala, U. (1966) Suomalaisen yhteiskunnan sosiaalinen kerrostuneisuus. Porvoo: WSOY. (In Finnish).
- Sargan J. (1958) The estimation of economic relationships using instrumental variables. *Econometrica* 26, 393–415.
- Semykina, A., & Linz, S. J. (2007) Gender differences in personality and earnings: Evidence from Russia. *Journal of Economic Psychology* 28, 387–410.
- Stock, J. H., & Yogo, M. (2005) Testing for weak instruments in linear IV regression. In Andrews, D.W.K. & Stock, J. H. (eds.) *Identification and inference for econometric models: Essays in honor of Thomas Rothenberg*. Cambridge: Cambridge University Press, 80–108.
- Tobias, J. L. (2003) Are returns to schooling concentrated among the most able? A semiparametric analysis of the ability-earnings relationships. *Oxford Bulletin of Economics and Statistics* 62(1), 1–29.
- 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.
- Uusitalo, R. (1999) Return to education in Finland. *Labour Economics* 6(4), 569–580.