Psychological Traits and Earnings Differences Among Men: A Study of Second - Generation Immigrants in Sweden[#]

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Abstract

The purpose of this study is to analyse the impact of psychological traits on earnings differentials between second-generation immigrants and individuals with native-born parents. The study is based on the cohort of men born in 1973 and residing in Sweden in December 1990. In this paper we use an indicator of psychological ability measured in connection to the military enrolment test in Sweden. The results show that the measure of psychological traits is an important determinant of earnings at the age of 30. Using an Oaxaca-Blinder decomposition we find that the earnings differences between second-generation immigrants and individuals with native born parents to a large part are explained by differences in endowments of psychological traits.

Key words: Earnings differentials, psychological traits, military enrolment test, second-generation immigrants, Oaxaca-Blinder decomposition
JEL code: J15, J24, J61, J71

1. **Introduction**

The share of the population with immigrant background is growing in most Western countries. In Sweden, as much as 12 percent of the population in 2003 was born abroad and approximately 9 percent of the Swedish born population had at least one foreign-born parent. It is well established that immigrants face adverse labour market outcomes compared to the native-born population; some of theses differences also seem to persist for the immigrant's children. On average, second-generation immigrants enter the labour market with lower formal skills. Other individual characteristics may also be important for explaining labour market success; a fast growing literature highlights the importance of psychological traits such as self-esteem, motivation and emotional stability (see, e.g., Dunifon and Duncan, 1998, Heckman and Rubinstein, 2001, Bowles et al., 2001, and Osborne, 2005). Heckman (2000) states that education and labour market policies generally are based on misconceptions about the formation and relative importance of skills in that policies prioritise cognitive skills on the expense of non-cognitive skills[1]. Psychological traits have also been found to be of importance for explaining adverse labour market outcomes for individuals with minority background (see e.g., Carneiro et al., 2005).

The purpose of this paper is to analyse the importance of non-cognitive skills for explaining earnings differences between second-generation immigrants and individuals with native-born parents. The impact of non-cognitive skills is studied by using a measure of psychological traits from the Swedish military enrolment test. The measure is set up to capture characteristics such as emotional stability and social ability and aims at identifying

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[1] Psychological traits and non-cognitive skills are used synonymously in the paper.

those with an ability to deal with extraordinary situations. The empirical analysis is based on the cohort of men born in 1973 and residing in Sweden on December 31, 1990.[2]

Much research effort has been put into explaining the labour market outcomes for immigrants; far less empirical research has been presented for their children. Labour market outcomes for second-generation immigrants in Sweden have previously been studied by for example Ekberg (1997), Schröder and Vilhelmsson (1998), Rooth and Ekberg (2003), and Nordin and Rooth (2007).[3] In a comprehensive study, Rooth and Ekberg (2003) find that second-generation immigrants with a non-European or South European background are much more likely to be unemployed compared to natives. Adverse patterns are also found for these groups with respect to annual earnings. Furthermore, using an Oaxaca-Blinder decomposition they show that the lower earnings for non-European and South European groups are foremost unexplained, i.e. the difference in earnings is not due to differences in endowments (personal attributes). Instead the gap can be explained by differences in returns to the endowments, or possible by unobserved characteristics not included in the model. In a recent study by Rooth and Nordin (2007) a test of cognitive skills from the military enlistment test is added to the data set used by Rooth and Ekberg (2003). The results indicate that the test variable is an important determinant of earnings differences. In an earlier study Ekberg (1997) found only small differences in unemployment rates between second-generation immigrants and natives born before 1970. The opposite result was found in Schröder and Vilhelmsson (1998). Studying second-generation immigrants born after 1970, they found that the probability of being unemployed increases by one third if an individual is a second-generation immigrant (at least one parent born abroad).

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[2] The fact that we want to highlight the importance of non-cognitive skills such as psychological ability measured in the military enlistment test restricts us to only consider men in this study.

[3] A number of studies on U.S. data have also considered second-generation immigrants, e.g. Borjas (1993, 1994).

Our paper contributes with the non-cognitive dimension of individual skills; furthermore, extensive register data allows us to identify individual differences in the adolescence more narrowly than previous studies using Swedish data, e.g. more specific measures of efficiency in the human capital (grades from 9th year of compulsory school). We also believe that the paper can contribute to the empirical literature on psychological traits and labour market outcomes; since we use an evaluation conducted by psychologists for the entire cohort of men, we do not have to rely on self-evaluations in small samples that are common in the literature. Using a detailed Oaxaca-Blinder decomposition (see Yun, 2005) we try to answer to what extent the earnings differentials can be explained by differences in endowments or differences in returns from endowments, i.e. the explained and unexplained part of the earnings difference is further disaggregated to the contribution of the separate variables and their coefficients.

The main finding in the paper is that the measure of non-cognitive skills from the military enrolment test explains a relatively large part of the earnings differences between individuals with Swedish born parents and second-generation immigrants. Thus, the results indicate that the psychological traits that are evaluated in the military enrolment test are also rewarded in the labour market. It is differences in endowments of the psychological traits between the groups that matter; most groups are rewarded equally for a given endowment of psychological traits. Individuals with Swedish born parents have higher endowments compared to second-generation immigrants. One interesting observation is that individuals with one Swedish born parent and one foreign born parent end up between the groups with two Swedish born parents and two foreign born parents. It is tempting to interpret these differences as some Sweden specific traits that are rewarded in the labour market.

The rest of the paper is organised as follows. In section 2, we briefly discuss psychological traits and their impact on labour market outcomes. In section 3, we present the

empirical model and our research strategy. Data is described in section 4, and the results are presented in section 5. The paper is concluded in section 6.

2. Psychological traits and labour market outcomes

In this section we will present some of the research that focuses on psychological traits and labour market success. As an introduction, we discuss the measure of psychological traits that is obtained in the enlistment test and how it might relate to the literature. The short literature summary is used as a guideline in our selection of variables and the interpretation of the results.

The enlistment evaluation of psychological traits

The empirical analysis in this paper relies on an evaluation of psychological traits in the military enrolment test. The evaluation is set up to capture individual characteristics such as emotional stability and social ability. The non-cognitive ability is measured on a scale between one (low) and nine (high). The main purpose of the evaluation is to identify the individual's ability to handle stress and to work under extraordinary situations, e.g. combat situations during wartime (see Carlstedt, 2003). In contrast to many other measures that have been used in the empirical literature, the measure of psychological traits in this study is based on evaluations of professional psychologists. This means that the measure does not rely on self-evaluations. The measure is also available for almost the entire cohort of men. The individuals are evaluated in the military enrolment test at the age of 18-19. Thus, the evaluation is conducted before most individuals enter the labour market.

Studying U.S. soldiers in the Korea War Egbert et al. (1957) developed an evaluation method upon which the Swedish enlistment test is based. Egbert et al. identified

links between individual characteristics and "fighting performance" by studying the individual's background, and interviewing peers and officers from the battlefield. This knowledge was used to develop question batteries aiming at identifying "fighters" and "non-fighters". Applied to the Swedish enlistment test, the question batteries are adapted to the Swedish environment and the time period for the relevant cohort (see Carlstedt, 2003). Interviews concerning child hood, living conditions, school experiences, commitments in sports associations, etc., are potential indicators of how the individuals interact with others and how they behave under extraordinary situations.

Carlstedt (2003) has analysed the measure of psychological traits for the cohorts of men in Sweden born 1972-1983 and found that men with Swedish born parents have the highest results followed by second-generation immigrants and first-generation immigrants. This pattern is also evident for the 1973 cohort that is studied in this paper. Carlstedt (2003) argues that the evaluation is ethnically biased and that it is not possible to construct an evaluation method that is independent of ethnic and cultural background. It might be tempting to interpret the ethnic diversity in psychological traits in terms of an ethnically biased evaluation method. However, a conclusion of the existences of ethnic bias based solely on exploratory analysis is too strong. One observation in our data is that individuals with one Swedish born parent and one foreign born parent end up between the groups with two Swedish born parents and two foreign born parents. Such a pattern may indicate that there is a Sweden specific non-cognitive skill. At the same time, an observation that contradicts the "Sweden specific" skill is that men with both parents born in other Nordic countries have the lowest result compared to the other groups. The Nordic countries should be "closer" to Sweden than other regions with respect to ethnicity and culture.

Our point of departure is that the evaluation of psychological traits might be ethnically biased, but we cannot test this hypothesis. However, we are able to study if the

evaluation of psychological traits in the military enlistment test is a predictor of earnings at the age of 30 and if this characteristic can explain earnings differences across groups.

Theoretical underpinnings

The general approach for studying labour market success has its starting point in human capital theory and focuses on the individual's cognitive ability and returns to education. There is also a fast growing literature that provides evidence that several dimensions of individual ability and traits beyond cognitive skills are important for explaining labour market outcomes; for example, self-esteem (Waddell, 2006), motivation (Condon and Kiker, 1979; Long, 1995, Dunifon and Duncan, 1998), as well as aggression and withdrawal (Osborne, 2000).

What is it that the labour market rewards in the context of psychological traits? As pointed out by Bowles et al. (2001), non-cognitive skills are not likely to be captured by a single measure like cognitive skills and IQ. From a theoretical point of view, the relation between non-cognitive skills and labour market outcomes is not straightforward. Several psychological traits can be productivity enhancing; it is easy to see that personal characteristics such as social ability and emotional stability can increase productivity. However, other individual characteristics that are not foremost seen as productivity enhancing have also been found to correlate with labour market outcomes. In a "Schumpeterian economy", which is characterised by technological and organisational changes and persistent disequilibrium rents, some individuals with characteristics such as aggressiveness and ambition may have better ability to capture the rents. Further, if the labour market is characterised by asymmetric information, the principal agent problem becomes relevant. Bowles et al. (2001) present a model of incentive enhancing preferences. The main feature of the model is that employers are not able to observe effort among employees; contracts

between employers and employees can only stipulate the working time and not the effort. The incentive-enhancing preference increases the effort for a given wage incentive.

A question that is central when studying second-generation immigrants is whether differences in earnings that is associated with national origin tends to diminish over generations (see e.g., Borjas, 1994, for a discussion). Our data indicates that earnings are more homogeneous among the second generation compared to the first generation. However, it is also clear that parental characteristics such as birth region and education level are correlated with psychological traits of their offspring. With these differences as a starting point, through what channels do the parents' affect the formation of different psychological traits and cognitive skills? Parents and the home environment are important for supporting the children during the school years and there is solid empirical evidence that parental background influences education choices and achievements by their children. Sociologists have highlighted the importance of the parents' endowments of cultural as well as social capital for supporting the offspring (see Farkas, 2003, for a discussion). The parents' endowment of social capital, e.g. the access to social networks through neighbourhoods and other parents, may be very important when the child's cognitive and non-cognitive skills are formed.

3. Empirical model

In this section we present the empirical model and our research strategy for analysing the impact of psychological traits on earnings differentials between native Swedes having two Swedish parents and second-generation immigrants. Following Rooth and Ekberg (2003), we conduct an Oaxaca-Blinder decomposition, i.e. the difference in annual earnings is decomposed into one part that is explained by differences in endowments and a second part

that is explained by differences in the coefficients. The first part is generally referred to as the "explained" part and the latter is referred to as the "unexplained" part. A recently developed extension of the Oaxaca-Blinder decomposition (see Yun, 2005) allows us to conduct a detailed decomposition, i.e. the two components, the explained and unexplained part can further be disaggregated to show the impact of the separate variables.

3.1 *The Oaxaca-Blinder decomposition*

The following earnings equation is estimated for each group

$$\ln E_i = X_i \beta + \varepsilon_i \tag{1}$$

where the log of earnings for individual i is given by $\ln E_i$, X_i is a vector of explanatory variables, β is a vector of parameters to be estimated and ε_i is an error term. The properties of the ordinary least square estimator implies that the mean difference in predicted earnings between two groups ($\overline{\ln E^N} - \overline{\ln E^{SG}}$) can be expressed as

$$\overline{\ln E^N} - \overline{\ln E^{SG}} = \overline{X}^N \hat{\beta}^N - \overline{X}^{SG} \hat{\beta}^{SG} \tag{2}$$

where the superscript *N* refers to the group with two Swedish born parents and the superscript *SG* refers to a group of second generation immigrants. $\overline{X}^N$ and $\overline{X}^{SG}$ are matrices of mean regressors for the native group and immigrant group respectively, $\hat{\beta}^N$ and $\hat{\beta}^{SG}$ are vectors of estimated parameters for the respective groups. Equation (2) can be rewritten as

$$\overline{\ln E^N} - \overline{\ln E^{SG}} = \hat{\beta}^N (\overline{X}^N - \overline{X}^{SG}) + \overline{X}^{SG} (\hat{\beta}^N - \hat{\beta}^{SG}) \tag{3}$$

The right hand side of equation (3) has two components; the first term, $\hat{\beta}^N (\overline{X}^N - \overline{X}^{SG})$, can be interpreted as the difference in earnings that is explained by differences in observed endowments. Note that the decomposition uses $\hat{\beta}^N$ when calculating the explained part. There are two reasons for this choice. First, is quite natural to take the pay-off-scheme for natives as the non-discriminatory benchmark. Secondly, since we will compare four second-generation

groups with the group of natives, the analysis is facilitated if we use the same parameter estimates and not four different weighted averages. The second term on the right hand side, $\overline{X}^{SG}(\hat{\beta}^N - \hat{\beta}^{SG})$, can be interpreted as the effect of being a native Swede instead of being a second-generation immigrant, i.e. the unexplained part.

3.2 Identification in detailed decompositions

The Oaxaca-Blinder decomposition is often used to analyse wage discrimination in the labour market. It is tempting to disaggregate the explained and unexplained parts to the different variables and their coefficients (see, e.g., Oaxaca, 1973, Cunningham and Zalokar, 1992). However, in some cases it is not straightforward to conduct a detailed decomposition, e.g. when dummy variables are used (see Jones, 1983, and Oaxaca and Ransom, 1999). The inclusion of dummy variables introduces an identification problem since the constant term becomes dependent on the choice of reference group. A few papers have proposed solutions to the identification problem (see Suits, 1984, Gardeazabal and Ugidos, 2004, and Yun, 2005). Suits (1984) and Gardeazabal and Ugidos (2004) suggest normalised regressions as the solution to the identification problem, imposing restrictions on the parameters. Yun (2005) present an intuitive approach based on averaging of the parameters, i.e. using the fact that different reference groups give different parameter estimates. In this paper we follow the solution suggested by Yun (2005), which is based on the averaging idea. However, note that there may still be problematic to determine the size of the unexplained part for variables that do not have a natural zero point, i.e. an arbitrary linear transformation of a variable will change the magnitude of the separate variables the unexplained part.

4. Data

The empirical analysis in this paper is based on the cohort of men born in 1973 and residing in Sweden in December 31, 1990. Data have been obtained from The Statistics Sweden (SCB) and The National Service Administration (Pliktverket).

The cohort consists of 112 851 individuals, 57 709 men and 55 142 females. Due to the fact that we rely on data obtained from the military enlistment test we only consider men in the analysis. Although a small number of females have done the military enlistment test, this group has been excluded since they are not likely to constitute a representative sample of the female cohort. Of the cohort of men, a total of 46,305 (80.2 percent) are born in Sweden having Swedish born parents, 4,095 individuals (7.1 percent) are foreign born, and 7,309 individuals (12.7 percent) are born in Sweden having one or two foreign born parents. The number of observations only allows us to consider three regions in the analysis, individuals with both parents born in Sweden (Both Swe) are compared with individuals with two or one parents born in other Scandinavian countries (Both North and One North) and individuals whose parents are born outside EU15 (Both non-EU15 and One – non-EU15)[4]. The EU15 group is relatively small and excluded from the analysis.

The process of compiling the data set has resulted in a "positive selection" of individual and parental characteristics. Average values on variables not coming from the enlistment test are "better" for the group that has undertaken the test than for the cohort as a whole (foreign born and EU15 excluded). The positive selection is stronger in the second-generation groups than for "Both Swe", as a consequence the differences between groups that we present below is notably smaller than for the entire cohort.

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[4] Individuals with parents born in North America or Oceania are not included.

Table 1 presents the average values of the dependent and independent variables for the five heritage groups. The dependent variable is the log of annual income (SEK 100) for the year 2003.[5] The cohort is thus 30 years old when earnings are measured. Individuals with an annual income less that SEK 40,000 are excluded.[6] As can be seen from the table, the group with two Swedish born parents has the highest average income and the lowest average income are found for individuals with both parents born outside EU15.

Some interesting patterns are found when looking at the main variable of the study, the non-cognitive ability. The measure of psychological ability ranges from one (low) to nine (high), the average value is five for the population. The highest mean is found for the group with two Swedish born parents and the groups with both parents born in other Nordic countries or outside the EU15 have the lowest average ranking of psychological ability. Another pattern for the psychological ability is that the group with one Swedish born parent and one foreign-born parent ends up between the other groups.

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[5] Annual income is measured as gross wages including incomes farm property, sickness allowance, and parental allowance.

[6] Björklund and Antelius (2000) argue that using Swedish data and excluding individuals with very low earning makes it possible to interpret earnings as hourly wages. We have also estimated the models with SEK 80,000 as the cut-off point, the main results were not altered.

Table 1. Mean values

Variable	Both Swe	Both North	One North	Both non-EU15	One non-EU15
Ln income	7.81	7.77	7.76	7.73	7.76
Non-cognitive ability (NC)	5.33	4.66	5.01	4.70	5.14
GPA 9th year	3.20	3.02	3.08	3.25	3.24
Income Fam (SEK 10,000)	26.80	22.33	25.21	19.11	26.13
Education Family	2.96	2.12	2.88	2.48	3.33
Education 1	0.056	0.082	0.070	0.040	0.064
Education 2	0.277	0.406	0.309	0.252	0.207
Education 3	0.230	0.241	0.264	0.282	0.209
Education 4	0.161	0.132	0.151	0.196	0.168
Education 5	0.276	0.140	0.206	0.230	0.352
Average education	3.32	2.84	3.11	3.32	3.53
Experience	8.32	9.62	8.95	8.54	7.48
Married	0.212	0.188	0.182	0.322	0.192
Local unemployment	4.40	4.27	4.42	4.72	4.31
Number of observations	27,557	478	1,277	326	469

Grade point average (GPA) in ninth year of compulsory school, five being the best grade, is highest for individuals with one or two parents born outside EU15. The lowest GPA on average is found for groups with one or two parents born in another Nordic country. Although the group with both parents born outside EU15 has an average grade from compulsory school that is slightly higher than the group with two Swedish born parents, the average rating of the psychological ability is substantially lower. Interesting to note is that despite that the education level for the parents born outside the EU15 is relatively low, their children have the highest average grade from compulsory school. The average grades for the group with one Swedish born parent and one parent born outside EU15 are also relatively high. A striking feature is that the groups with background from another Nordic country have lower GPA's.

A natural starting point for the discussion of earnings differentials and differences in personal traits is to compare parents' education levels and earnings between the

groups.[7] Family income consists of the average income for the mother and father (*Income Fam*). The family income is measured as an average of annual earnings for the years 1990-1992. It is evident that earnings differences are considerable in the parental generation. The family income is highest in families with two Swedish born parents and lowest in the group with both parents born outside the EU15. The variable *Education Family* measures the highest education level among the parents. The variable range between 1 and 5 where the lowest level is compulsory school and the highest level is more than 2 years of college or university education. The group with one Swedish born parent and one parent born outside EU15 has the highest education level on average.

Five levels of education for the individuals are included in the analysis. The first level is compulsory school. The second and third levels are two and three/four years of upper secondary school (*Education 2* and *Education 3*). *Education 4* is up to two years of college/university education and *Education 5* is more than two years of college/university education. For an exploratory purpose, the average education level is also presented in the descriptive statistics. The highest education level is found in the group with one parent born outside EU15. The group with both parents born in another Nordic country deviates strongly from the other groups. Only 14 percent of this group has more than two years of higher education, which can be compared to nearly 28 percent for the "Both Swe" group.

Three other control variables are considered; experience captures the number of years since the highest level of education was obtained, marital status is also included as an explanatory variable in the model, and finally a variable measuring the regional unemployment level is included.

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[7] Parental variables are available for the years 1990-1992 for individuals living with their (house) parents. Thus, the parents are not necessarily the biological parents. Note that the origin of the second-generation immigrants is based on the biological parents.

Table 2 presents correlations between the non-cognitive ability and the dependent variable and three main explanatory variables. The correlation between the non-cognitive ability and income ranges between 0.16 and 0.27. As expected, the correlation between non-cognitive ability and parental characteristics is not negligible. Parental characteristics and the home environment are likely to affect psychological traits. As can be seen from Table 2, the correlation between psychological ability and the average grade in the 9th year of compulsosy school is relatively strong. The correlation is strongest for the group with both parents born outside the EU15 and weakest for the group with one parent born outside EU15.

Table 2. Correlations: non-cognitive ability (NC) – ln income,

education family, income parents, grade point average (GPA)

Group		lnE	Educ. fam.	Inc. par.	GPA
Both Swe	NC	0.215	0.245	0.212	0.453
Both North	NC	0.188	0.182	0.196	0.459
One North	NC	0.166	0.230	0.238	0.428
Both non-EU15	NC	0.182	0.226	0.215	0.471
One non-EU15	NC	0.274	0.183	0.177	0.402

5. Results

The estimation results are presented in three stages. Firstly, the OLS estimates for the separate groups are presented in Table 3. Thereafter, the results from the Oaxaca-Blinder decomposition are discussed (Table 4). The decomposition is essentially a combination of the OLS estimates and the descriptive statistics for the groups of different heritage. Finally, the detailed Oaxaca-Blinder decomposition on explained differences are presented in Table 5.

OLS regressions

A result that appears to be robust in the OLS regressions regardless of model specification is that the non-cognitive ability has a positive impact on annual earnings at the age of 30. The result holds for all groups except for the "Both non-EU15" group where the effect is not significant. The impact of non-cognitive ability on earnings is strongest for the "One non-EU15" group, the effect is twice as large as for the "Both Swe" group.

The parameter for the grade point average from 9th year of compulsory school is positive for all groups although not significantly determined for the "Both North" and "One non-EU15" groups.[8] The individuals in the "Both non-EU15" group have the largest return of GPA. As was mentioned above, this group is the only one where the parameter for non-cognitive ability is not significantly determined. This group has the highest grade point average but a relatively low non-cognitive ability on average. In the "Both non-EU15" group the correlation between GPA and the non-cognitive ability is also the highest of all groups, although not so strong compared to the other groups that it reasonably could eliminate the effect of the non-cognitive variable.

The income of the parents has a positive effect on annual earnings for the offspring. The effect of education level among the parents is ambiguous. The effect is negative but only significantly determined for the "Both Swe" group. The negative effect may be explained by the fact that the income and education variables are correlated. When leaving out the income variable the effect of parental education on earning is positive.[9]

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[8] We have also estimated the model with the cognitive test score from the enlistment test instead of the GPA. The qualitative results throughout the rest of the paper are not sensitive to this alteration.

[9] The main results are not affected if one of the variables is excluded.

Table 3 OLS-estimates on the groups separately, p-values in parenthesis

Variable	Both Swe	Both North	One North	Both non-EU15	One non-EU15
Non-cognitive ability	0.0326 *(0.000)*	0.0228 *(0.097)*	0.0245 *(0.003)*	0.0129 *(0.460)*	0.0684 *(0.000)*
GPA 9th year	0.0772 *(0.000)*	0.0081 *(0.838)*	0.0778 *(0.002)*	0.1097 *(0.031)*	0.0556 *(0.222)*
Income Family	0.0033 *(0.000)*	0.0031 *(0.896)*	0.0029 *(0.021)*	0.0054 *(0.070)*	-0.0009 *(0.676)*
Education Family	-0.0112 *(0.000)*	-0.0296 *(0.089)*	0.0028 *(0.795)*	-0.0157 *(0.529)*	-0.0157 *(0.502)*
Education 2	-0.0499 *(0.050)*	0.3213 *(0.074)*	0.0557 *(0.607)*	0.4792 *(0.102)*	0.3092 *(0.189)*
Education 3	-0.0371 *(0.253)*	0.4803 *(0.035)*	0.0579 *(0.679)*	0.6281 *(0.094)*	0.3908 *(0.202)*
Education 4	0.0289 *(0.343)*	0.5317 *(0.046)*	0.1627 *(0.307)*	0.9260 *(0.028)*	0.4620 *(0.143)*
Education 5	0.2313 *(0.000)*	0.6569 *(0.017)*	0.4919 *(0.002)*	1.2035 *(0.004)*	0.6718 *(0.036)*
Experience	0.0271 *(0.000)*	0.0292 *(0.033)*	0.0507 *(0.000)*	0.0608 *(0.000)*	0.0381 *(0.008)*
Exp_NegDev^2	-0.0076 *(0.000)*	-0.0094 *(0.000)*	-0.0052 *(0.000)*	-0.0037 *(0.236)*	-0.0072 *(0.002)*
Exp_PosDev^2	-0.0057 *(0.000)*	0.0028 *(0.703)*	-0.0055 *(0.248)*	0.0132 *(0.272)*	0.0023 *(0.832)*
Married	0.0538 *(0.000)*	0.0021 *(0.961)*	0.0636 *(0.024)*	0.1782 *(0.001)*	0.0179 *(0.746)*
Local unemployment	-0.0232 *(0.000)*	-0.0468 *(0.003)*	-0.0407 *(0.000)*	0.0069 *(0.710)*	-0.0401 *(0.051)*
Constant	7.4309 *(0.000)*	7.4393 *(0.000)*	7.0796 *(0.000)*	5.8556 *(0.000)*	6.9141 *(0.000)*
R^2 adj	0.1860	0.1965	0.1898	0.2056	0.2087
Observations	27557	478	1277	326	469

Note: Standard errors White corrected for heteroscedasticity.

The parameter estimates for the individuals' education levels are positive except for the parameters for level two and three for the "Both Swe" group. The results indicate that effect of more than two years of higher education is significant for all groups. Experience, measured as the number of years since the highest education was obtained, has a positive effect on earnings. Two additional experience variables are included. These variables are measured as the squared deviation from the mean, the first one is the negative deviation from the mean and the second is the positive deviation from the mean. The negative deviation from the mean is negatively associated with earnings, which is expected. The effect of the positive deviation is

on the other hand ambiguous.[10] Marriage is positively associated with earnings at the age of 30, especially for the group "Both non-EU15". The unemployment rate in the municipality where the individual is residing in 2003 is negatively associated with earnings (except for the "Both non-EU15" group").

The Oaxaca-Blinder decomposition

The Oaxaca-Blinder decomposition presented in Table 4 is based on the parameters from the OLS estimations presented above. The group with two Swedish born parents is used as the reference group. The total difference that appears in the first row is therefore the difference in average earnings between the "Both Swe" group and the corresponding group of second-generation immigrants. The difference in earnings range from 0.0413 for the group with two parents born in another Nordic country, to 0.082 for the group with both parents born outside EU15. Note that the "contribution" of the non-cognitive skill to the explained part is presented in the table, i.e. a sneak peek on the detailed decomposition presented in the next section is given.

The total difference for the "Both North" group is 0.0413 and the explained part is 0.0470, i.e. the explained part is actually larger that the observed total difference. The interpretation is that, given the observed differences among explanatory variables, the models predict that earning differences should be larger. There is no significant "unexplained" earning difference between the groups, i.e. it is differences in the observed characteristics that explain differences in annual income between the groups. As can be seen from the table, the non-cognitive ability has a relatively large impact on the earning difference. Nearly half of the

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[10] If the squared experience is included instead of the positive and negative deviations, the main results are not affected.

explained difference is attributed to non-cognitive ability when the "Both North" group is compared to the "Both Swe" group.

Table 4. The Oaxaca-Blinder decomposition, p-values in parenthesis

	Both North	One North	Both non-EU15	One non-EU15
Total Difference	0.0413	0.0506	0.082	0.0481
	(0.045)	*(0.000)*	*(0.007)*	*(0.076)*
Total Unexplained	-0.0057	0.0199	0.0503	0.0345
	(0.765)	*(0.099)*	*(0.078)*	*(0.163)*
Total Explained	0.0470	0.0308	0.0325	0.0136
	(0.000)	*(0.000)*	*(0.003)*	*(0.200)*
- Non-cognitive	0.0220	0.0106	0.0205	0.0061
	(0.000)	*(0.000)*	*(0.000)*	*(0.026)*
If NC not included				
Total Unexplained	0.0071	0.0260	0.0701	0.0422
	(0.710)	*(0.031)*	*(0.014)*	*(0.092)*
Total Explained	0.0342	0.0246	0.0127	0.0059
	(0.000)	*(0.000)*	*(0.207)*	*(0.568)*
Change in explained difference when NC not included	0.0128	0.0062	0.0198	0.0077
Note: The contribution of the non-cognitive ability to the total explained difference is derived through the detailed decomposition presented in Table 4.				

The total difference is higher for the "One North" group and the unexplained part is much higher for this group. Non-cognitive ability has less impact on the earnings difference in this case where only one of the parents is born in another Nordic country. However, the non-cognitive ability still explains a substantial part: one third of the explained part can be attributed to the non-cognitive ability.

In the third column, the comparison between "Both non-EU15" and "Both Swe" is presented. In this case the total difference is large (0.082), furthermore, the unexplained part of the total difference is quite large. The result reflects what can be seen from the descriptive statistics. The average earning of this group is considerable lower compared to the

"Both Swe" group. A somewhat surprising fact is that this group actually has a higher grade point average than the "Both Swe" but the average non-cognitive ability is substantially lower. The non-cognitive ability does play an important role for explaining the earnings difference. A crucial question is to what extent the relatively low non-cognitive ability of the group is a result of discrimination. This is a question that cannot be answered within the scope of this paper. It is tempting to interpret the relatively large unexplained part as a result of labour market discrimination although such conclusion is far too rash.

The total difference in earnings is smaller when one of the parents is born outside EU15 (0.0481). However, the model is less able to explain the earning difference and the contribution of the non-cognitive ability to the explained difference is small. In this case one might find an explanation in the fact that the total earning difference is in parity with "Both North" groups although the "One non-EU15 group" has a grade point average and average non-cognitive ability that is relatively high. Once again it is tempting to think in terms of discrimination when analysing the earnings difference.

In the bottom part of the table an alternative way of displaying the importance of non-cognitive ability in explaining earnings differences is given. The unexplained and explained part of the total difference is presented for estimations where the non-cognitive ability is excluded. The explained part is of course smaller. The most considerable changes are found for the "Both North" and "Both non-EU15" groups. The explanation is that the groups with one Swedish parent have higher non-cognitive ability on average; the contribution to the explained part that consists of difference in endowments is therefore smaller.

The detailed decomposition

In the previous discussion it was clear that the non-cognitive ability is an important determinant of income differences between second-generation immigrants and those with Swedish born parents. In the detailed decomposition that is presented in Table 5 below, the contribution of different characteristics to the explained earnings difference is shown. It is then possible to compare the relative importance of the non-cognitive ability compared to the other explanatory variables.[11]

Note that only the explained differences are shown in the table. The reason is that the size of the unexplained part is not possible to determine for variables that do not have a natural zero point, e.g. the non-cognitive ability. This means that an arbitrary linear transformation of a variable changes the result. The main result from the detailed decomposition, which has already been noted in the previous discussion, is that the non-cognitive ability contributes significantly to the explained part of the earnings differences between groups.

The detailed decomposition reveals that for the "Both North" group the non-cognitive ability explains almost half of the explained part and almost twice as much as the grade point average.[12] The contribution of non-cognitive ability is also relatively large for the "One North" and "Both non-EU15" groups. The contribution of the non-cognitive ability seems to be smaller for the "One non-EU15" group. In the detailed decomposition we also found a significant unexplained difference with respect to non-cognitive skills for the "Both non-EU15 group" (not presented in the tables). However, this group experiences a greater return to non-cognitive ability compared to the "Both Swe" group. To summarize the

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[11] Note that all categories are included in the detailed decomposition, i.e. all education levels including education one as well as unmarried and married, this follows from the averaging strategy proposed by Yun (2005).

[12] If we use the cognitive test score instead of the GPA the relative importance of the non-cognitive ability is even stronger.

discussion of the non-cognitive ability, it seems safe to argue that the importance of non-cognitive ability for explaining earnings differences is unambiguous.

For the "Both non-EU15" and the "One non-EU15" groups the contribution of GPA is negative which is explained by the fact that these groups have higher GPA than the "Both Swe" group. However the effect is not significantly determined. Among the other variables it is clear that parental income has a significant and relatively large contribution to the explained difference, except for the "One non-EU15" group. Parental education does on the other hand explain earnings differences for the latter group.

Table 5. Explained Differences for the detailed decomposition, p-values in parenthesis

Variable	Both North	One North	Both non-EU15	One non-EU15
Non-cognitive ability	0.0220 *(0.000)*	0.0106 *(0.000)*	0.0207 *(0.000)*	0.0061 *(0.026)*
GPA 9th year	0.0132 *(0.000)*	0.0087 *(0.000)*	-0.0044 *(0.153)*	-0.0032 *(0.223)*
Income Family	0.0147 *(0.000)*	0.0052 *(0.000)*	0.0254 *(0.000)*	0.0022 *(0.276)*
Education Family	-0.0094 *(0.000)*	-0.0009 *(0.058)*	-0.0054 *(0.058)*	0.0040 *(0.000)*
Education 1	0.0009 *(0.300)*	0.0005 *(0.314)*	-0.0006 *(0.379)*	0.0003 *(0.600)*
Education 2	0.0109 *(0.000)*	0.0027 *(0.017)*	-0.0022 *(0.296)*	-0.0059 *(0.000)*
Education 3	0.0007 *(0.603)*	0.0024 *(0.012)*	0.0037 *(0.047)*	-0.0015 *(0.271)*
Education 4	-0.0002 *(0.681)*	-0.0001 *(0.750)*	0.0002 *(0.697)*	0.0000 *(0.870)*
Education 5	0.0266 *(0.000)*	0.0137 *(0.000)*	0.0089 *(0.056)*	-0.0150 *(0.001)*
Experience	-0.0352 *(0.000)*	-0.0171 *(0.000)*	-0.0060 *(0.313)*	0.0227 *(0.000)*
Exp_NegDev^2	0.0006 *(0.876)*	0.0028 *(0.322)*	-0.0043 *(0.423)*	0.0044 *(0.420)*
Exp_PosDev^2	0.0039 *(0.054)*	0.0001 *(0.952)*	-0.0051 *(0.015)*	0.0005 *(0.754)*
Married	0.0006 *(0.200)*	0.0008 *(0.009)*	-0.0030 *(0.000)*	0.0005 *(0.284)*
Unmarried	0.0006 *(0.200)*	0.0008 *(0.009)*	-0.0030 *(0.000)*	0.0005 *(0.284)*
Local unemployment	0.0031 *(0.045)*	0.0005 *(0.601)*	0.0073 *(0.000)*	-0.0022 *(0.103)*
Total Explained	0.0470 *(0.000)*	0.0308 *(0.000)*	0.0325 *(0.003)*	0.0136 *(0.200)*
Total Unexplained	-0.0057 *(0.765)*	0.0199 *(0.099)*	0.0503 *(0.078)*	0.0345 *(0.163)*
Grand Total	0.0413 *(0.045)*	0.0506 *(0.000)*	0.082 *(0.007)*	0.0481 *(0.076)*
If NC not included				
Explained	0.0342 *(0.000)*	0.0246 *(0.000)*	0.0127 *(0.207)*	0.0059 *(0.568)*
Unexplained	0.0071 *(0.710)*	0.0260 *(0.031)*	0.0701 *(0.014)*	0.0422 *(0.092)*
Change in explained difference when NC not included	0.0128	0.0062	0.0198	0.0077

6. Discussion

In this study, we have analysed the impact of non-cognitive ability on earnings for Swedish men at the age of 30. Our results clearly indicate that the non-cognitive ability, evaluated by psychologists at the military enlistment test, is a good predictor of annual earnings. Furthermore, the psychological ability is an important determinant of earnings differences between second-generation immigrants and those with Swedish born parents. The Oaxaca-Blinder decomposition indicates that it is differences in the access to this ability, rather than differences in returns, that can explain earning differences between groups.

It is important to note that there is a positive selection of the individuals that are studied since we rely on data from the enlistment test. The selection in the group of second-generation immigrants is even more positive compared to the group with Swedish born parents. Furthermore, the parental generation in this study is more likely to be well integrated compared to later immigrants, where migration were more driven by refugee reasons. Despite this positive selection, we have concluded that non-cognitive ability is important for labour market outcomes, and that the endowment of these characteristics varies between groups with different heritage.

Although we know the purpose of the measure of non-cognitive ability, i.e. what personal traits that the armed forces are looking for, the measure is to some extent a black box in the sense that we do not know the ground for the judgement. This paper has merely shown that the measure of non-cognitive ability matters for labour market outcomes. It requires a large research effort to understand how individual acquires these skills and especially to what extent these skills have an ethnic and cultural dimension. One possible explanation is that the measure actually captures personal traits that to some extent are "Sweden specific".

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