



Institute of
Higher Education
UNIVERSITY OF GEORGIA

IHE Research Projects Series

IHE Research in Progress Series 2019-014
Submitted to series: September 27, 2019

The Long-Term Consequences of College Undermatching on Career and Personal Well-Being

Marjolein Muskens
Maastricht University, School of Business and Economics

&

Gregory Wolniak
University of Georgia, Institute of Higher Education gwolniak@uga.edu

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Muskens, M. & G. Wolniak, “The Long-Term Consequences of College Undermatching on Career and Personal Well-Being” (2019). *IHE Research Projects Series 2019-014*. Available at: https://ihe.uga.edu/rps/2019_014



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Paper presented in track 7 at the

EAIR 41st Annual Forum in Leiden, The Netherlands

25 till 28 August 2019

Name of Author(s)

Marjolein Muskens
Gregory Wolniak

Contact Details

Marjolein Muskens
Maastricht University, School of Business and Economics
Tongersestraat 53 6211 LN
Maastricht
The Netherlands
E-mail: m.muskens@maastrichtuniversity.nl

Key words

Undermatching, Socioeconomic Status, Work Satisfaction, Life Satisfaction

Abstract

It is considered undesirable when students attend institutions that are less selective than their academic credentials would permit (i.e., “undermatching”), yet little is known about its long-term, post-college consequences. Drawing on longitudinal data from Germany (SOEP, N = 8,336), results shows that undermatching negatively influences wages and satisfaction with work and income, but does not affect satisfaction with personal aspects of one’s life. Furthermore, the negative relationships between undermatching and work satisfaction outcomes increase with age and are more pronounced among low-SES students. The findings partially support the misalignment perspective on undermatching: Not maximizing potential in college negatively influences work-related outcomes.

(Words: 100)

Presentation

INTRODUCTION & AIMS

Graduating from highly selective colleges and universities tends to lead to better career opportunities and higher wages compared to graduating from less selective institutions (Mayhew, et al., 2016). Because of these career and economic benefits, undermatching (when students attend a less selective college than their credential would permit) has been generally considered an undesirable occurrence in one’s educational trajectory (Tiboris, 2014). Undermatching is a particular concern given evidence that students from lower socioeconomic status (SES) backgrounds are more likely to undermatch than students from higher-SES backgrounds, thus reinforcing social and economic inequality (Deutschlander, 2017). However, very little is known about the direct relationship between undermatching in college and students’ experiences once in the labour market, or if a student’s SES moderates these relations. The proposed study aims to fill this knowledge gap using data from the German context that span more than three decades. Specifically, we focus attention on the added value of higher education in young people’s developmental pathways in terms of post-college, labour market participation and subjective wellbeing. We specifically aim to replicate the finding from a recent study by Ovink et al. (2018), which found that undermatching predicts lower wages and less job opportunities in adulthood within the U.S. context. We aim to replicate Ovink et al.’s findings in the German context, while extending that work by investigating satisfaction with work and other aspects of life in adulthood. We pay particular attention to investigating the moderating role of SES across these relationships. Ultimately, we have designed the study to address the following two research questions:

Q1: What are the long-term effects of college undermatching on labour market outcomes and personal well-being?

Q2: Do the effects of undermatching differ for individuals who were the first in their family to attend college compared to those who were not? In other words, are the effects of undermatching general for all individuals, or moderated by (conditional on) first-generation status?

Q3. Does the influence of undermatching and first-generation status on labour market outcomes and personal well-being strengthen, weaken, or remain consistent as more years pass following college graduation?

CONCEPTUAL FRAMEWORK & EVIDENCE

Put simply, we lack empirical evidence on the long-term, career implications of undermatching and must therefore draw from multiple frameworks in grounding the present study. While the large majority of prior studies have focused on undermatching as an outcome (e.g., Belasco & Trivette, 2015; Hoxby & Avery, 2013), only two published studies that we are aware have extended beyond initial enrollment in college: Muskens et al.’s (2019) study of subjective experiences during college among students in the Netherlands,

and Ovink et al.'s (2018) examination of U.S. students within the first few years of completing college. Particularly germane to the present study, Ovink et al. found a negative relationship between undermatch and employment, and earnings within the first few years of completing college. No prior study has examined the subjective facets of career outcomes or extended beyond the first few years after college. We address both with the present study, grounded in terms of three key perspectives that have informed prior inquiry on undermatching and college student outcomes, which point to plausible mechanisms by which undermatching may influence long-term outcomes.

First, we draw from the life course development perspective which suggests that early circumstances set in motion sequences of experiences, predicting that positive or negative experiences during adolescence produce cumulative advantage or disadvantage from early adolescence to adulthood (Yoshioka, & Noguchi, 2009). Therefore, students' subjective experiences during college may have far-reaching consequences for their further development in areas such as subsequent satisfaction with their jobs and subjective well-being (Wickrama, O'Neal, & Lee, 2016). Drawing on the life course development perspective, undermatching may lead to less satisfaction, especially with academic aspects of college and work, both during college and once in the labour market.

Second, we draw from the misalignment perspective which suggests that development may be influenced by undermatching due to a lack of fit between an institution and a students' capacities (Hoxby & Turner, 2013). For example, exposure to a less rigorous curriculum and larger misalignment with an institution's academic profile may serve to de-motivate undermatched students and diminish their satisfaction. Therefore, a negative association between undermatching and affective development would support the misalignment hypothesis. A recent study has added evidence in support of this hypothesis in terms of satisfaction with academic and social aspects of college toward students' last year in higher education (Muskens, et al., 2019).

Third, studies have shown that upward social mobility may accompany stressful experiences that may negatively influence well-being (Jury et al., 2017) and health (Miller, Yu, Chen, & Brody, 2015; Wickrama et al., 2016). For example, experiences of social exclusion and mismatch when low-SES students enter highly selective institutions are well documented (Jury et al., 2017), such that undermatching may be a way to circumvent these negative experiences in college, and once in the labour market. In this way, for low-SES students, undermatching may potentially contribute to more positive experiences at the labour market during adulthood relative to matching.

METHODS

Participants and Data

Data for this study come from the Socio-Economic Panel (SOEP), a large-scale longitudinal study in Germany with more than 20,000 participants sampled since 1984. Subjects participated since 1984, or since their birth, and have been examined longitudinally every year ever since, through questionnaires and interviews. The data contain data from 33 waves (from 1984 to 2017). From this sample, 8,336 participants completed higher education, and about 23 percent of them can be characterized as having 'undermatched'. Our analytic sample was comprised of those respondents who completed some form of higher education. The age of the respondents during participation ranged from 21 to 94 ($M = 41,76$, $SD = 13,37$). Since students' typical graduation age in Germany is 23.9 (OECD, 2019), the average amount of years in the labor market after college in this sample is approximately 18 years.

Measures

Dependent Variables. Our dependent variables include a collection of measures related to one's career and personal well-being after college. Specifically, we examine whether the respondent has a fulltime job (1= yes, 0 = no), net monthly work-related earnings, and five dimensions of satisfaction (1=very unsatisfied, to

10=very satisfied). The satisfaction measures address distinct facets of individuals' lives after college, including work satisfaction, satisfaction with income, general life satisfaction, satisfaction with family life, and satisfaction with health.

Independent variable. The primary independent (or treatment) variable is undermatching. In Germany, there are two types of higher education institutions: highly selective and less selective. For highly selective institutions, students may apply only if they have attained a diploma in the highest level in high school (Abitur -- Universitaet, Technische hochschule). For less selective institutions, students are eligible to enroll if they receive a diploma from a lower level of secondary education (e.g., Fachhochschulreife) or tertiary education (Fachschule); a diploma from the highest level of secondary education (i.e. Abitur) is not required. Therefore, respondents are determined as 'matched' if they were eligible for the most selective institutions in higher education and subsequently attended an institution that can be characterized as 'most selective', while respondents are determined as 'undermatched' if they were eligible for the most selective institutions in higher education and subsequently attended a less selective institution. The well-defined and centralized distinction between highly selective and less selective institutions in Germany offers a relatively clear framework to determine academic undermatch and represents what Bastedo and Flaster (2014) identify as an "ideal situation for studying undermatch" (p. 98).

Covariates. Covariates include indicators for age, gender, immigrant status, parental educational attainment (secondary and tertiary), and number of siblings. Our primary indicator of socioeconomic status (SES) was first-generation status (1=Neither parent had obtained a degree in higher education, 0=One or both parents had attained a degree in higher education), which we included alongside parents' occupational status, based on the International Socio-Economic Index of occupational status (ISEI).

ANALYSIS

Throughout the study we employed linear regression techniques with adjustments for selection based on propensity score matching (PSM). In testing the relationship between undermatching and subsequent career and personal life outcomes, selection effects might play a role, where students may have chosen to attend a less selective higher education institution (i.e., chose to undermatch) based on a set of systematic, non-random features. PSM allows us to generate a treatment group (e.g., students who undermatched) and a comparison group (e.g., students who matched), before comparing these groups to the outcome measure of interest, thus creating two statistically comparable groups based on several precollege covariates (Rosenbaum and Rubin, 1983; Thoemes & Kim, 2011).

We have estimated the propensity to undermatch using a logit model that predicts undermatch with the covariates mentioned above, and assigned each respondent a resulting propensity score. We then used a two-to one nearest-neighbour matching, with a 0.02 caliper level and without replacement. Results from this analytic step show that matched and undermatched students differ significantly on eight out of twelve covariates, and that matching effectively achieved statistical balance across all covariates. Overall, the PSM results highlight how SES influences one's likelihood to undermatch (see Appendix, Table A.1 and Table A.2).

Following the matching procedures, we used linear regression to estimate the effects of undermatching in order to address Question 1. In addition, we segmented the sample according to first-generation (versus continuing-generation) status to examine a possible moderating influence on the relationship between undermatching and the career and personal well-being outcomes; in so doing, we address Question 2. Lastly, to address Question 3, we examined the interaction with age for the relationships found in the analyses addressing Questions 1 and 2. In this way, we examined if the influence of undermatching and first-generation status on labour market and personal well-being change as more years pass following college graduation.

RESULTS

Descriptive statistics for all variables are presented in Table 1.

Table 1

Descriptive Statistics among Study Variables

	1	2	3	4	5	6	7	8	9	10
Mean or Proportion	0.23	0.58	2447	7.36	7.01	5.69	7.98	7.35	0.49	44.94
SD	0.42	0.44	1776	1.57	2.00	1.36	1.51	1.64	0.50	13.76
Minimum	0	0	0	0	0	0	0	0	0	21
Maximum	1	1	30000	10	10	10	10	10	1	96
1 Undermatching										
2 Full-time employed	0.02*									
3 Netto income per month	-0.09*	0.44*								
4 Satisfaction with work	-0.04*	0.09*	0.14*							
5 Satisfaction with income	-0.05*	0.20*	0.39*	0.43*						
6 Satisfaction with life	-0.03*	0.11*	0.03*	0.24*	0.19*					
7 Satisfaction with family	-0.01	-0.06*	0.06*	0.33*	0.27*	0.13*				
8 Satisfaction with health	-0.03*	0.08*	0.02*	0.39*	0.24*	0.27*	0.33*			
9 Female	0.02	-0.37*	-0.38*	-0.06*	-0.14*	-0.03*	-0.01	0.02*		
10 Age	-0.08*	-0.24*	0.26*	-0.02	0.15*	-0.08*	0.02	-0.27*	-0.16*	
11 Immigrant status	0.02*	0.00	-0.04*	0.02	-0.05*	-0.02	0.02	0.05*	0.03*	-0.12*
12 First generation	0.10*	0.02	-0.02	-0.04*	0.02	0.02	-0.04*	-0.07*	-0.06*	0.12*
13 Highest level SE father	-0.09*	-0.03*	0.02*	0.02	0.01	0.01	0.01	0.04*	0.04*	-0.06*
14 Highest level SE mother	-0.07*	-0.01	-0.01	0.02	-0.03*	-0.02	0.02	0.07*	0.06*	-0.15*
15 Highest level HE father	-0.10*	-0.02	0.03*	0.02	0.00	-0.02	0.03*	0.05*	0.03*	-0.07*
16 Highest level HE mother	-0.07*	0.00	-0.04*	0.03*	-0.03*	-0.05*	0.04*	0.09*	0.05*	-0.18*
17 Occ. status parents	-0.06*	0.01	0.01	-0.02*	0.00	0.02	0.01	0.02*	0.01	-0.06*
18 Siblings (yes/ no)	0.02	0.00	0.02*	-0.01	0.01	0.03*	0.01*	0.02	-0.02	-0.01*
19 Number of brothers	-0.01	-0.03*	0.03*	0.03*	0.02	0.01	0.03	-0.01	-0.04	0.11
20 Number of sisters	0.00	-0.03*	0.01	0.00	0.02	0.03*	0.01*	-0.01	-0.01	0.07*
	11	12	13	14	15	16	17	18	19	20
Mean or Proportion	0.05	0.55*	0.33	0.19	0.29	0.14	43.48	0.73	0.65	0.64
SD	0.22	0.48*	0.47	0.39	0.46	0.35	26.34	0.44	0.86	0.84
Minimum	0	0	0	0	0	0	0	0	0	0
Maximum	1	1	1	1	1	1	90	1	7	9
1 Undermatching										
2 Full-time employed										
3 Netto income per month										
4 Satisfaction with work										
5 Satisfaction with income										
6 Satisfaction with life										
7 Satisfaction with family										
8 Satisfaction with health										
9 Female										
10 Age										
11 Immigrant status										
12 First generation	-0.01									
13 Highest level SE father	-0.03*	-0.71*								
14 Highest level SE mother	0.01	-0.50*	0.46*							
15 Highest level HE father	0.01	-0.92*	0.75*	0.41*						
16 Highest level HE mother	0.05*	-0.56*	0.35*	0.70*	0.41*					
17 Occ. status parents	-0.05*	-0.43*	0.49*	0.30*	0.49*	0.25*				
18 Siblings (yes/ no)	0.05	-0.07*	0.15*	0.11*	0.15*	0.10*	0.26*			
19 Number of brothers	0.00	-0.02*	0.09*	0.06*	0.07*	0.04*	0.12*	0.46*		
20 Number of sisters	-0.01*	-0.03*	0.09*	0.06*	0.07*	0.04*	0.10*	0.46*	0.09*	

* p < .05, N = 8,336

Undermatching and labour market outcomes

After balancing the undermatched and matched student groups on the full set of covariates, we estimated long-term effects of undermatching on seven outcomes related to careers and personal well-being on the pooled sample. We used Linear Regression Models, with undermatching as predictor, age as covariate, and each of the outcome measures as dependent variables (see Table 2).

The results (see Table 2) show a clear pattern in which the impact of undermatching are statistically significant, uniformly negative, and cutting across both monetary (i.e., monthly income) and psychological (satisfaction with work, income, and one's own health) dimensions. Specifically, the average "treatment" effect associated with undermatching on net monthly income was €263, which translates to more than €3000 per year (roughly \$3400 USD per year). Results show no indication that undermatching predicts general life satisfaction or satisfaction with family.

Table 2
Relation between college undermatching and outcomes in adulthood

Outcome measures	B	Beta	R ²
1 Full-time employed	0.00	0.00	0.05
2 Net income per month	-263.49***	-0.07***	0.07
3 Satisfaction with work	-0.13**	-0.04**	0.00
4 Satisfaction with income	-0.14*	-0.03*	0.02
5 Satisfaction with life	0.00	0.00	0.03
6 Satisfaction with family	0.01	0.00	0.00
7 Satisfaction with health	-0.17***	-0.28***	0.08

Note. Linear regression analyses. Age was included as covariate. * $p < .05$; ** $p < .01$; *** $p < .001$. N = 5,648

Undermatching, labour market outcomes and first-generation students

In addition, it appears that the long-term and largely negative consequences of undermatching are more pronounced among first-generation students (see Table 3). While reported levels of satisfaction with work and income were significantly lower among first-generation students who undermatched, undermatching did not yield a significant influence among continuing-generation students.

Consequences of undermatching throughout adulthood

Finally, we examined how the relationships between undermatching and outcomes in adulthood develop during the life course between age 25 and age 50, using Repeated measures mixed linear regression, with age as the within-subjects factor, undermatching and the interaction age \times undermatching as predictors, and the outcome measures as the dependent variable. Results yield a significant interaction effect between undermatching and age on net earnings, satisfaction with work and satisfaction with income (see Table 4). These results indicate that the negative relationship between undermatching and these labour market outcomes increase with age. Results did not indicate an interaction between undermatching and age for satisfaction with health. Results are presented in Table 4.

Table 3

Relation between college undermatching and outcomes in adulthood, by students' first-generation status

Outcome measures	First generation	Continuing generation
1 Full-time employed	0.02	-0.02
2 Net income per month	-0.06***	-0.10***
3 Satisfaction with work	-0.04*	-0.05
4 Satisfaction with income	-0.04*	-0.03
5 Satisfaction with life	0.00	0.00
6 Satisfaction with family	0.00	-0.01
7 Satisfaction with health	-0.05**	-0.05*
N	3,558	2,090

Note. Linear regression analyses. Standardized regression coefficients β . Age was included as covariate. * $p < .05$; ** $p < .01$; *** $p < .001$.

Table 4

Interaction effects between undermatching and age on outcomes in adulthood

	Dependent variable	Satisfaction with work	Satisfaction with income	Satisfaction with health
	Net income			
Undermatching	-392,44***	-0.19	-0.20	-0.01*
Age	74,12***	-0.01***	0.03***	-0.04***
Undermatching \times age	-15,81***	-0.01*	-0.01*	0.00

Note. Repeated measures mixed linear regression. Unstandardized regression coefficients B. * $p < .05$; ** $p < .01$; *** $p < .001$.

In addition, we examined whether the development of the relationship between undermatching and the outcomes throughout life differs between first generation students and continuing generation students, by applying the same models, adding first generation, and the interaction for first generation \times age \times undermatching (in addition to the other two-way interactions) as predictors. Results show a significant three-way interaction regarding net monthly earnings ($b = 6.60$, $t(30775) = 2.60$, $p = 0.009$, 95% CI = [1.62, 11.58]), but not with regard to satisfaction with earnings ($b = 0.01$, $t(30775) = 1.80$, $p = 0.071$, 95% CI = [-0.00, 0.02]), or work satisfaction ($b = 0.01$, $t(30775) = 3.01$, $p = 0.083$, 95% CI = [0.00, 0.02]).

We show the relation between undermatching and age for net monthly earnings separated by first-generation and continuing generation status in Figure 1. It appears that continuing generation students who attended a matched college receive higher net monthly earnings than all other students, and these differences become significant after age 30. In addition, first-generation students who attended a matched college appear to have higher monthly earnings than students who were undermatched. Furthermore, for older individuals, the earnings differences between matched and undermatched groups are greater for continuing generation students. In other words, undermatching has a larger negative influence on earnings among continuing generations student than among first-generation students.

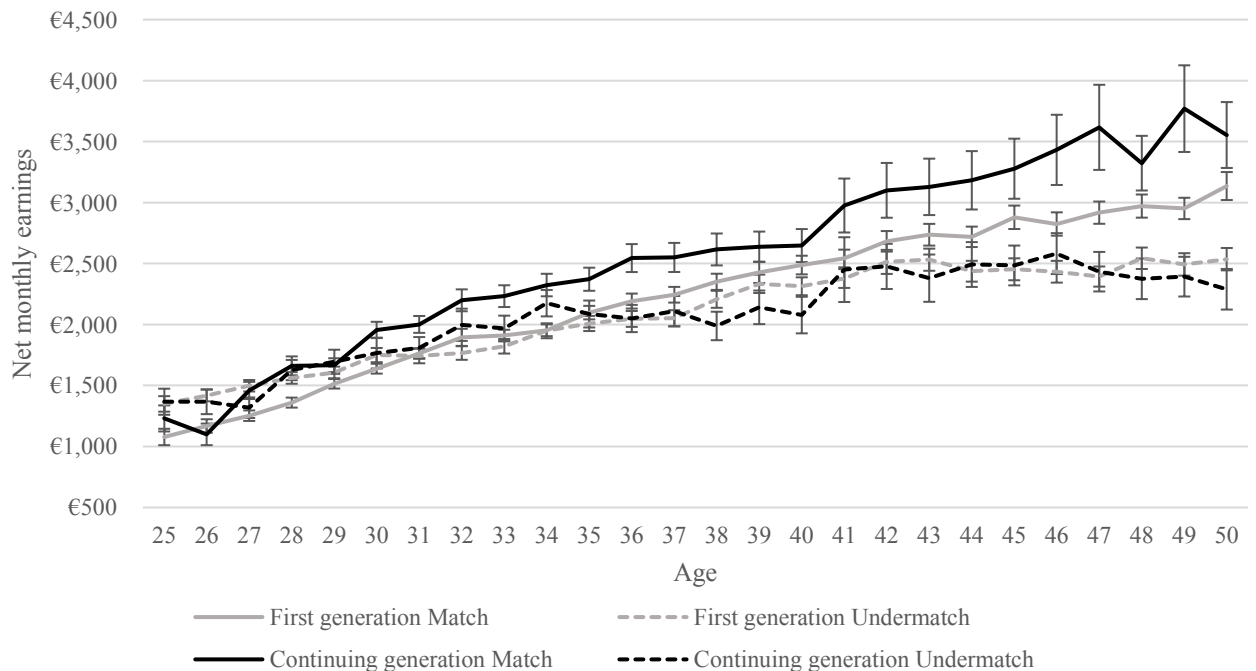


Figure 1
Net monthly earnings separated by undermatching, first generation status and age.

DISCUSSION

Although undermatching is a concern because the presumed long-term effects on wages and job opportunities, little is known about its consequences for adult well-being. In this study, we replicated prior findings that undermatching predicts a lower monthly income (Ovink et al., 2018). In addition, we showed that the differences in monthly income between matched and undermatched students increase with age. Also, whereas matched students with highly educated parents have the highest monthly income in adulthood compared to all other students, matching (versus undermatching) appeared to contribute to monthly income for first generation students as well.

Moreover, we contributed new evidence on the potential detrimental effects of undermatching on psychological well-being. Undermatching is related to less satisfaction with work and income, and these relationships increase with age. These results are in-line with the hypothesis that students who undermatch are not maximizing their full potential (Hoxby & Turner, 2013), leading to less satisfaction during college and once in the labour market. We find no evidence for the hypothesis that low-SES (captured here based on first-generation status) students benefit from undermatching in terms of more satisfaction because of a better match with social aspects in college, as some prior research has suggested (Fostnacht, 2015; Kurlaender & Grodsky, 2013). In fact, for first-generation (lower-SES) students, undermatching has more pronounced negative consequences on satisfaction with work and income than among continuing generation (higher-SES) students, thereby potentially reducing opportunities for social mobility among those who attended an undermatched institution. Although speculative, these findings may be related to the higher likelihood among low-SES students to undermatch for reasons that are not related to their academic talents or capacities (e.g., staying closer to their family and friends) (Belasco & Trivette, 2015). The findings of the current study mark some of the clearest evidence to date on the long-term implications of college undermatching.

(words: 3145)

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Appendix

Table A.1

Logistic regression estimates for propensity score models

Variable	Coefficient (Exp B)	Standard error	p-Value
Female	1.04	0.05	.483
Age	0.98**	0.00	<.000
Immigrant status	1.09	0.12	.464
First generation	1.10*	0.05	.044
Highest level SE father	0.83*	0.11	.042
Highest level SE mother	0.84	0.09	.095
Highest level HE father	0.80*	0.11	.033
Highest level HE mother	0.81	0.12	.074
Occupational status parents	1.00	0.00	.125
Siblings (yes/ no)	1.20*	0.08	.026
Number of sisters	0.99	0.04	.837
Number of brothers	0.98	0.04	.503

* $p < .05$; ** $p < .01$, N = 8,336

Table A.2

Generating balance among undermatched and matched students: Pre- and Post-test matching T-tests using 2-1 nearest neighbour matching

	Unmatched sample		t-value	Matched sample		t-value
	Control (Matched)	Treatment (Undermatched)		Control (Matched)	Treatment (Undermatched)	
Female	0.49	0.50	1.391	0.50	0.50	0.01
Age	45.49	43.03	-7.01**	43.19	43.04	-0.41
Immigrant status	0.05	0.06	2.00**	0.05	0.06	0.41
First generation	0.53	0.63	5.68**	0.63	0.63	0.19
Highest level SE father	0.35	0.25	-9.02**	0.25	0.25	-.46
Highest level SE mother	0.20	0.14	-7.16**	0.14	0.14	-.36
Highest level HE father	0.32	0.21	-9.61**	0.21	0.21	-0.07
Highest level HE mother	0.15	0.10	-6.76***	0.10	0.10	0.06
Occupational status parents	44.26	40.81	-5.19**	41.10	40.78	-0.43
Siblings (yes/ no)	0.73	0.74	1.34	0.74	0.74	0.59
Number of sisters	0.64	0.63	-0.14	0.63	0.62	0.57
Number of brothers	0.65	0.66	-0.06	0.62	0.63	0.84
N	6558	1884		3765	1883	