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How to Model Parental Education Effects on Men and Women's Attaintment? Cross-National Assessments of Different Approaches*

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Research in social stratification shares the assumption that social origin operates through assets embedded in the family structure, yet scholars' opinions of how resources get transmitted intergenerationally vary significantly. The result of this variation in opinions is a range of measures for family background, and distinct empirical models. A simplified schema yields three main methodological approaches: (a) one parent's characteristics models; (b) models using characteristics of both parents; and (c) models accounting for specific effects of social origin depending on gender. In this paper we analyze how models of each type perform when applied to cross-national data from the European Social Survey (Round 3). We focus on the impact of parental education on children's success, while controlling for parents' social class position. Individual success is conceptualized primarily in terms of educational attainment, but also of occupational standing. Although our analyses do not disclose consistent patterns across all studied countries -- neither of the models performs uniformly better, or worse, in majority of countries – some regularities are noticeable. In particular, with respect to explaining educational attainment, we find that it is generally preferable to include measures for both parents' education, rather than use one parent's characteristics models. The best fitting model – in terms of explained variance – is that combining father's and mother's education by including an interaction term of these variables. In the case of occupational standing, we generally consider the model that accounts for father's and for mother's education as the preferred solution – at least when direct effects are statistically significant. In addition, the hypothesis that the intergenerational transmission of parental education affects men and women differently is, in light of these outcomes, supported only in some of the countries.

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Key words: intergenerational transmission of family resources; measurement of social background; gender specific effects of social origin; cross-national analysis; European Social Survey

INTRODUCTION

This paper takes on the long-standing discussion in the field of social stratification of how to best capture the role of individuals' social background for their educational and occupational outcomes. The basic assumption researchers share is that social origin operates through the assets embedded in the family structure. However, opinions as to how economic and/or cultural resources pass from one generation to the next vary. In a simplified outline, three main points of view stand out:

(1) Family members share one class position, whose characteristics (e.g. consumption patterns, life style, resources) influence children's lives. The family class position is determined by the parent with the higher (i.e. dominant) social class, generally the father (Goldthorpe 1983; Erikson 1984).

(2) Parents' contribution to their children's achievements is cumulative; whether they share the same class position or not, it is imperative to account for both parents' socio-economic standing (Beller 2009).

(3) The effect of social origin is gender specific, because children imitate parents and have a strong same-sex orientation toward role playing (Smith and Self 1980; Boyd 1989). The expectation is that fathers' resources are passed on primarily to boys, while mothers matter especially for girls.

Methodologically, these approaches lead to different operationalization of social background, and different empirical models. In this paper we analyze how the various models perform when applied to contemporary cross-national data, specifically the European Social Survey (ESS, Round 3, 2006). Our focus is on the impact of parental education on children's success, where success is conceptualized primarily in terms of education. In the last part of the paper, we extend our analyses to occupational standing as a further measure of individual success. All mechanisms of educational selection – whether related to the role of entrance examinations, payment of tuition fees, reasons of leaving school on consecutive levels – boil down to the effect of parental "capitals" on offspring's staying in the educational system. This relation is key to stratification research, since a person's level of education is a main prerequisite for their entry into occupational positions, it shapes values, orientations, political preferences, lifestyle, and provides, indirectly, access to desired goods such as income, authority, and prestige. Occupation, in addition, is the most valid single indicator of a person's social position, though whether this measure should be categorical (thus, reflective of social class) or continuous (for social status) is debated.

THEORETICAL BACKGROUND AND RESEARCH QUESTIONS

The relationship between ascription and socio-economic attainment belongs to the most researched topics in sociology, dating back to the classical studies on intergenerational mobility, and the "status attainment school" (Lipset and Bendix 1959; Blau and Duncan 1967; Featherman and Hauser 1978; Goldthorpe 1980; Erikson and Goldthorpe 1992; see Breen and Jonsson 2005 for a review; Ganzeboom 2010). The unabated interest is due to the essential information that this relation holds about the nature of society: to the extent to which individuals' positions in the stratification system depend primarily on their personal effort rather than on ascribed characteristics, is it sensible to speak about equality of opportunities, and of meritocracy.

Stratification scholars contend that the family is the primary context for children's development, and thus a crucial factor for individuals' life chances. However, there is long-standing disagreement regarding the specific mechanisms that govern the intergenerational transmission of economic and/or cultural assets. The different underlying theoretical assumptions have led to different measures of social origin, and different empirical models.

Our paper focuses first and foremost on the relation between parental education and children's educational outcomes. Hence, in the first section we consider the theoretical mechanisms for each of the following approaches:

(1) Models employing one parental education variable are based on the assumption that family members share a common location in the social structure. Regarding these models, two points are in order.

A. In the conventional model, the impact of the family is related to its social class position, which can be accurately derived from the socio-economic characteristics of the father (Goldthorpe 1983; 1984). In this type of models it is assumed that father's resources are a good indicator for social origin because in most cases males' attachment to the labor force over the lifecycle is stronger than women's, and wives are generally dependent on their husbands' socio-economic achievement. Studies carried out in this tradition ignore mother's educational and/or occupational characteristics.

B. The dominance model builds upon the conventional model. It contends that social background – that is, the impact of the status position, consumption levels and housing standards of the family on children's outcomes – be derived from the parent with the highest socioeconomic status because (a) this member determines the status of the family (Erikson 1984; Erikson and Goldthorpe 1992); and/or (b) the parent's higher status relates to a stronger power position within the family, and children are generally oriented towards the most powerful parent (McDonald 1977).

In both the conventional and dominance models, the regression includes only one parent's characteristics – the father's (in the conventional model, 1A), or the parent's with the highest SES (in the dominance model, 1B) – as a summary measure of social origin. In this paper we compare these two models and ask: Does the dominance model perform better than the conventional model?

(2) Models using information on the education of both parents are based on the assumption that each parent contributes to their children's outcomes, often quite unequally. Researchers using these models invoke different arguments, proposing specific solutions:

A. The impact of social origin on destination operates through the cumulative characteristics of the parents (Beller 2009; Korupp et al. 2002; Mare 1981). Women's increasing educational attainment and attachment to the labor market in recent decades strengthen this assumption (Sorensen 1994). Since father's and mother's contribution is not redundant, to adequately measure the effect of social background one needs indicators for father's and for mother's attributes. This leads to employing a simple combined effects model.

B. Korupp and her colleagues propose a modified version of the dominance model (Korupp et al. 2002: 20) that builds on Garnsey's (1978) proposition that the resources of the lower status parent also matter when children's educational outcomes are seen as a way of parental resource consumption. According to the modified dominance model, to cover children's status background both the parent with the highest and the parent with the lowest status position are needed.

C. In mixed-class families, children tend to be positioned in-between their father's and their mother's location in the social structure (Gratez 1991; Sorensen 1994), possibly because the lower status parent acts as an opposing force to the gains stemming from the higher status parent (McRae 1986). In line with this view, researchers have operationalized family characteristics as the average of parents' education and/or occupational standing.

D. It is possible to operationalize fathers' and mothers' joint contribution using the interaction between parents' education, and/or between parents' occupational standing (Beller 2009). This approach implies that the effect of the characteristics of one parent on their offspring's outcomes depends on the characteristics of the other parent.

The research questions that we explore are straightforward: Does the simple model that accounts for both parents' individual characteristics (2A) perform better than the models of one parent's characteristics? How do models transforming parental education (models 2B and 2C) compare to the simple model that accounts for both parents' individual characteristics (2A)? Among the joint-effects models, does the interaction model (2D) explain more than the simple two parents' characteristics model?

Some researchers argue that the transmission of parental assets is gender specific. Because children have a strong same-sex orientation (see Smith and Self, 1980; Starrels, 1992; Huttunen 1992; Updegraff et al. 1996 for various explanations for such an orientation), it is likely that mother's education and occupation matter primarily for girls' outcomes, while father's characteristics are important for the achievements of their sons. Hence, accounting for the influence of parental education should take into account the interaction of parental education with the sex of the offspring (same-sex hypothesis, Korupp et al. 2002:21).

In section 2 we evaluate whether the effects of father's education and mother's education are different by gender using a model that contains interaction terms between father's characteristics and respondent's gender, as well as between mother's characteristics and respondent's gender (model 3A). Since it is possible that parents' joint contribution would work differently for men than for women, we will also examine the interaction model separately for men and women (model 3B).

In the last section we extend the analyses to occupational standing as a measure of individual success. However, only a subset of the theoretical mechanisms discussed above and their corresponding empirical models will be examined. Specifically, we will compare the conventional model (1A), the dominance model (1B), the simple combined effects model (2A) and the parental education interaction model (2D) when the criterion variable is respondent's SEI.

DATA AND METHODS

ESS Round 3 – 2006 was fielded in 24 European countries. Due to lacking or insufficient information on key variables for Cyprus, Romania, and Russia we exclude them from the analyses. To correct for slightly different probabilities of selection of individuals in each country, we apply ESS design weight (see the ESS Documentation Report for information weights: ess.nsd.uib.no/ess/round3).

We measure the outcome, respondent's success, in terms of (1) their education, and (2) their occupational standing. ESS uses a slightly modified version of ISCED-97 to capture the highest level of achieved education. The ISCED (designed by UNESCO in the early 1970's) is an instrument for compiling internationally comparable education statistics. Empirically, ISCED assumes that there are several criteria underlying the hierarchical ranking of educational levels (typical entrance qualification, minimum entrance requirement, minimum age, staff qualification, etc.). Following ISCED-97, in ESS seven levels of education are distinguished: (i) pre-primary education – for example nursery school education for children up to 3 years old, (ii) primary education – usually the first stage of compulsory education, (iii) lower secondary education – building on primary education with a stronger

subject focus, (iv) Upper secondary education – generally non-compulsory and with entry requirements, (v) post-secondary non-tertiary education – for example vocational training for specific labour markets, (vi) tertiary education (first stage) – generally university-level, academic and vocational education, (vii) tertiary education (second stage) – further university-level studies usually leading to doctoral qualifications (PhD). We use a scale from 1 to 7 as interval-level variable for two reasons. First, a transformation of this scale into the number of school years that are typical for each level is close to linear and therefore would not change the results. One of the crude transformations of this type is 4 + 2*ISCED-97 level. Second, as demonstrated many times, assigning consecutive numbers to levels of ordinal variables does not destroy the basic underlying relationships with other variables; on this matter, see e.g.: Bollen and Barb (1981); Johnson and Creech (1983).

We obtain respondent's socio-economic index (SEI) by recoding respondent's occupational score (ISCO88) using the *International Socio-Economic Index* – ISEI (Ganzeboom et al. 1992). ISEI is a cross-culturally valid index for the comparative study of the relationship between occupational status and other variables. Its theoretical background is based on Duncan's definition of occupations as the intervening variable between education and income (Duncan, 1961). Technically, ISEI construction involves a weighting of the standardized education and standardized income of occupational categories, controlled for age effects, by means of the statistical technique of optimal scaling. The optimization aims at maximizing the indirect effect of education on income and minimizing the direct effect (Ganzeboom et al. 1992:11).

The independent variables pertain to respondent's social origin, as well as to their personal characteristics. We examine the impact of *social origin* primarily through the effect of parental education. In ESS, respondents are asked about the highest level of education that their father and their mother achieved. We use this information to create the measures for mother's and father's education, as well as the variables Highest Educated Parent and Lower Educated Parent (see Appendix A for details on how the variables are constructed). In addition, we control for parental social class. Specifically, using the items "Father's occupation when respondent was 14" and "Mother's occupation when respondent was 14" we create a set of dichotomous variables that indicate father's and mother's high social class position (traditional professional occupations, modern professional occupations, and senior manager or administrators = 1, else = 0), and low social class position (semi-routine manual and service occupations and routine manual and service occupations = 1, else = 0). These variables allow us to create the measures for "Parent with Highest Social Class Position" and "Parent with Lowest Social Class Position" (see Appendix A for methodological details). When we include Highest Educated

Parent and Lower Educated Parent, we restrict analyses to respondents who have no missing information on parental education. In the models that include Parent with Highest/Lowest Social Class Position, analyses are restricted to respondents who have no missing information on parental occupation.

Throughout all analyses we account for respondents' gender (male = 1, female = 0), RGender, and age (measured in years), RAge. When testing for gender-specific patterns of the intergenerational transmission of resources, we use the interaction terms of respondent's gender with their father's education, and with their mother's education, respectively. When the dependent variable is respondent's SEI, the regression equation also includes respondent's education. We examine the relationship between the variables of interest across 21 countries of Europe using OLS regression.

FINDINGS

1. Social Origin and Education

According to the conventional model, father's socioeconomic background sufficiently represents his family's socioeconomic position, while the dominance model advocates for taking the parent with the highest SES. Using parental education as a summary measure of social origin, and children's education as the outcome variable, Table 1 shows how the two models perform across 21 European countries.

The differences in the adjusted R^2 values are not that great. For five countries (Austria, Belgium, Finland, France and the Netherlands) applying the dominance model leads to a roughly two percent gain in the amount of variance explained. The number of countries increases to ten if we take a 0.01 increase in the adjusted R^2 as the benchmark (Switzerland, Denmark, Estonia, the UK and Hungary). In eight countries, the conventional and the dominance models perform relatively equal, while for Slovenia, Spain, and Portugal, the conventional model is the preferred model.

While analyzing the educational characteristics of one parent, we decided to also see how the empirical model that accounts for mother's education (but not for father's) compares to the conventional model (Table B1 in Appendix B). For most countries (17 of 21), the conventional model yields a much better fit. For Germany and Netherlands the adjusted R^2 values are roughly equal, and for Finland and France, the adjusted R^2 of the model taking mother's education is higher.

Table 1 The Effects of Parental Education on Respondent's Education for the Conventional and Dominance Models, by Country

Country	Conventional Model (1A) [a]		Dominance Model (1B) [b]	
	b for FE (Father's Education)	Adjusted R^2	b for HE (Education of Highest Educated Parent)	Adjusted R^2
Austria	0.186*	0.089	0.275*	0.108
Belgium	0.255*	0.134	0.330*	0.151
Bulgaria	0.501*	0.295	0.525*	0.298
Switzerland	0.325*	0.137	0.355*	0.147
Germany	0.185*	0.108	0.218*	0.112
Denmark	0.271*	0.084	0.311*	0.093
Estonia	0.243*	0.137	0.289*	0.148
Spain	0.377*	0.292	0.356*	0.286
Finland	0.203*	0.136	0.300*	0.164
France	0.346*	0.229	0.425*	0.257
United Kingdom	0.238*	0.156	0.264*	0.166
Hungary	0.437*	0.227	0.502*	0.237
Ireland	0.260*	0.083	0.265*	0.082
Netherlands	0.222*	0.054	0.272*	0.069
Norway	0.202*	0.065	0.222*	0.062
Poland	0.337*	0.196	0.348*	0.197
Portugal	0.524*	0.417	0.510*	0.411
Sweden	0.188*	0.101	0.215*	0.103
Slovenia	0.261*	0.142	0.225*	0.127
Slovakia	0.149*	0.117	0.144*	0.117
Ukraine	0.220*	0.162	0.228*	0.162

[a] $RE = a + b_1FE + b_2HSCls + b_3LSCls + b_4RGender + b_5RAge$

[b] $RE = a + b_1HE + b_2HSCls + b_3LSCls + b_4RGender + b_5Rage$

RE = Respondent's Education, FE = Father's Education, HE = Education of Parent with Highest Education, HSCls = Highest Parental Social Class, LSCls = Lowest Parental Social Class, RGender = Respondent's Gender, Rage = Respondent's Age

* $p < 0.01$

Next, we explore the methodological gains of using information on the education of both parents. The first question is whether the simple model that accounts for both parents' individual characteristics (model 2A) performs better than the models of one parent's characteristics discussed in Table 1. Results in Table 2 show that, compared to the conventional model, taking into account mother's education in addition to father's yields a better fitting model (in terms of adjusted R^2 value) in 15 of the 21 countries.

Table 2 The Effects of Parental Education on Respondent's Education for a Simple Combined Effects Model, by Country

Country	Simple Combined Effects Model (2A) [a]			Difference between Adjusted R^2s	
	b for FE (Father's Education)	b for ME Mother's Education	Adjusted R^2	R^2 for Model 2A – R^2 for Model 1A	R^2 for Model 2A – R^2 for Model 1B
Austria	0.125**	0.185**	0.103	0.015	-0.005
Belgium	0.189**	0.164**	0.145	0.013	0.013
Bulgaria	0.367**	0.201**	0.306	0.011	0.008
Switzerland	0.216**	0.220**	0.158	0.022	0.011
Germany	0.154**	0.168**	0.122	0.014	0.010
Denmark	0.207**	0.176**	0.103	0.020	0.010
Estonia	0.178**	0.157**	0.149	0.013	0.001
Spain	0.345**	0.057	0.292	0.001	0.006
Finland	0.118**	0.224**	0.157	0.022	-0.007
France	0.243**	0.239**	0.251	0.023	-0.006
United Kingdom	0.191**	0.152**	0.168	0.013	0.002
Hungary	0.392**	0.162*	0.233	0.007	-0.004
Ireland	0.191*	0.141^{+}	0.089	0.009	0.007
Netherlands	0.143*	0.164**	0.067	0.015	-0.002
Norway	0.191**	0.050	0.065	0.001	0.003
Poland	0.264**	0.187**	0.205	0.010	0.008
Portugal	0.422**	0.217**	0.426	0.010	0.015
Sweden	0.185**	0.013	0.100	0.000	-0.003
Slovenia	0.256**	0.016	0.142	0.000	0.015
Slovakia	0.135**	0.022	0.117	0.000	0.000
Ukraine	0.166**	0.102*	0.166	0.004	0.004

[a] $RE = a + b_1FE + b_1ME + b_3HSCls + b_4LSCls + b_5RGender + b_6RAge$
RE = Respondent's Education, FE = Father's Education, ME = Mother's Education, HSCls = Highest Parental Social Class, LSCls = Lowest Parental Social Class, RGender = Respondent's Gender, Rage = Respondent's Age
** $p < 0.01$; * $p < 0.05$; $^{+}$ $p < 0.10$

However, we should bear in mind that the simple combined effects model cannot explain less variance than the conventional model, since the first is an extension of the second. This is not the case in relation to the dominance model. Indeed, when comparing models 2A and 1B it is apparent that the gain in explained variance that the simple combined effects model brings in some countries is counterbalanced by loss in other countries.

Table 3 The Effects of Parental Education on Respondent's Education for Highest and Lowest Educated Parent Effects Model, by Country

Country	Highest and Lowest Educated Parent Effects Model (2B) [a]			Parental Mean Education Effect Model (2C)[b]		Difference between Adjusted R^2s		
	b for HE (Education of Highest Educated Parent)	b for LE (Education of Lowest Educated Parent)	Adjusted R^2	b for (FE + ME)/2	Adjusted R^2	R^2 for Model 2B – R^2 for Model 2A	R^2 for Model 2C – R^2 for Model 2A	R^2 for Model 2B – R^2 for Model 1B
Austria	0.257**	0.037	0.107	0.306**	0.103	0.004	0.000	0.000
Belgium	0.292**	0.063	0.152	0.354**	0.147	0.007	0.002	0.001
Bulgaria	0.376**	0.196**	0.305	0.574**	0.304	-0.001	-0.002	0.008
Switzerland	0.245**	0.187**	0.158	0.436**	0.159	0.000	0.001	0.013
Germany	0.155**	0.167**	0.122	0.322**	0.122	0.000	0.000	0.010
Denmark	0.223**	0.159**	0.104	0.384**	0.104	0.001	0.001	0.011
Estonia	0.228**	0.103*	0.141	0.336**	0.150	-0.008	0.001	0.004
Spain	0.310**	0.079	0.287	0.419**	0.283	-0.005	-0.009	0.001
Finland	0.292**	0.015**	0.164	0.333**	0.156	0.007	-0.001	0.000
France	0.374**	0.092	0.259	0.482**	0.252	0.008	0.001	0.002
United Kingdom	0.220**	0.109*	0.169	0.345**	0.169	0.001	0.001	0.003
Hungary	0.464**	0.086	0.238	0.584**	0.228	0.005	-0.005	0.001
Ireland	0.167+	0.166+	0.088	0.333**	0.091	-0.001	0.002	0.009
Netherlands	0.222**	0.079	0.070	0.306**	0.069	0.003	0.002	0.001
Norway	0.194**	0.060	0.063	0.251**	0.061	-0.002	-0.004	0.001
Poland	0.245**	0.207**	0.204	0.456**	0.205	-0.001	0.000	0.008
Portugal	0.351**	0.202**	0.423	0.647**	0.424	-0.003	-0.002	0.013
Sweden	0.224**	-0.020	0.102	0.211**	0.094	0.002	-0.006	0.000
Slovenia	0.161*	0.120+	0.130	0.283**	0.131	-0.012	-0.011	0.003
Slovakia	0.137**	0.011	0.116	0.160**	0.115	-0.001	-0.002	0.000
Ukraine	0.162**	0.105*	0.165	0.271**	0.166	-0.001	0.000	0.003

[a] $RE = a + b_1HE + b_2LE + b_3HSCls + b_4LSCls + b_5RGender + b_6RAge$

[b] $RE = a + b_1[(FE+ME)/2] + b_2HSCls + b_3LSCls + b_4RGender + b_5RAge$

RE = Respondent's Education, HE = Education of Most Educated Parent, LE Education of Leat Educated Parent, HSCls = Highest Parental Social Class, LSCls = Lowest Parental Social Class, FE = Father's Education, ME = Mother's Education, RGender = Respondent's Gender, RAge = Respondent's Age

** $p < 0.01$; * $p < 0.05$; + $p < 0.10$

In Table 3 we provide the results for two different ways of measuring the impact of both parents on respondent's education. Model 2B includes the effects of the highest and of the lowest educated parent (i.e. the modified dominance model according to Korupp et al. 2002), while model 2C operationalizes family characteristics as the average of parents' education.

The differences in the adjusted R^2 values allow us to assess, in terms of explanatory power, how the models transforming parental education compare to the simple model that accounts for both parents' individual characteristics (2A). In Belgium, Finland, France and Hungary, the modified dominance model brings a 1% increase in variance explained, compared to the simple combined effects model. This gain, however, is offset by a 0.01 decrease of the adjusted R^2 value for Estonia, Spain and Slovenia. For the 14 remaining countries, the adjusted R^2 values for models 2B and 2A are roughly equal. In the case of the average model (2C), using the same 1% change in variance explained as the benchmark, we find this model to fit no better than the simple combined effects model in 17 of the 21 countries. For Hungary, Slovenia, Spain and Sweden, model 2C yields a poorer fit than model 2A.

Model 2B is an extension of the dominance model (1B). The last column in Table 3 compares the difference in explanatory power between the two models. Including the highest as well as the lowest educated parent yields a better fit (a modest increase in the amount of explained variance of 1%) in one third of the analyzed countries—Bulgaria, Switzerland, Germany, Denmark, Ireland and Portugal.

A third alternative to the simple combined effects model (2A) is to use the interaction between parents' education as the summary measure for social background. According to the information presented in Table 4, the interaction model (2D) explains more than the simple two parents' characteristics model in 12 of the 21 countries. For Bulgaria, we find a 3% increase in the variance explained. A gain of 2% is present for Belgium, Spain, Finland, France, Poland and Portugal, while for Austria, Estonia, Sweden, Slovenia, and Hungary the increase in the adjusted R^2 value is of one percent.

We note that all interaction coefficients are negative, and statistically significant for most of the countries.

To get a better understanding of this finding, Figures 1 and 2 depict the basic relation between each parent's education, and the education of the respondents, for all countries together. Figure 1 shows seven regression lines corresponding to the effects of father's education on respondent's education depending on the levels of mother's education. At the lowest level of father's education, we have seven starting points, corresponding to the range of mother's education levels, from incomplete elementary (bottom line) to second stage of tertiary (the top line). One can see that the slope for father's education is very steep when mother's education is low.

Table 4 The Effects of Parental Education on Respondent's Education for Interaction Effects Model, by Country

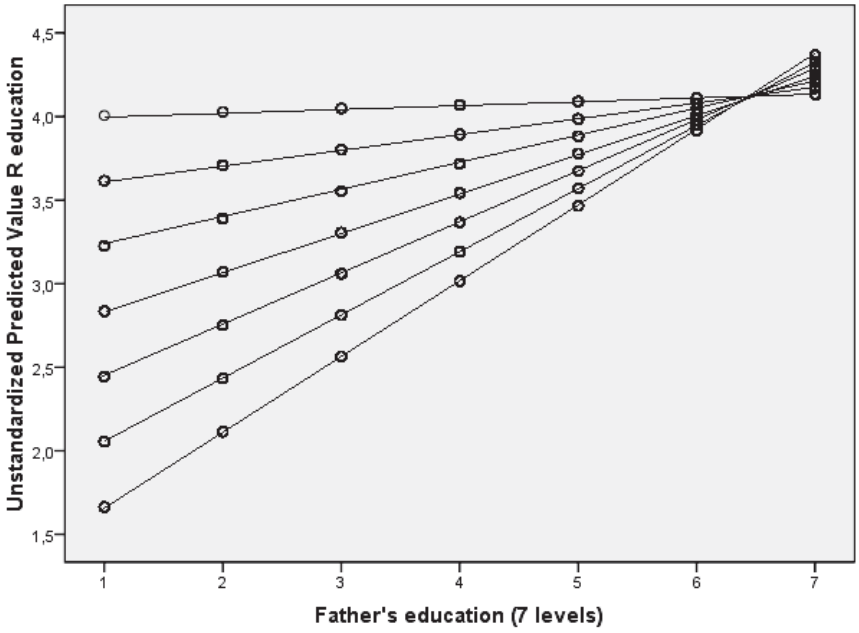
Country	Interaction Effects Model (2D) [a]				R^2 for Model 2B – R^2 for Model 2A
	b for FE (Father's Education)	b for ME (Mother's Education)	Interaction FE*ME	Adjusted R^2	
Austria	0.363**	0.434**	-0.069*	0.109	0.006
Belgium	0.543**	0.505**	-0.092**	0.165	0.020
Bulgaria	0.692**	0.533**	-0.107**	0.337	0.031
Switzerland	0.263**	0.277**	-0.014	0.157	-0.001
Germany	0.325*	0.355*	-0.040	0.122	0.000
Denmark	0.229*	0.199*	-0.006	0.102	-0.001
Estonia	0.338**	0.311**	0.040*	0.154	0.005
Spain	0.606**	0.355**	-0.088**	0.311	0.019
Finland	0.433**	0.524**	-0.090**	0.181	0.024
France	0.532**	0.537**	-0.083**	0.269	0.018
United Kingdom	0.410**	0.376**	-0.052*	0.171	0.003
Hungary	0.723**	0.541**	-0.099**	0.247	0.014
Ireland	0.410*	0.282*	-0.048	0.092	0.003
Netherlands	0.306*	0.350**	-0.046	0.070	0.003
Norway	0.442**	0.308*	-0.057*	0.069	0.004
Poland	0.580**	0.483**	-0.089**	0.221	0.016
Portugal	0.777**	0.546**	-0.111	0.446	0.020
Sweden	0.433**	0.259**	-0.063**	0.111	0.011
Slovenia	0.473**	0.223*	-0.058*	0.147	0.006
Slovakia	0.329**	0.229*	-0.048*	0.119	0.003
Ukraine	0.247**	0.182**	-0.022+	0.167	0.001

[a] $RE = a + b_1FE + b_2ME + b_3FE*ME + b_4HSCls + b_5LSCls + b_6RAge + b_7RGender$

RE = Respondent's Education, FE = Father's Education, ME = Mother's Education,
FE*ME = Interaction Term, HSCls = Highest Parental Social Class, LSCls = Lowest Parental Social Class,
RGender = Respondent's Gender, RAge = Respondent's Age

** $p < 0.01$; * $p < 0.05$; + $p < 0.10$

Figure 1 The Effects of Father's Education on Respondent's Education, depending on Mother's Education, for the Pooled Country-Data

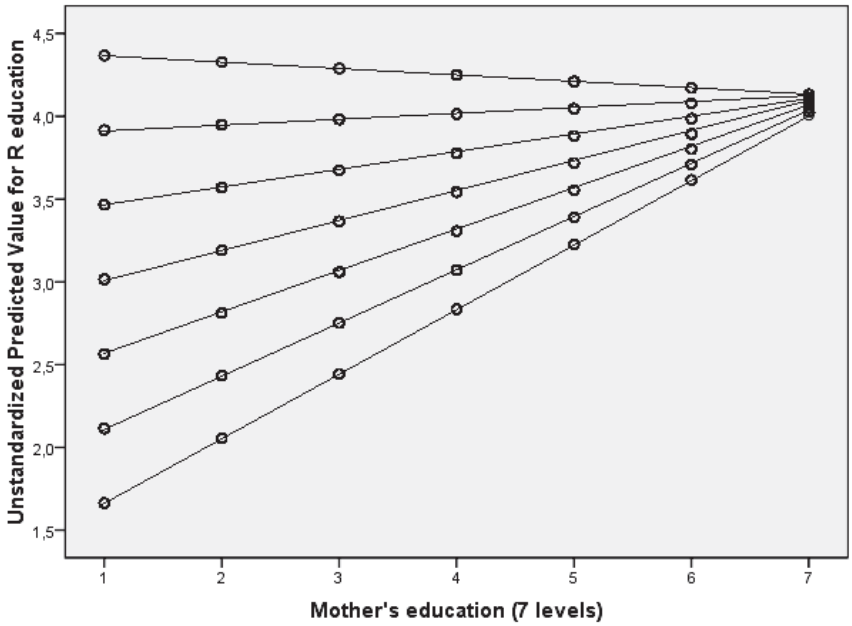


To illustrate numerically, one can find that if mothers have not completed elementary education the predicted value of respondents' education varies very much with respect to the level of father's education – it is 1.7 for incomplete elementary and 4.4 for second stage of tertiary education. If, however, mothers' education is at the highest level – that is, second stage of tertiary, then there is practically no effect of fathers' education on respondents' education. For example, for fathers' incomplete elementary, the expected value for respondents' education is 4.0, and for fathers' second stage of tertiary, it is 4.1. We can also observe that fathers' education at the highest level yields a higher predicted value for respondents' education if mothers' education is low, than if mothers' education is highest. The summary distribution of these values for education of fathers cross-classified with education of mothers is presented in Appendix B, Table B2.

Figure 2 shows the effect of mothers' education for seven levels of fathers' education. In the case of fathers' incomplete elementary, the predicted value of respondents' education for mothers who have not finished elementary schooling is 1.7, and for mothers with MA and/or PhD (second stage of tertiary) it is 4.0. When fathers are at the highest level of education (second stage tertiary), for mothers' incomplete elementary we get a predicted value for respondents education of 4.4,

while for mothers second stage of tertiary, the predicted value is 4.1 (Table B2, Appendix B).

Figure 2 The Effects of Mother's Education on Respondent's Education, depending on Father's Education, for the Pooled Country-Data



2. Social Origin Effect by Gender

In this paper, we also set out to assess whether the effects of father's and of mother's education are different by gender. Table 5 presents the results for the regression model that contains interaction terms between father's characteristics and respondent's gender, as well as between mother's characteristics and respondent's gender (model 3A). Regarding the importance of each parent's education among men and women, controlling for age, and highest and lowest parental social position, we find that:

(a) Among men, their education is influenced more by mother's education than by father's education in the following countries: Germany, Finland, Ireland, Netherlands, and Ukraine;

(b) Among women, their education is influenced more by mother's education than by father's education in the following countries: Austria, Belgium, Switzerland, Finland, France, Hungary, Poland, and Slovakia.

Table 5 Net Effects of Father's Education and Mother's Education on Son's Education and Daughter's Education for Gender Specific Model (3A), by Country

Countries	Gender Specific Model (3A) [a]				Adjusted R^2	Significant differences for sons and daughters [b]
	Effects for Sons		Effects for Daughters			
	$b_1 + b_7$ (Father's Education)	$b_2 + b_8$ (Mother's Education)	b_1 Father's Education	b_2 Mother's Education		
Austria	0.163	0.078	0.097	0.267	0.106	M-E
Belgium	0.203	0.058	0.190	0.238	0.152	M-E
Bulgaria	0.348	0.097	0.358	0.270	0.314	None
Switzerland	0.224	0.027	0.224	0.342	0.179	M-E
Germany	0.115	0.150	0.195	0.183	0.122	None
Denmark	0.292	0.071	0.130	0.266	0.109	M-E, F-E
Estonia	0.173	0.127	0.230	0.174	0.151	None
Spain	0.348	-0.035	0.360	0.125	0.295	None
Finland	0.163	0.201	0.078	0.244	0.157	None
France	0.279	0.269	0.207	0.254	0.251	None
United Kingdom	0.176	0.133	0.204	0.168	0.167	None
Hungary	0.517	0.007	0.298	0.313	0.240	M-E, F-E
Ireland	0.157	0.271	0.193	0.027	0.096	M-E
Netherlands	0.082	0.153	0.190	0.162	0.067	None
Norway	0.208	0.004	0.171	0.095	0.065	None
Poland	0.313	0.046	0.211	0.352	0.217	M-E
Portugal	0.339	0.218	0.467	0.235	0.428	None
Sweden	0.232	-0.040	0.145	0.056	0.100	None
Slovenia	0.238	0.063	0.273	-0.031	0.139	None
Slovakia	0.199	-0.074	0.080	0.118	0.119	M-E
Ukraine	0.092	0.147	0.209	0.085	0.166	None

[a] $RE = a + b_1FE + b_2ME + b_3HSCls + b_4LSCls + b_5RAge + b_6RGender + b_7RGender^* FE + b_8RGender^* ME$
RE = Respondent's Education, FE = Father's Education, ME = Mother's Education, HSCls = Highest Parental Social Class, LSCls = Lowest Parental Social Class, RGender = Respondent's Gender, RAge = Respondent's Age

[b] M-E means that there is statistical difference between mother's education effect for son's education and daughter's education ($p < 0.05$). F-E means that there is statistical difference between father's education effect for son's education and daughter's education ($p < 0.05$). "None" means that neither of these effects is different in the compared groups. The significance of the differences between the involved effects was assessed under the assumption that the standard errors of $b_1 + b_7$ and $b_2 + b_8$ are equal to the highest standard errors of individual effects, respectively. Under this condition we applied an common formula for computing the standard error of the difference between effects, $\beta_i - \beta_j$, as the square root of $var(\beta_i) + var(\beta_j) + cov(\beta_i, \beta_j)$. Since $cov(\beta_i, \beta_j)$ is not obtainable, we have made a *conservative assumption* that it can vary among countries and that for a given country it is equal to the square root of the highest standard error of the involved effects. Obtaining standard error of $\beta_i - \beta_j$ we applied the t-test.

On the question of whether mother's education matters primarily for girls' education, while father's education is important for the achievements of their sons, results show the following:

(1) The effect of father's education is significantly different for men's education than for women's education in only two countries, Denmark and Hungary, where we find the impact of father's education to be higher among men than among women. Effects of the same type – although non-significant – are present in Slovakia, Poland, Sweden, Finland, France, Austria and Belgium. In all other countries the effect is in opposite direction – and not significant.

(2) In Ukraine, Slovenia, France, and Ireland the effect of mother's education is higher among men than among women; however, only for Ireland is the inter-group difference statistically significant.

(3) In all countries other than Ukraine, Slovenia, France, and Ireland, mother's education matters more among women than among men. The difference is statistically significant for one third of the 21 countries, namely for Austria, Belgium, Switzerland, Denmark Hungary, Poland, and Slovakia.

It is possible that the joint effects of parental education would play out differently for men than for women. We investigate this hypothesis through interaction models of father's and mother's education on respondent's education (see model 2D) run separately for men and for women (models 3B and 3C in Table 6). In these models all interaction terms for parental education that are statistically significant are negative, irrespective of respondents' gender. This finding, in line with results in Table 4, indicates that the impact of joint parental education on their offspring educational attainment diminishes when both parents are highly educated. For most cases, where the interaction term is significant it is so in both model 3B and 3C. There are exceptions, however, pointing to gender differences in the process of intergenerational transmission of educational resources. In Austria and Portugal, we find the combination of parental education to be significant among men, but not among women. Conversely, in Estonia, Norway and Slovakia, it is significant for women, and not for men.

The last column in Table 6 compares the adjusted R^2 values of the two models. We observe large differences in the amount of variance explained, by gender. In addition, whether the empirical model fits better for men or for women varies across countries. We note that in Portugal and Poland model 3B explains 7-8% less of variance in education than model 3C; this difference is more striking for Belgium, Bulgaria, Switzerland and Spain, where the explained variance in men's education is from 10 to 18% lower than the explained variance in women's education. In Germany, Denmark, France, Hungary, Ireland, Slovenia and Slovakia, on the other hand, the interaction model of father's and mother's education explains from six to 10% more variance in men's education than it does in women's education.

Table 6 The Effects of Parental Education on Men and Women's Education for Gender Specific Interaction Effects Models (3B and 3C), by Country

Country	Interaction Effects Model for Men [a] (3B)				Interaction Effects Model for Women [a] (3C)				R^2 for Model 3B – R^2 for Model 3C
	b for FE (Father's Education)	b for ME (Mother's Education)	b for Interaction FE*ME	Adjusted R^2	b for FE (Father's Education)	b for ME (Mother's Education)	b for Interaction FE*ME	Adjusted R^2	
Austria	0.449**	0.391*	-0.085*	0.125	0.254*	0.442**	-0.047	0.120	0.005
Belgium	0.560**	0.369*	-0.100**	0.115	0.552**	0.589**	-0.085**	0.215	-0.100
Bulgaria	0.737*	0.436**	-0.125**	0.255	0.666**	0.623**	-0.105**	0.385	-0.130
Switzerland	0.217^{+}	0.040	0.003	0.097	0.309**	0.418**	-0.023	0.252	-0.155
Germany	0.331^{+}	0.417*	-0.047	0.165	0.324*	0.302	-0.035	0.100	0.065
Denmark	0.322**	0.118	-0.005	0.140	0.110	0.234	0.001	0.075	0.065
Estonia	0.308**	0.312**	-0.037	0.145	0.346**	0.294**	-0.038^{+}	0.146	-0.001
Spain	0.576**	0.338^{+}	-0.075*	0.223	0.621**	0.378**	-0.097**	0.403	-0.180
Finland	0.526**	0.522**	-0.090**	0.199	0.379**	0.544**	-0.099**	0.170	0.029
France	0.565**	0.573**	-0.088**	0.304	0.489**	0.494**	-0.074**	0.240	0.064
United Kingdom	0.387*	0.351*	-0.044	0.144	0.420**	0.402**	-0.059^{+}	0.192	-0.048
Hungary	0.740**	0.409*	-0.085**	0.293	0.650**	0.645**	-0.098*	0.218	0.075
Ireland	0.342	0.386*	-0.041	0.135	0.395^{+}	0.154	-0.046	0.036	0.099
Netherlands	0.244	0.343	-0.040	0.078	0.356*	0.333^{+}	-0.049	0.088	-0.010
Norway	0.411**	0.245	-0.040	0.095	0.447*	0.371*	-0.071^{+}	0.063	0.032
Poland	0.523**	0.249*	-0.060*	0.205	0.646**	0.775**	-0.118**	0.275	-0.070
Portugal	0.857**	0.690**	-0.136**	0.396	0.705**	0.442**	-0.094	0.477	-0.081
Sweden	0.502**	0.254*	-0.063*	0.122	0.372**	0.257*	-0.065**	0.098	0.024
Slovenia	0.489**	0.317*	-0.062*	0.185	0.488**	0.141	-0.062^{+}	0.092	0.093
Slovakia	0.201	-0.047	0.000	0.161	0.481**	0.510**	-0.099**	0.100	0.061
Ukraine	0.067	0.174	0.000	0.145	0.366**	0.236**	-0.044	0.188	-0.043

[a] $RE = a + b_1FE + b_2ME + b_3FE*ME + b_4HSCls + b_5LSCls + b_6Rage$
RE = Respondent's Education, FE = Father's Education, ME = Mother's Education, FE*ME = Interaction Term, HSCls = Highest Parental Social Class, LSCls = Lowest Parental Social Class, RAge = Respondent's Age
** $p < 0.01$; * $p < 0.05$; $^{+}$ $p < 0.10$

Returning to the combined effects of parental education , it is worthwhile to note that in some cases the coefficients of the interaction terms for men are different in magnitude from those for women (and both are statistically significant). Poland stands out in this regard, but similar findings occur for Bulgaria and Spain (see Table 6, columns 3 and 7). We examine the Polish case in more detail, and illustrate

numerically, with help of predicted values, how each parent's education affects their sons and daughter's education (Table 7).

Table 7 Predicted Values of Men and Women's Education for Selected Combinations of Parental Education, Poland

Father's Education	Mother's Education		
	Elementary	High School	Tertiary
	Predicted Value of Education for Men		
Elementary	2.2	2.5	2.8
High School	3.0	3.1	3.3
Tertiary	--	4.1	4.2
	Predicted Value of Education for Women		
Elementary	2.3	3.3	--
High School	3.1	3.7	4.6
Tertiary	--	4.2	4.0

In Poland, the effect of mother's education is steeper for daughters than it is for sons, except for the situation where fathers have tertiary education. For fathers' completed high school and mothers' three education levels, the predicted values of education for men are 3.0, 3.1 and 3.3; the corresponding values for women are 3.1, 3.7 and 4.6. If mothers' education is at the highest level, i.e. tertiary, then the effect of fathers' education on girls' education diminishes; it increases substantially on boys' education.

3. Social Origin and Occupational Status

Analyses so far prompt the following conclusion: if interest is in explaining respondent's education, it is generally preferable to have measures for both parents' education, rather than use either of the one parent characteristics models. Specifically, we gain most in terms of explained variance from combining father's and mother's educational attainment through an interaction term (model 2D). Moreover, in most countries we gain important insights from looking at this type of model separately for men and for women; only for Estonia are the adjusted R^2 values for the model for men and for women roughly equal (Table 6, last column).

We are extending these analyses to respondent's SEI as the outcome variable, to assess if results would be similar. Table 8 presents three one parent

Table 8 The Effects of Parental Education on Respondent's SEI, by Country

Country	Separate Effects Models			Separate Effects Models Adjusted R^2			Simple Combined Effects Model [d]		Simple Combined Effects Model	Interaction Model [e]
	b for FE (Father's Education) [a]	b for ME (Mother's Education) [b]	b for HE (Highest Educated Parent) [c]	Father	Mother	Highest Educated Parent	b for FE (Father's Education)	b for ME (Mother's Education)	Adjusted R^2	Adjusted R^2
Austria	0.602	0.279	0.598	0.291	0.290	0.291	0.578	0.078	0.291	0.292
Belgium	0.818	0.297	0.509	0.344	0.342	0.342	0.831	-0.037	0.344	0.342
Bulgaria	1.025+	0.687	0.788	0.534	0.534	0.534	1.057	-0.051	0.534	**0.538**
Switzerland	1.285*	1.208*	1.458**	0.430	0.428	0.431	0.991+	0.665	0.430	0.431
Germany	0.804	-0.543	0.648	0.235	0.234	0.235	0.918	-0.703	0.236	**0.240**
Denmark	0.701	0.656	0.799	0.358	0.358	0.359	0.551	0.464	0.358	0.357
Estonia	0.484	1.106*	0.925+	0.332	0.334	0.333	0.082	1.068+	0.334	0.333
Spain	1.716**	0.921+	1.164*	0.408	0.395	0.400	1.788**	-0.140	0.408	0.411
Finland	1.133**	1.365**	1.034**	0.375	0.375	0.373	1.020*	0.770*	0.377	0.379
France	0.367	0.826+	0.585	0.347	0.350	0.348	0.048	0.805+	0.349	0.350
United Kingdom	0.611	0.259	0.610	0.228	0.227	0.228	0.591	0.069	0.228	0.227
Hungary	1.270*	0.612	1.404*	0.529	0.526	0.530	1.226*	0.188	0.529	0.529
Ireland	-0.287	0.392	0.066	0.203	0.203	0.202	-0.638	0.715	0.202	0.201
Netherlands	1.437*	1.676**	1.744**	0.295	0.297	0.299	0.869	1.233+	0.299	0.299
Norway	0.671	1.358**	1.000+	0.257	0.261	0.258	0.384	1.259*	0.261	0.260
Poland	1.235**	1.099*	1.093*	0.519	0.517	0.518	0.988*	0.631	0.519	0.519
Portugal	1.476**	-0.698	0.149	0.534	0.530	0.529	2.043**	-1.504*	0.537	**0.540**
Sweden	0.550	0.281	0.776+	0.301	0.301	0.302	0.519	0.142	0.301	0.300
Slovenia	1.051+	-0.346	0.406	0.438	0.434	0.434	1.272*	-0.771	0.439	0.438
Slovakia	0.507	1.155+	0.484	0.382	0.384	0.382	-0.258	1.311+	0.383	0.382
Ukraine	0.377	0.652+	0.491	0.472	0.473	0.472	0.078	0.603	0.472	0.472

[a] RSEI = a+ b_1FE + b_2HSCls + b_3LSCls +b_4RGender + b_5RAge + b_6RE
[b] RSEI = = a+ b_1ME + b_2HSCls + b_3LSCls +b_4RGender + b_5Rage + b_6RE
[c] RSEI = = a+ b_1HE + b_2HSCls + b_3LSCls +b_4RGender + b_5Rage + b_6RE
[d] RSEI = a+ b_1FE + b_2ME + b_3HSCls + b_4LSCls +b_5RGender + b_6Rage + + b_7RE
[e] RSEI = a+ b_1FE + b_2ME + b_3FE*ME+ b_4HSCls + b_5LSCls + b_6RE + b_7RAge + b_8RGender
RSEI = Respondent's SEI, FE = Father's Education, ME = Mother's Education, HE = Highest Educated Parent, FE*ME = Interaction Term, HSCls = Highest Parental Social Class, LSCls = Lowest Parental Social Class, RGender = Respondent's Gender, RAge = Respondent's Age, RE = Respondent's Education
** $p < 0.01$; * $p < 0.05$; + $p < 0.10$

educational characteristics models – conventional model, mother's effects model, and dominant model – and two joint parent characteristics models: the simple combined characteristics model and the interaction model of father's and mother's education (the unstandradized coefficients for the interaction model are presented in Appendix B, Table A2). In all instances we control for parental social class position, as well as respondent's gender, age and education.

One quickly notes that, compared to results in section 1, there are far fewer instances where the coefficients for parental education reach statistical significance. This is to be expected, since the impact of social origin on occupational standing operates primarily indirectly, through respondent's education. If we compare the five models in terms of their respective adjusted R^2 values, we find no differences with regard to how well they explain variation in respondent's SEI. It appears that the safest strategy for explaining respondent's SEI is to rely on the simple combined effects model. The model using the interaction between parents' education as the summary measure for social background does not add to our explanation of the variation in the dependent variable.

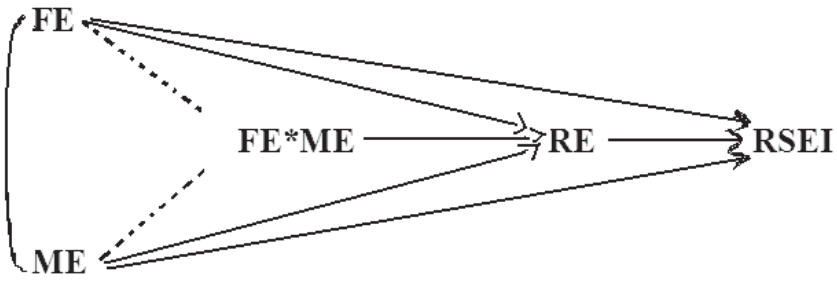
CONCLUSION

In the literature on social stratification several models were proposed to capture the influence of social origin on respondent's educational and occupational attainment. However, most studies are limited to one or a few countries. For one-country study, the recent paper of Beller (2009) is a good example. Interesting analyses by Korupp et al. (2002) revealed that the modified dominance model distinguishing the effect of the highest from the lowest status parent had the best fit – but the data came only from Germany, Netherlands, and the United States. We extended prior research by examining both the explanatory power of various models of parental background effect, and how it varies for different nation-states.

Our analyses did not disclose consistent patterns across all studied countries. Neither of the models performed uniformly better, or worse, in a decisive majority of countries. With respect to explaining educational attainment we found that it is generally preferable to have measures for both parents' education, rather than use either of the one parent characteristics models. Specifically, the best fitting model – in terms of explained variance – is that combining father and mother's educational attainment, including an interaction term.

The influence of parents' education on their children's occupational standing operated primarily indirectly, through respondent's education. For the cases where the direct effects were statistically significant, we generally saw the simple combined model as the preferred solution. Figure 3 summarizes our recommendations for modelling parental education effects on respondents' education and on their SEI.

Figure 3 Relationships between parental educational resources, respondents' education, and respondents' SEI



FE = Father's Education, ME = Mother's Education, FE*ME = Interaction Term, RE = Respondent's Education, RSEI = Respondent's SEI

Concerning the effects of social origin by gender, the hypothesis that the intergenerational transmission of parental education affects men and women differently is, in light of these outcomes, not supported in all countries. Mother's educational status seems to be more often important for daughters (significant results for seven countries) than father's for sons (significant results for two countries). In five instances we also found that the joint effects of parental education worked differently for men than for women; whether the combination of resources was significant among men, or among women, however, varied across countries. The issue of inter-country differences also emerged with regard to the explanatory power of the interaction models, in that the same model worked better for men in some countries, yet for women in others.

A main lesson from this paper is that modeling the effect of parental education on the educational and occupational attainment of their offspring should be country-specific. It is likely that groups of countries sharing the same patterns of effects could be characterized by some macro-economic or macro-political variables. It would be reasonable to examine the variation in parameters of the models due to individual-level and macro-level variables, with help of nested models.

Our paper analyzed the effects of parental education using information on both fathers and mothers resources. Oftentimes, however, children are raised in single-parent families, or in 'restructured' families, following the divorce and re-marriage of the parent(s). We endorse the concern other scholars have voiced that our current knowledge of the link between social origin and destination in these different environments is limited. A major reason for this situation is data shortage, and ESS Round 3 is no exception to the problem. This survey only contains information on whether parents were "dead or absent when respondent was 14 years old" (in variables *emprf14* and *emprm14*, respectively). Since we cannot

tell which of the two qualitatively different events occurred, how long before respondent's 14th birthday, nor whether the remaining parent re-entered a lasting relationship while their child was still a minor, any analyses using these variables are tentative. With this caveat, we explored how parental education affects the offspring's educational attainment when either of the parents is not present.[1] In 11 of the 21 countries we found a significant effect of father's education, but not of mother's, when respondent's father was absent. For Hungary and Austria, both the coefficients for father and for mother's education were significant, while for Bulgaria, France, Ireland and Poland only mother's education mattered. We could not perform similar by country analyses for the subsample of respondents' whose mothers were absent when they were 14 years old, as cases were too few. However, we looked at the relations in the pooled country-data. In both instances – father absent or mother absent – we found that the impact of father's and of mother's education is substantive and statistically significant. Yet parental absence seems to play out differently for sons than for daughters. The regression model that contained interaction terms between father's education and respondent's gender, as well as between mother's education and respondent's gender yielded significant effects (and of opposite sign) of the interaction terms only when mothers where absent. Overall, these results encourage data collection on the over-time relationships of respondents to each of their parents.

NOTES

1 $RE = a + b_1FE + b_2ME + b_3RGender + b_4Rage$

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APPENDIX A

In SPSS, we performed the following steps in creating the variables for Highest Educated Parent, Lower Educated Parent, Parent with Highest Social Class Position, and Parent with Lowest Social Class Position and:

Highest Educated Parent

A) Create 'Father dominant':

1) recode the ESS variable for father's education (0-6) to obtain a variable whose levels range from 1 to 7;

2) create the variable 'Father dominant' equals the values of 'father's education' (1-7) if the condition that father's education >= mother's education is satisfied;

3) recode for 'Father dominant' missing values into 0.

4) create a filter variable for father's missing info on education through recoding system missing information in 'father's education' into -1 (sysmis = -1; else copy)

B) Create 'Mother dominant'

1) recode the ESS variable for mother's education (0-6) to obtain a variable whose levels range from 1 to 7;

2) create the variable 'Mother dominant' equals the values of 'mother's education' (1-7) if the condition that father's education < mother's education is satisfied;

3) recode for 'Mother dominant' missing values into 0.

4) create a filter variable for mother's missing info on education through recoding system missing information in 'mother's education' into -1 (sysmis = -1; else copy)

C) Create Highest Educated Parent

1) Filter out cases that have missing information on father's and mother's education;

2) add the variables 'Father dominant' + 'Mother dominant'

Since there is no overlap between the constituent variables ("father dominant' and 'mother dominant') the new variable, Highest Educated Parent will range from 1–7.

Lowest Educated Parent

A) Create 'Father low':

1) create the variable 'Father low' equals the values of 'father's education' (1–7) if the condition that father's education <= mother's education is satisfied;

2) recode for 'Father low' missing values into 0.

B) Create 'Mother low'

1) create the variable 'Mother low' equals the values of 'mother's education' (1–7) if the condition that father's education > mother's education is satisfied;

2) recode for 'Mother dominant' missing values into 0.

C) Create Lowest Educated Parent

1) Filter out cases that have missing information on father's and mother's education;

2) add the variables 'Father low' + 'Mother low'

Highest education could be equal to lowest education of parents;

Parent with Highest Social Class Position

1) create dummy 'Father high class' using ESS items "Father's occupation when respondent 14." Traditional professional occupations, modern professional occupations, and senior manager or administrators = 1, else =0;

2) create dummy 'Mother high class' using ESS items "Father's occupation when respondent 14." Traditional professional occupations, modern professional occupations, and senior manager or administrators = 1, else =0;

A) Create dummy 'Father class highest'

1) create the variable 'Father class highest' equals 'Father high class' if the condition that father's high class >= mother's high class;

2) recode for 'Father class highest' missing values into 0.

3) create a filter variable for father's missing info on class through recoding system missing information in 'father's high class' into -1 (sysmis = -1; else copy)

B) Create dummy 'Mother class highest'

1) create the variable 'Mother class highest' equals 'Mother high class' if the condition that father's high class < mother's high class;

2) recode for 'Mother class highest' missing values into 0.

3) create a filter variable for mother's missing info on class through recoding system missing information in 'mother's high class' into -1 (sysmis = -1; else copy)

C) Create dummy 'Parent with Highest Social Class Position'

1) Filter out cases that have missing information on father's and mother's high class;

2) add the variables 'Father class highest' + 'Mother class highest'

Parent with Lowest Social Class Position

1) create dummy 'Father low class' using ESS items "Father's occupation when respondent was 14." Semi-routine manual and service occupations and routine manual and service occupations = 1, else = 0

2) create dummy 'Mother low class' using ESS items "Father's occupation when respondent was 14." Semi-routine manual and service occupations, and routine manual and service occupations = 1, else = 0;

A) Create 'Father class lowest'

1) create the variable 'Father class lowest' equals 'Father low class' if the condition that father's low class (1,0) >= mother's low class (1,0);

2) recode for 'Father class lowest' missing values into 0.

3) create a filter variable for father's missing info on class through recoding system missing information in 'father's low class' into -1 (sysmis = -1; else copy)

B) Create 'Mother class lowest'

1) create the variable 'Mother class lowest' equals 'Mother low class' if the condition that mother's low class (1,0) >= father's low class (1,0);

2) recode for 'Mother class lowest' missing values into 0.

3) create a filter variable for mother's missing info on class through recoding system missing information in 'father's low class' into -1 (sysmis = -1; else copy)

C) Create dummy 'Parent with Lowest Social Class Position'

1) Filter out cases that have missing information on father's and mother's low class;

2) add the variables 'Father class lowest' + 'Mother class lowest'

Since there is no overlap between the constituent variables (Father class lowest' and 'Mother class lowest') the new variable, 'Parent with Lowest Social Class Position' is dichotomous (1, 0).

APPENDIX B

Table B1 The Effects of Mother's Education on Respondent's Education[1], by Country

Country	Separate Effects Model		Contribution of Father's Education in Simple Combined Effects Model (Change in Adjusted R^2)
	b for ME (Mother's Education) [a]	Adjusted R^2	
Austria	0.234**	0.095	0.008
Belgium	0.251**	0.127	0.020
Bulgaria	0.476**	0.265	0.041
Switzerland	0.353**	0.133	0.026
Germany	0.198**	0.109	0.013
Denmark	0.259**	0.074	0.030
Estonia	0.246**	0.129	0.021
Spain	0.291**	0.238	0.055
Finland	0.280**	0.150	0.007
France	0.353**	0.225	0.027
United Kingdom	0.216**	0.147	0.022
Hungary	0.316**	0.178	0.056
Ireland	0.242**	0.074	0.017
Netherlands	0.243**	0.056	0.013
Norway	0.100*	0.041	0.024
Poland	0.311**	0.181	0.025
Portugal	0.442**	0.383	0.044
Sweden	0.067^{+}	0.079	0.022
Slovenia	0.103*	0.107	0.035
Slovakia	0.110**	0.108	0.009
Ukraine	0.206**	0.153	0.013

[a] $RE = = a + b_1ME + b_2HSCls + b_3LSCls + b_4RGender + b_5Rage$

RE = Respondent's Education, FE = Father's Education, ME = Mother's Education, FE*ME = Interaction Term, HSCls = Highest Parental Social Class, LSCls = Lowest Parental Social Class, RGender = Respondent's Gender, RAge = Respondent's Age

** $p < 0.01$; * $p < 0.05$; $^{+}$ $p < 0.10$

Table B2 Means for Predicted Values of Respondent's Education by Father's and by Mother's Education, Pooled Country-Data

	Mother's education							
Father's education	Incomplete Elementary	Elementary completed	Incomplete High School	Complete High School	Post High School	University	Second stage of Tertiary	Total
	Means for Predicted Values of Respondent's Education							
Incomplete Elementary	1.7	2.1	2.4	2.8	3.2	3.6	4.0	1.8
Elementary completed	2.1	2.4	2.8	3.1	3.4	3.7	4.0	2.5
Incomplete High School	2.6	2.8	3.1	3.3	3.6	3.8	4.0	3.1
Complete High School	3.0	3.2	3.4	3.5	3.7	3.9	4.1	3.5
Post High School	3.5	3.6	3.7	3.8	3.9	4.0	4.1	3.8
University	3.9	3.9	4.0	4.0	4.0	4.1	4.1	4.0
Second stage of Tertiary	4.4	4.3	4.3	4.2	4.2	4.2	4.1	4.2
Total	1.9	2.6	3.2	3.6	3.8	4.0	4.1	3.0

Table B3 The Effects of Parental Education on Respondent's SEI for Interaction Effects Model, by Country

Country	b for FE (Father's Education)	b for ME (Mother's Education)	b for Interaction FE*ME	Adjusted R^2
Austria	2.165+	1.740	-0.461	0.292
Belgium	0.572	-0.303	0.070	0.342
Bulgaria	-0.904	-2.060+	0.639*	0.538
Switzerland	-0.084	-0.659	0.330	0.431
Germany	5.056**	3.869+	-0.977*	0.240
Denmark	0.484	0.397	0.017	0.357
Estonia	-0.676	0.349	0.189	0.333
Spain	0.570	-1.637	0.442	0.411
Finland	-0.276	0.027	0.296	0.379
France	0.804	1.572+	-0.213	0.350
United Kingdom	0.870	0.356	-0.067	0.227
Hungary	2.469*	1.645	-0.378	0.529
Ireland	0.530	1.442	-0.251	0.201
Netherlands	1.933	2.447	-0.294	0.299
Norway	-0.779	0.043	0.267	0.260
Poland	1.229	0.872	-0.071	0.519
Portugal	3.704**	-0.341	-0.503*	0.540
Sweden	0.388	0.012	0.033	0.300
Slovenia	0.493	-1.552	0.221	0.438
Slovakia	-0.370	1.195	0.028	0.382
Ukraine	0.134	0.659	-0.016	0.472

[a] $RSEI = a + b_1FE + b_2ME + b_3FE*ME + b_4HSCls + b_5LSCls + b_6RE + b_7RAge + b_8RGender$

RSEI = Respondent's SEI, FE = Father's Education, ME = Mother's Education, FE*ME = Interaction Term, HSCls = Highest Parental Social Class, LSCls = Lowest Parental Social Class, RGender = Respondent's Gender, RAge = Respondent's Age, RE = Respondent's Education

** $p < 0.01$; * $p < 0.05$; + $p < 0.10$