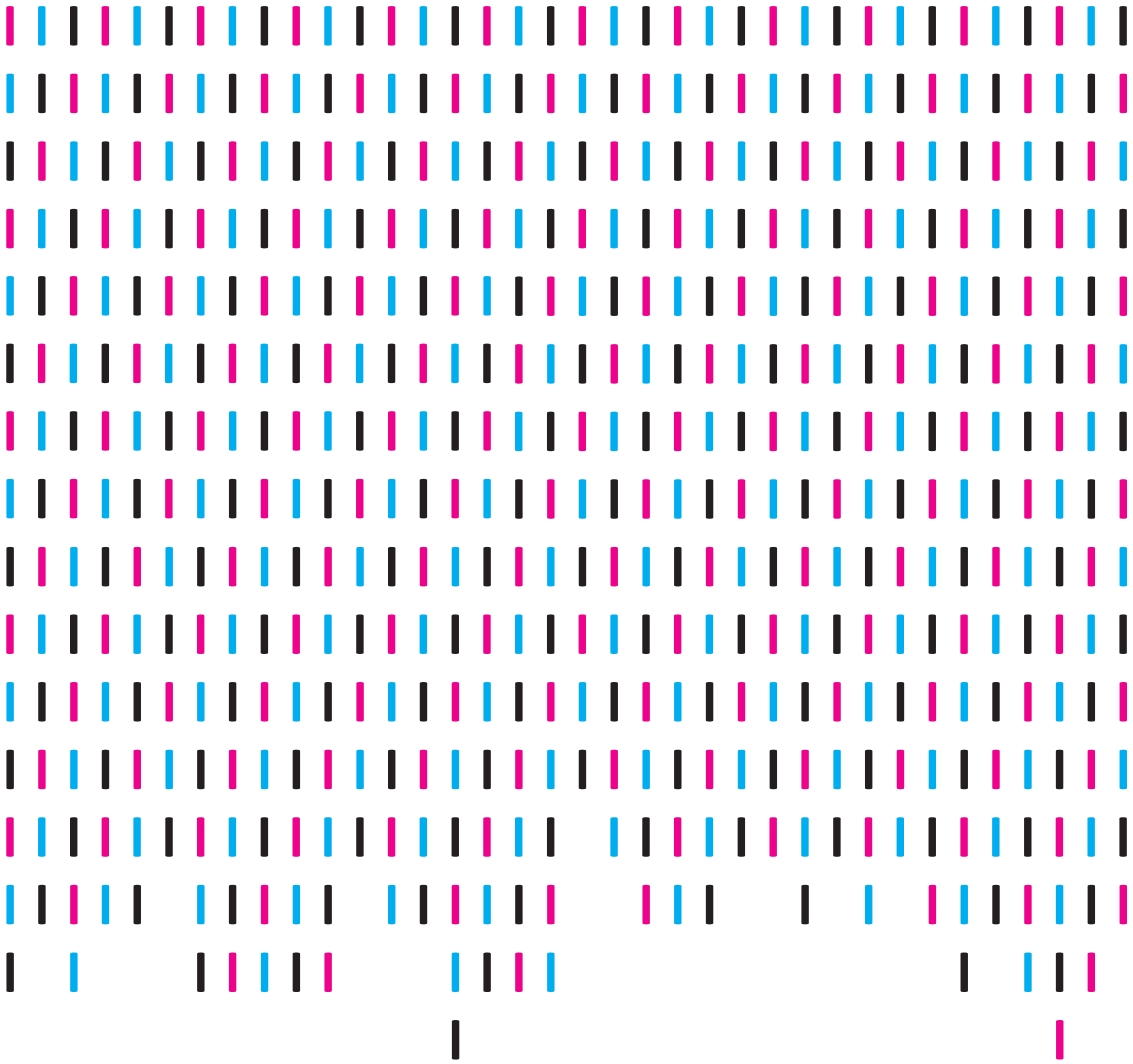

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A MULTIDIMENSIONAL MEASURE OF SOCIAL ORIGIN: THEORETICAL PERSPECTIVES, OPERATIONALIZATION AND EMPIRICAL APPLICATION IN THE FIELD OF EDUCATIONAL INEQUALITY RESEARCH

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A multidimensional measure of social origin:

Theoretical perspectives, operationalization and empirical application in the field of educational inequality research

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A multidimensional measure of social origin:

Theoretical perspectives, operationalisation and empirical application in the field of educational inequality research

Abstract

This working paper describes the theoretical reasons and empirical operationalization of a multidimensional social origin measure in the field of educational inequality research. Application examples are based on data from the National Educational Panel Study (NEPS). This measure combines information on parental education, parental class and parental status (in a Weberian sense). The multidimensional social origin variable is useful for educational researchers who are interested in analyzing status inconsistencies as well as cumulating and compensating effects of social origin resources on educational opportunities.

Keywords

Multidimensional social origin measure, CAMSIS, Status inconsistencies, Cumulating effects, Compensating effects

1. Introduction

In most empirical studies on educational inequality, social origin is operationalized only by single measures such as parental education or parental class or both (e.g. Buchholz & Pratter 2017; Reimer & Schindler 2010; Müller & Pollak 2010). Often these uni- or two-dimensional social origin operationalizations are interpreted as interchangeable (Bukodi & Goldthorpe 2013: 1025; Goldthorpe 2008: 350; Lazarsfeld 1939). For a long time, there has been no explicit theoretical reflexion on why social origin is operationalized in one way or another (Bukodi & Goldthorpe 2013: 1025). Recently, several sociologists have questioned this procedure and stressed that social background should be measured by a more comprehensive concept reflecting the multitude of mechanisms through which social origin is related to children's inequality of educational opportunity (e.g. Erikson 2016; Meraviglia & Buis 2015: 37; Buis 2013 ; Bukodi & Goldthorpe, 2013; Marks, 2011; Chan & Goldthorpe 2007; Jaeger 2007).

As one solution, researchers proposed to include several social origin measures simultaneously into an analysis, where each of the resources were theoretically linked to distinct mechanisms of family background (e. g. Blossfeld, 2018; Barone & Ruggera 2018; Bukodi, Bourne & Betthäuser 2017; Erikson 2016; Bukodi & Goldthorpe 2013; Jaeger 2007). The interest lies in the decomposition of social origin. A major problem of this procedure is, that these social origin measures are often quite highly correlated (Blossfeld 2018; Engzell 2016: 2; Betthäuser & Bourne 2016: 15; Chan 2010: 43; see also Table A2 in the appendix). So some researchers argue that this approach faces the problem of multicollinearity (Marks 2011; Meraviglia & Buis 2015: 38). However, Chan (2010: 44-49) as well as Blossfeld (2018) could show that there is quite a substantive variability in the distribution of parental education and parental class within parental status groups and vice versa (Chan 2010). Thus, a lack of resources in one dimension might be compensated by additional resources in another dimension. Therefore, it is important to combine these various resources in one measure.

Other researchers have suggested to pool different family background resources in order to create a latent social origin variable (Barone & Ruggera 2018: 19; Meraviglia & Buis 2015: 37; Buis 2013). Here each of the various social origin resources is theoretically linked to a specific mechanism. The authors suggest the following procedure: First, the relationship between the latent social origin measure and educational attainment is analysed. The mix of social origin resources together influences educational attainment. Second, the relative weight of each parental resource is then estimated (Meraviglia & Buis 2015). The relative weight indicates the importance of each family resource. One advantage of this approach is that multicollinearity is avoided (Meraviglia & Buis 2015: 38). Another benefit is that this latent measure takes into account cumulative effects of parental resources. However, the former and the latter approach both do not take into account that parental resources can also compensate each other (Erola & Kilpi-Jakonen 2017; Saar & Helemäe 2017).

This paper provides another possibility to combine various social origin resources in one multidimensional variable. The proposed social origin measure also takes theoretically and empirically into account that different parental resources are linked through distinct mechanisms to educational opportunities and attainment. The family resources considered are also parental education, parental class and parental status. The idea of this measure is based on a previous suggestion by Bukodi and Goldthorpe (2013: 1033-1035). Nevertheless,

it is constructed somewhat differently. Moreover, this article provides a theoretical justification for this measure. In contrast to the previously mentioned two approaches, this social origin measure has several advantages. It avoids the problem of multicollinearity - and most importantly, it considers cumulative and compensatory effects of different family resources as well as status inconsistencies. Moreover, this measure of social origin is easy to operationalize.

The paper is structured as follows: It starts from the assumption that the family is the unit of stratification. Thus both partners of the origin family and not only a single parent (in the past mostly males) are considered. It then discusses several important theoretical reasons for a *multidimensional measure of social origin* (see Marks 2011) for the empirical analysis of educational inequality. Then, data from the National Educational Panel Study (NEPS) is used to describe a more appropriate operationalization of social origin in Germany. The six most important categories of the multidimensional social origin variable are identified on basis of the probability to obtain a higher education degree. Then, it is demonstrated that this six category social origin measure is also suitable to capture the significant social origin differences in being unqualified and qualified. Finally, the six social origin categories are described and discussed at the end of the paper.

2. The family as unit of social stratification

Sociological theories, whether based on Max Weber or Karl Marx, consider the family as the key unit of social stratification (Erikson & Goldthorpe, 1992: 237; Sørensen, 1994: 32; Wright, 1989). Families are seen as collective entities in which family members share the rewards gained from education, from work and from social deference. As primary agents of socialization, parents are channelling educational, economic and network resources to the next generation. Thus, the family[1] is the unit of consumption, where its members live together in a household, where children are raised and where the support of children in education is mainly based (Gambetta 1996: 64; Erikson 1984: 501).

In the classical intergenerational social mobility studies, reflecting the traditional family model and the breadwinner-homemaker template, only the social position of the male family head was used to determine the position of the family in the stratification system. However, today, modern service societies are characterized by a high level of gender-specific equalization of education, at least in terms of the educational attainment levels, high women's labor force participation, and a high rate of married women's paid employment. A growing stream of research therefore suggested that in empirical inequality studies individuals and not families should be the units of analysis. For example, there is a study that analysed the individual influence of mother's and father's resources on their children's educational attainment (e. g. Minello and Blossfeld 2014). However, a major limitation of such an individualistic approach would seem to be its failure to acknowledge the role of intimate ties between the partners in conjugal and nonmarital units as well as the importance of family interactions that take place in the process of children's socialisation (Blossfeld & Drobnic 2001). Thus, an appropriate

[1]In this document the term „family" is not restricted to conjugal couples with at least one child. Also non-married couples or single parents with at least one child are seen as a family unit.

conception of the family as the unit of social stratification has to take the characteristics of both parents into account.

Following Erikson's (1984, p. 503) idea of the dominance approach, social origin information of both mothers and fathers is used to create the multidimensional social origin measure of the family. Whenever a mother and a father differ in their levels of education, class or status position, the value of the parent with the respective dominant characteristic is taken for the family of social origin (Erikson, 1984, p. 503).

3. The three types of parental resources and their mechanisms

In this section, I will shortly describe the three most important parental resources and their distinct mechanisms with regard to children's educational opportunities, which I use to create the multidimensional measure of social origin.

The first family resource that I include in my multidimensional social origin measure is *parental education*. Parental education is an attributional measure, which can be characterized by a distribution in which families with differing amounts of education can be ranked (Goldthorpe & Hope 1972: 23; Goldthorpe 2010: 732). Parental education can be considered as the most important indicator for parents' ability to *support their children's homework and exam preparation* and *parents' familiarity with the educational system* which allows them to give more or less informed advice on their children's educational decisions (Bukodi & Goldthorpe 2013: 3). In my analyses, I rely on the CASMIN educational scheme, implemented in the NEPS, to define parental education (see Section 5.2; Müller, Steinmann & Schneider 1997).

The second resource I use for my multidimensional social origin variable is *parental class (Klasse)* (Weber 1976: 177-180). I refer to the narrow concept of class as suggested by J. H. Goldthorpe (1996: 487), where parents who dispose of similar economic goods or qualifications and skills that can be translated into income and other returns on the labor market are in the same *class* (Goldthorpe 1996:487; Mayer 1977: 159; Müller 1977: 25; Weber 1976). Thus, for my social origin measure, I operationalize parental class on basis of the Erikson-Goldthorpe-Portocarero (EGP) class schema (see Section 5.2; Erikson & Goldthorpe 1992), which is also implemented in the NEPS. This class conception differs from other class measures, which assume that class members are socialized to have specific class values, norms, 'forms of consciousness' or other aspects of class cultures (Goldthorpe 1996: 487). Theoretically, it has been established that it is not possible to rank the various classes on only one dimension since the differences in resources, opportunities and constraints that class members experience are ones of 'kind' and 'level' (Goldthorpe 1996: 486). Nevertheless broad contrasts can be made among more disadvantaged and more advantaged classes along the mode of employment regulation (service relationships vs. labor contracts). Thus, I use a condensed three EGP class version that contrasts broad classes according to service relationships, mixed forms and labor contracts (Goldthorpe 1996: 486) which allows me to rank them (Goldthorpe 1996: 486). Service relationships are characterized by often highly specialized knowledge, difficulties of monitoring the employee, long-term contracts, better career opportunities, higher security, higher delegated authority and more diffuse working tasks (Goldthorpe 2000: 217-221). Labor contracts on the other side are normally short-term with payment on a piece or time rate, which offer only low human asset specificity, where employees are easy to replace and easy to monitor (Goldthorpe 2000: 214-217). The mixed

class include mixed forms of the service relationship and labor contract (Goldthorpe 2000: 221-223). The mechanisms of parental class generally work in two ways. First, families from more privileged classes have more *economic resources* to support and help their children in school (Bukodi & Goldthorpe 2013: 2). For example, affluent parents can more easily pay for tutoring. Second, privileged classes normally have lower unemployment risks, lower short-term variability in earnings, long-term earnings security (Chan & Goldthorpe 2007: 518; Goldthorpe 2000: 228), and higher career prospects (Goldthorpe & McKnight 2006: 109), which allows them to make farsighted educational plans for their children, so that their children can stay longer in (costly) school (see also the time horizon theory by Hillmert & Jacob 2003).

Parental status (Stand) is the third social origin resource that I use to construct my multidimensional social origin variable. This variable is often neglected in many educational studies. It defines the position families have in a hierarchy of social deference (Weber 1976: 177-180). According to Weber (1976) it is another dimension besides class on which society is stratified. Members of each status group (1) seek to associate with superiors and honor them; (2) are in intimate and frequent interaction with equals (such as friends, colleagues and people who often constitute a marriage market); and (3) avoid interaction with inferiors on the prestige hierarchy, which is particularly emphasized by distinct beliefs, values, norms, customs and consumption (Goldthorpe & Hope 1972: 24; Mayer 1977: 155). For the construction of parental status in my multidimensional origin measure, I use information on the Cambridge Social Interaction and Stratification (CAMSIS) status scale (see Section 5.2; Bottero et al 2009: 141; Prandy & Lambert 2003), which is also offered in the NEPS. The CAMSIS status scores simply show the estimated likelihood of parental occupational combinations in a bivariate cross-tabulation (Bottero et al 2009: 148). The comparison of parental occupations is seen as a structural manifestation of social distance in which individuals with certain occupations experience different opportunities to meet each other (Bukodi, Dex & Goldthorpe 2011). In the context of educational inequality, Bukodi and Goldthorpe (2013: 3) state that *parental status* represents social and cultural resources that are available to families such as parental *social networks* and their *cultural tastes*, which both are seen as important factors for children's educational opportunities. For example, the normative educational expectations of families' social networks can have an influence on families' and children's educational aspirations (Roth 2017; Goldthorpe 1996: 494). Furthermore, high status families are more likely to have contact to a social network, which provides more effective advice about schools and a better help for their children (Roth 2017). Moreover, teachers and children from higher social status families share the same middle-class values and norms (Boudon 1974; Bourdieu 1984). Thus, the cognitive standards and social behaviour of higher status children conform better with the expectations and regulations of upper-secondary schools, so that these children have a higher likelihood to get better grades from their teachers.

It is important to stress that in my composite measure of social origin, parental class and parental status are relational concepts (Goldthorpe 2012: 212). This means that they reflect social relations in the labor market and social relations of perceived superiority, equality or inferiority that derive from social deference (Goldthorpe 2012: 204, 2010: 732; Goldthorpe & Hope 1972: 23). The positions individuals take in these two kinds of social hierarchies affect children's educational opportunities and educational choices (Erikson & Goldthorpe 2009; Goldthorpe 2010: 733).

4. Compensation and accumulation

The availability of each of the three resources will vary across families and affect children's educational investments and attainment differently. I assume that, on average, parents with more of each of the three resources will be better able to support their children in the process of acquiring a higher educational degree. The multidimensional social origin variable will therefore combine the three differing levels of parental resources available in families into one variable.

All empirical studies demonstrate that parental education is the most important of the three family resources for children's educational success (Marks 2011; Bukoi & Goldthorpe 2013). This is easy to understand because parental education comes causally and temporally before parents achieve their own class and status positions and their education has a strong bearing on both of these measures of social origin (Pfeffer 2008: 544). The resource "parental education" is also more directly and intrinsically related to a child's educational aspirations and attainment. For example, the educational level of the parents often translates into an aspiration level of the family and/or a child's own educational aspiration level. Several empirical analyses have shown that the influence of parental education on their children's educational attainment has even increased across cohorts (Baker 2014; Bukodi & Goldthorpe 2013; Buis 2013; Ermisch & Francesconi 2001; Mayer et al. 2009). The importance of parental education has risen since the lengthening of compulsory education, the improvement of living conditions and the trend towards smaller families have led to a weakening association of parental class and parental status with children's educational attainment across birth cohorts (Blake 1989; Breen et al. 2009; Erikson & Jonsson 1996; Müller & Haun 1994: 6-7; Schimpl-Neimanns 2000: 641). Using the sheaf coefficient method, I have also empirically tested which of the three social origin resources is most important (see Table A1 in the appendix; Buis 2014). Again, in this analysis parental education turns out to be the most important resource for educational inequality (largest coefficient) in the NEPS sample. However, as has been already argued above, parental class and status are still important for the educational success of children.

This multidimensional measure of social origin takes up the question of how different parental resources affect educational inequality together (Erola & Kilpi-Jakonen 2017: 13). It is argued that the three parental resources are highly interwoven and different combinations of parental resources can have *compensating* and *cumulative* effects (Erola & Kilpi-Jakonen 2017). Compensation means that families might replace low or intermediate capacities on one of the three resources by higher capacities of the respective other ones. For example, parents with only an intermediate education might use their higher class and/or status position to compensate for their intermediate educational resource. Furthermore, cumulation means that a child from a highly educated family is likely to profit also from a high parental class and/or a high parental status position. I assume that this accumulation of resources is beneficial for children's educational careers in comparison to children from highly educated parents who have only intermediate resources in one or two of the other parental origin characteristics.

This suggested multidimensional social origin measure has two further advantages: First, it allows taking into account status inconsistencies and second, it avoids the problem of

multicollinearity that might be present if one introduces the three parental resources separately into the analyses (see Table A2 in the Appendix; Meravigilia & Buis 2015).

5. Operationalizing the multidimensional measure of social origin

5.1 The NEPS sample and variables

For the construction of the social origin measure, I rely on data from the Adult Cohort (SC6) of the NEPS (Blossfeld, Roßbach & von Maurice 2011; doi:10.5157/NEPS:SC6:6.0.1). This multicohort panel is carried out by the Leibniz Institute for Educational trajectories. In my analyses, I include all men and women who have participated in at least one of the NEPS panel waves until 2014 (see von Maurice, Blossfeld, & Roßbach 2016:11). My sample comprises birth cohorts born between 1944 and 1983. This means I restrict the sample of men and women who were born in Germany and aged 30 years or above at the time of the interview in order to make sure that they have completed their ultimate educational attainment at the institutions of higher education (Breen et al. 2009: 1506). There are 10,918 respondents in the sample.

For data reasons, I exclude individuals who attended special schools for disabled or schools for students with learning disabilities since they are a very specific group (see for the same decision Buchholz & Schier 2015). In addition, I excluded first and 1.5 generation migrants from my analysis, since they have not spend their complete educational career in the German educational system.

To define the relevant categories of my social origin variable from an extended 27 category version I estimate several binary logistic regressions on the probability to obtain a tertiary degree. The dependent and independent variables are constructed as follows:

Dependent variable

As *dependent dichotomous variable* for the grouping of the categories of the social origin measure, an indicator for whether individuals had reached a tertiary education (Y = 1) or not (Y = 0) is used (see Tables 1-2 and 1-3).

For descriptive purposes, I also distinguish *qualified individuals* with a 'Haupt-' or 'Realschulabschluss' with a vocational training certificate as well as higher education entry certificate holders with and without a vocational training certificate (see Table 1-4).

Furthermore, I distinguish *unqualified individuals* which at most have a 'Haupt-' or 'Realschulabschluss' and no vocational training certificate (see Table 1-4).

Independent variable

C*ohort trend variable*. My analyses include also a linear *cohort trend* to model changes in higher educational attainment over time. The linear *cohort trend* ranges from 0 for the "1944 birth cohort" to 39 for the "1983 birth cohort". I tested the linear *cohort trend* variables against birth cohort dummy variables as well as a cohort trend with a quadratic term. In all these models, results are very similar, so that the substantive conclusions are the same. To

keep the analysis as simple as possible, I use only the linear cohort trend in my analyses (Blossfeld 2018).

5.2 Operationalization of the three parental resources

In the following, I describe how I operationalize parental education, parental class and parental status using data from the NEPS. To simplify the construction of the multidimensional social origin measure, I used a three category version of the parental education, parental class, and parental status resources (see for a quite similar implementation Bukodi & Goldthorpe 2013: 1033-1034, who used a four category version for the UK).

Parental education

As a measure for parental education, I use an updated version of the CASMIN educational schema which was developed on basis of the German microcensus from the 1970s to 2000s and which is available in the NEPS data set (Brauns & Steinmann 1999:3). I use the dominance approach in which the highest educational value of the father or the mother is taken to obtain an indicator for parental education (Erikson 1984). The results of the dominance method differ only from the conventional approach, if the mother has a higher educational value than the father. The NEPS offers nine ordered categories on the CASMIN classification for mother's and father's education. I collapse these categories into the three major educational levels for labor market chances and career advancement in Germany (Hausner et al. 2015; Müller & Shavit 1998; Schmillen & Stüber 2014):

(1) The *lowly skilled* comprise parents without any educational certificate, with only "Hauptschulabschluss" without vocational training, or only "Realschulabschluss" without vocational training.

(2) The *skilled* represent parents who have a "Hauptschulabschluss" with vocational training, a "Realschulabschluss" with vocational training, or an "Abitur" with or without vocational training.

(3) The *highly skilled* include parents who have a higher education degree such as a university degree or a university of applied sciences degree ("Fachhochschulabschluss").

Parental class

I use the Erikson-Goldthorpe-Portocarrero class scheme for parental class (Erikson & Goldthorpe 1992). This scheme was developed in reference to the term social class by Weber (1976), where *the life chances of individuals depend on their negotiating position on the (labor) market* (Goldthorpe 2000:206). The EGP variable in the NEPS was generated on the basis of employment status information and the International Standard Classification of Occupations (ISCO88). Again, the dominance method is used to determine *parental class* (see Erikson 1984). I have simplified the original 11 EGP class categories of the NEPS (see Erikson & Goldthorpe 1992:38–39) to a three class scheme, which can be ranked and which reflect the three different kinds of employment relationships (service relationship, mixed forms and labor contracts; Erikson & Goldthorpe 1992; Goldthorpe 2000):

(1) The "*salariat*" includes higher-grade professionals, administrators and officials as well as managers in large industrial establishments and large proprietors [I] and lower-grade professionals, administrators, and officials, higher-grade technicians, managers in small industrial establishments as well as supervisors of non-manual workers [II].This class is defined by service relationships (Goldthorpe & McKnight 2006: 112)

(2) The "*intermediate class"* includes the following EGP classes: „farmers and small holders and other self-employed workers in primary production" [IVc], „small proprietors, artisans, etc., with employees" [IVa], the „small proprietors without employees" [IVb], the „lower-grade technicians and supervisors of manual workers" [V] and the „higher-grade routine non-manual employees" [IIIa]. This class is characterised by "mixed" forms of service relationships and labor contracts (Goldthorpe & McKnight 2006: 113).

(3) The „*working class*" consists of the „skilled manual workers" [VI], the „lower-grade routine non-manual employees" [IIIb], „semi-skilled or unskilled workers" [VIIa] and the „agricultural and other workers in primary production" [VIIb]. This class is characterised by a labor contract (Goldthorpe & McKnight 2006: 111).

Parental status

Parental status is measured using the CAMSIS scale (Bukodi, Dex & Goldthorpe 2011; Chan 2010: 53-54). For Germany, the CAMSIS scale is constructed on basis of the 1995 micro census and is implemented in the NEPS data set on the basis of the ISCO88 code of marriage partners (Bukodi, Dex & Goldthorpe 2011: 627; Prandy & Lambert 2003). A bivariate cross-tabulation of different occupational positions of husbands and their wives is generated. The number in each cell constitute the number of empirical occurrences of each husband-wife combination. Using methods of correspondence analysis and Goodman's RC-II, CAMSIS scores are estimated that predict those numbers of occurrences. These scores show the distribution of combinations of father's and mother's occupations and thus the relative distance between occupational groups. Fathers and mothers have different CAMSIS scores since the same occupations display different relative positions within the occupational structure of fathers and mothers (Bottero et al. 2009). The dominance approach is applied to the CAMSIS information of mothers and fathers to determine the parental status resource (Erikson 1984). The CAMSIS scale ranges from 20 (lowest score) to 99 (highest score). In my analyses, I group the CAMSIS scores into three status groups: Children from families with scores of the lowest 30 % on the status scale are defined as children from (1) low-status parents, the '*inferiors*'. Children from families with scores of the highest 30 % on the status scale are classified as children from (2) high-status parents, the '*superiors'*. All other children from families with in-between status scores are labelled as (3) intermediate-status parents, the '*intermediate status group*'.

5.3 The construction of the multidimensional social origin measure

Since the aim of this social origin measure is to examine combined effects of the three parental resources, the three-category version of the parental education, parental class, and parental status resources are used to create 3×3×3=27 social origin combinations (see Table 1-1). This

Table 1-1: The 27 social origin combinations of the three family resources

No. of social origin combinations for the three parental resources	Parental education	Parental class	Parental status	Social origin groups	No. of observations
1	1	1	1	1	504
2	1	1	2	1	27
3	1	1	3	no cases	0
4	1	2	1	1	24
5	1	2	2	1	197
6	1	2	3	no cases	0
7	1	3	1	1	7
8	1	3	2	1	63
9	1	3	3	1	5
10	2	1	1	2	2,954
11	2	1	2	2	459
12	2	1	3	no cases	0
13	2	2	1	2	495
14	2	2	2	3	1,649
15	2	2	3	3	5
16	2	3	1	3	165
17	2	3	2	4	2,319
18	2	3	3	4	182
19	3	1	1	5	28
20	3	1	2	5	5
21	3	1	3	no cases	0
22	3	2	1	5	16
23	3	2	2	5	59
24	3	2	3	5	1
25	3	3	1	5	18
26	3	3	2	5	1,026
27	3	3	3	6	710
N					10,918

Source: SUF6.0.1 (Blossfeld et al. 2011; doi:10.5157/NEPS:SC6:6.0.1) author's own portrayal

Table 1-2: Logit model predicting the probability of graduating with a higher education degree aged 30 and above (12 social origin groups)

Variables		
Cohort trend		0.001
		(0.002)
Social origin (Ref.: group 1)	„Disadvantaged families with low education (DISLE)“	
Group 5		0.15
		(0.23)
Group 10		0.47***
		(0.13)
Group 11	„Families with intermediate education and low compensation potential (FIELC)“	0.78***
		(0.16)
Group 13		0.43***
		(0.17)
Group 14	Families with intermediate education and intermediate compensation potential (FIEIC)	0.99***
		(0.13)
Group 16		0.96***
		(0.21)
Group 17	Families with intermediate education and high compensation potential (FIWHC)	1.37***
		(0.13)
Group 18		1.88***
		(0.19)
Group 23	Families with high education and intermediate compensation potential (FHEIC)	2.13***
		(0.22)
Group 26		2.41***
		(0.14)
Group 27	Most privileged (MPRI)	3.03***
		(0.15)
Constant		-1.92***
		(0.15)
Pseudo-R^2		0.1089
Observations		10,918

Standard errors: *** p<0.01, ** p<0.05
Source: SUF6.0.1 (Blossfeld et al. 2011; doi:10.5157/NEPS:SC6:6.0.1), author's own calculations

construction of the combined social origin measure differs from a previous version by Bukodi and Goldthorpe (2013) for the UK since it uses a three category version of the three parental resources. In addition, it uses an absolute measure of parental education instead of a relative one, since empirical research could show that in countries with strong vocational training systems, such as Germany, overeducation and thus education as a positional good is less evident (Becker & Blossfeld forthcoming; Di Stasio et al. 2016; Shavit & Park 2016). Moreover, the social origin measure suggested in this article has fewer categories and the resource

combinations are differently combined compared to the Bukodi and Goldthorpe (2013) version and is therefore more parsimonious, but still sufficiently informative.

As can be seen in Table 1-1, a social origin measure, which takes into account status inconsistencies in different dimensions of inequality, is not only theoretically but also empirically important. The number of observations in the status consistent social origin combinations 1, 10 and 27 is indeed relatively high, with 504, 2,954 and 710 cases respectively. However, status inconsistent social origin combinations are prevalent and cannot be ignored by educational inequality analyses as is done by research that only uses single measures such as parental education or parental class or includes different measures simultaneously into the analysis. In particular, the social origin combinations 10, 17 and 26 are very common (see Table 1). These are either families that have an intermediate education and a low class and status position (N=2,954), families with intermediate education, from the salariat and intermediate status position (N=2,319) or families with high education, from the salariat and intermediate status position (N=1,026).

In the following, I describe how I have created the multidimensional social origin measure that expresses the most significant differences between the origin family groups:

(1) Social origin combinations 3, 6, 12 and 21 did not empirically exist (see Table 1-1).

(2) For some social origin combinations the number of observations is very small (n<40), thus no separate statistical analysis is possible for them. I integrated the social origin groups 2, 4, 7, 8, 9 with regard to their proximity into social origin group 1 and social origin group 15 into social origin group 16. Also social origin groups 19, 20, 22, 24 and 25 are placed in social origin group 23 because they are very close to each other. In other words, the categories that were numerically less relevant have been assigned to the respective neighbour categories.

(3) Then, I ran a binary logistic regression to predict the probability to graduate with a higher education degree (see Table 1-2). The independent variables are the cohort trend and the 12 remaining social origin groups. I then collapsed the remaining 12 groups into 6 empirically relevant social origin groups (see Tables 1-2 and 1-3), by combining the social origin groups with similar regression coefficients (see Table 1-3). This procedure leads to six relevant social origin groups with little loss of information (see Pseudo-R^2s in Tables 1-2 and 1-3). In addition, the variance of the coefficients of the more detailed groups that were combined into the six social origin groups turns out to be very small.

Table 1-3: Logit model predicting the probability of graduating with a higher education degree aged 30 and above (6 social origin groups)

Variables	
Cohort trend	0.001***
	(0.002)
Social origin (Ref.: Disadvantaged families with low education (DISLE))	
Families with intermediate education and low compensation potential (FIELC)	0.46***
	(0.11)
Families with intermediate education and intermediate compensation potential (FIEIC)	0.95***
	(0.12)
Families with intermediate education and high compensation potential (FIWHC)	1.37***
	(0.11)
Families with high education and intermediate compensation potential (FHEIC)	2.35***
	(0.12)
Most privileged (MPRI)	2.99***
	(0.14)
Constant	-1.88***
	(0.11)
Pseudo-R^2	0.1075
Observations	10,918

Standard errors: *** p<0.01, ** p<0.05
Source: SUF6.0.1 (Blossfeld et al. 2011; doi:10.5157/NEPS:SC6:6.0.1), author's own calculations

Table 1-4 shows for each of the six social origin groups the probabilities that children obtain one of the three most important German educational degrees (being unqualified, being qualified and having attained a tertiary degree). Table 1-4 demonstrates that the multidimensional social origin variable not only captures quite well differences among social groups in the likelihood to get a tertiary degree, but also of being an unqualified or qualified school leaver. Social origin group 1, the "Disadvantaged families with low education" (DISLE), have the highest proportion of children (16 %) who leave school as unqualified. 71 % of children from this origin group attain the "qualified" level and only 13 % of them graduate with a tertiary degree . Social origin groups 2 ("Families with intermediate education and low compensation potential" (FIELC)), 3 ("Families with intermediate education and intermediate compensation potential" (FIEIC)), and 4 ("Families with intermediate education and high compensation potential" (FIWHC)) have a quite low proportion of unqualified school leavers (between 4 % and 8 %), a high proportion of qualified school leavers (between 59 % and 73 %) and an intermediate proportion of individuals who graduate with a tertiary degree (between 19 % and 37 %). There are almost no unqualified school leavers from Social origin groups 5 ("Families with high education and intermediate compensation potential" (FHEIC)) and 6 (the "Most privileged" (MPRI)) (1 %). There is also only a quite moderate proportion of qualified individuals in Social origin groups 5 and 6 (23 % to 37 %), and a high proportion of children graduating with a tertiary degree (62 % to 76 %).

Table 1-4: Distribution of the social origin variable for the three highest educational degrees unqualified, qualified and a tertiary degree

Social origin group	Proportion of individuals who are unqualified	Proportion of individuals who are qualified	Proportion of individuals who have attained a tertiary degree	Total
1 DISLE	16 % (128/827)	71 % (588/827)	13 % (111/827)	100 % (827)
2 FIELC	8 % (293/3908)	73 % (2838/3908)	19 % (777/3908)	100 % (3908)
3 FIEIC	6 % (93/1649)	66 % (1082/1649)	28 % (474/1649)	100 % (1649)
4 FIWHC	4 % (101/2671)	59 % (1570/2671)	37 % (1000/2671)	100 % (2671)
5 FHEIC	1 % (12/1153)	37 % (426/1153)	62 % (715/1153)	100 % (1153)
6 MPRI	1 % (8/710)	23 % (165/710)	76 % (537/710)	100 % (710)

Source: SUF6.0.1 (Blossfeld et al. 2011; doi:10.5157/NEPS:SC6:6.0.1), author's own calculations

5.4 A short description of the six social origin groups

Table 1-5 provides a short description of the six social origin groups:

Social origin group 1: „Disadvantaged families with low education (DISLE)"

This group includes children with the lowest educated parents. Parent's low education is the most determining factor for these children's low educational success. In this group, a higher parental status or more parental economic resources cannot compensate for the low level of parents' education.

Social origin group 2: „Families with intermediate education and low compensation potential (FIELC)"

For children from „families with intermediate education and low compensation potential (FIELC)" even excellent social network resources are no additional asset. Furthermore, also children from intermediate educated parents with intermediate economic resources and low social network resources will be included in this social origin group.

Social origin group 3: „Families with intermediate education and intermediate compensation potential (FIEIC)"

Children from this origin group have parents with an intermediate education, intermediate economic resources, and intermediate social network resources. In addition, this group also includes children from families with intermediate education, intermediate class position, and high status or with intermediate education, high class position, and low status. This origin group is different from the „families with intermediate education and low compensation potential (FIELC)", since intermediate or high social network resources of parents indeed increase the educational opportunities of children. In addition, a high class position and intermediate education of families can compensate for a low status position of these families.

Table 1-5: Categories of the multidimensional social origin measure

Social origin groups	Combination of social origin resources	Abbreviation social origin groups
1	Low parental education with low and intermediate parental economic and social network resources	„Disadvantaged families with low education (DISLE)“
2	Intermediate parental education with low and/or intermediate economic and social network resources	„Families with intermediate education an low compensation potential (FIELC)“
3	Intermediate parental education, parental class and parental status, intermediate education and class and high status or intermediate education, high class and low status	„Families with intermediate education and intermediate compensation potential (FIEIC)“
4	Intermediate parental education and high parental economic and intermediate or high social network resources	„Families with intermediate education and high compensation potential (FIWHC)“
5	Highly educated parents with various combinations of values on the other two parental economic and social network resources	„Families with high education and intermediate compensation potential (FHEIC)“
6	Highly educated parents, high parental class and high parental status	„Most privileged (MPRI)“

Source: SUF6.0.1 (Blossfeld et al. 2011; doi:10.5157/NEPS:SC6:6.0.1) author's own portrayal

Social origin group 4: „Families with intermediate education and high compensation potential (FIWHC)“

Children from parents that dispose of intermediate education, high economic, and intermediate or high social resources form social origin group 4. Apparently, high economic, and intermediate or high social network resources guarantee significantly better educational opportunities compared to social origin group 3. Furthermore, in this group high economic resources can compensate for intermediate social network resources. This group has a significantly higher probability to obtain a higher education degree than social origin group 3, which shows that there are important cumulative effects taking place.

Social origin group 5: „Families with high education and intermediate compensation potential (FHEIC)“

This group refers to children whose parents are highly educated and who command either over the full range of economic or social resources. However, this group is different from families who have the best resources on all three social origin dimensions.

Social origin group 6: „Most privileged (MPRI)“

This group includes the most advantaged children whose parents have the highest resources in all three origin dimensions (education, class, and status). Table 1-4 shows that these children have significantly better educational opportunities than children from social origin group 5. Thus, here, the education, economic and social network resources clearly have a cumulative effect.

6. Summary

This article developed a theoretically grounded multidimensional social origin measure. Using data from the NEPS, the paper described how social origin can be empirically operationalized to bring out significant differences of families in educational inequality studies. The proposed measure uses information on parental education, parental class, and parental status. The paper demonstrates that the multidimensional origin variable is useful for educational researchers who want to take into account status inconsistencies of families, and cumulating as well as compensating effects of social origin resources when analysing inequality of educational opportunities in Germany with the NEPS. Another advantage of this proposed origin measure is that it avoids the problem of multicollinearity that is prevalent in analyses that include these three parental resources as separate covariates into statistical models.

References

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Appendix

Table A 1: Calculation of sheap coefficients (see Buis 2014)

Variables	
Parental education	0.47***
	(0.32)
Parental class	0.23***
	(0.03)
Parental status	0.29***
	(0.03)
Constant	-2.86***
	(0.11)
Observations	10,918

Source: SUF6.0.1 (Blossfeld et al. 2011; doi:10.5157/NEPS:SC6:6.0.1), author's own calculations

Table A2: Spearman rank correlations between the social origin variables (three category version of CAMSIS, EGP and CASMIN)

	Parental education	**Parental class**	**Parental status**
Parental education	1.00		
Parental class	0.46	1.00	
Parental status	0.44	0.75	1.00

Source: SUF6.0.1 (Blossfeld et al. 2011; doi:10.5157/NEPS:SC6:6.0.1), author's own calculations