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## Education

### The Transmission of Educational Opportunities across three Generations – Prospects and Limits of the SOEP Data

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#### Abstract

In the last centuries, Germany has witnessed a remarkable educational expansion with a long-lasting dynamic. If the educational expansion in West Germany has gained such a momentum, it has to be proven empirically that the respective generation of parents – who themselves had profited from the educational expansion – pass on their (higher) educational aspirations to their children. In this paper, this already forgotten issue in the research of status attainment has been revitalized. Analyses with large-scale longitudinal data such as German life history data or German socio-economic panel data provide evidence that there is sustainability of educational expansion across three generations. Some of the limitations of the data and the analysis has been discussed in order to motivate the scientific community to gather advanced information on inter-generational transmission of educational opportunities.

*JEL Classification: I2, I20, I21*

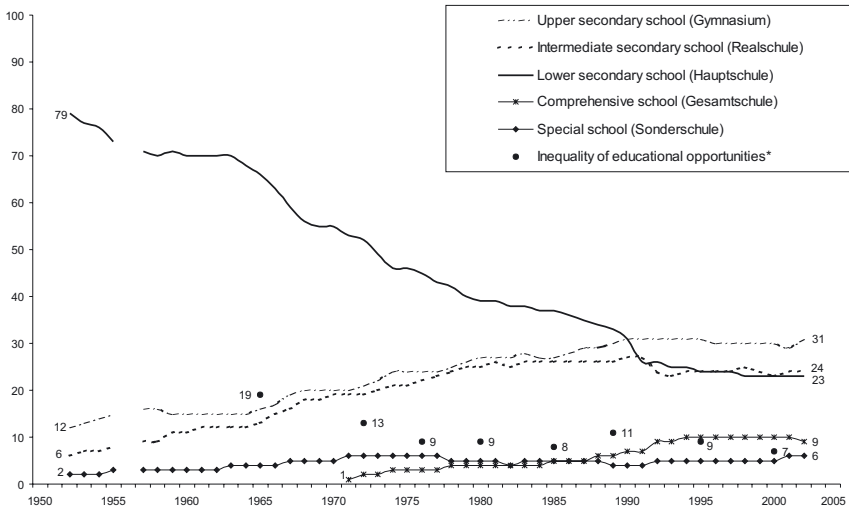
#### 1. Educational Expansion and Persistent Inequalities

In the last centuries, Germany has witnessed a remarkable educational expansion in the secondary school system (*figure 1*). While the enrolment in lower secondary school has declined in the course of the educational expansion, the access to upper secondary school after the primary school has increased significantly (Becker, 2006; Müller, 1998). However, in spite of the educational reforms and educational expansion in post-war Germany, the access to Gymnasium is still characterized by social inequality (Becker, 2003; Blossfeld, 1993; Mayer / Blossfeld, 1990).

In 1965, for the upper-service class children, the opportunity to be enrolled in the Gymnasium was 19 times higher than for the working-class children. In 2000, this class-related inequality has declined in the course of educational expansion, however, the upper-service-class children are still privileged re-

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garding the access to *Gymnasium*. Their opportunity is still 7 times higher than for pupils from the working classes.



\* Educational opportunities of upper-service-class children to continue secondary school education on *Gymnasium* in contrast to working-class children (odds ratios).

Data: Gesis-ZUMA System sozialer Indikatoren für die Bundesrepublik Deutschland; SOEP (1984–2000).

Figure 1: Educational expansion in (West) Germany, 1953 – 2003 – Changes in educational participation of pupils in age 13

Of course, the educational expansion has led to a profound decrease in educational inequalities, but social origin of individuals still influences their educational opportunities substantially. In order to disentangle the puzzle of persistent class-related inequality, as we already know, it is useful to reconstruct the historical process of educational expansion on the level of consecutive birth cohorts (Mayer / Blossfeld, 1990). Analyses with large-scale longitudinal data such as life history data or panel data provide evidence that both the educational expansion and the change of social inequality of educational opportunities are related to the sequence of cohorts born in the post-war period.

One of the most important findings is the educational advancement – measured by the individual’s opportunity to attain a higher secondary school qualification than their parents – across consecutive birth cohorts (Becker, 2006). In West Germany, the educational expansion is characterized by the cohort-specific trend that the cohorts born after 1940 are more likely able to attain a higher level of school education than the cohort born during the Second World War (*table 1*). Almost 21 percent of them born around 1950 got a higher

school certificate than their parents. This quota of educational upgrading has increased to 51 percent for the 1969–71 cohorts. While the impact of parental social status – measured by the Magnitude Prestige Score suggested by Wegener (1988) – on the likelihood of educational advancement across generations has diminished across consecutive birth cohorts, the opportunity of educational advancement has increased significantly for children of less qualified parents.

Table 1

**Development of the advancement of secondary school education  
across generations in West Germany (odds ratios)**

<i>Birth cohorts</i>	1919– 21	1929– 31	1939– 41	1949– 51	1959– 61	1969– 71	Total
<i>Gender (Female)</i>	1	1	1	1	1	1	1
Male	1.18	1.35	0.90	1.34	0.84	0.79	0.99
<i>Parents' educational degree (Upper secondary school)</i>	1	1	1	1	1	1	1
Lower secondary school	2.02*	2.98*	2.07†	2.23*	3.96*	4.89*	3.63*
<i>Social status of parents</i>							
Prestige (MPS)	1.02*	1.03*	1.01*	1.01*	1.00	1.00	1.01*
<i>Cohorts (1929–31)</i>							1
1919–21							2.43*
1939–41							0.85
1949–51							1.83*
1959–61							7.71*
1969–71							8.91*
Pseudo- $R^2$ (McFadden)	0.035	0.043	0.010	0.015	0.046	0.093	0.128
$N$	833	625	616	619	734	635	4062
Quota of upgrading	27%	11%	12%	21%	45%	51%	29%

\* at least  $p \leq 0.05$ ; †  $p \leq 0.10$ .

Data base: German Life History Study (Max Planck Institute of Human Development, Berlin, and CIQLE, Yale University), and German General Social Survey (ALLBUS 1992–2002).

Another important result of empirical longitudinal analyses on inequality of educational opportunities refers to the fact that the growing amount of status competition via education among the cohorts might be one of the pivotal generators of the still continuing educational expansion. If the educational expansion in West Germany has gained such a momentum, it has to be proven empirically that the respective generation of parents – who themselves had profited from the educational expansion – pass on their (higher) educational aspirations to their children. This perspective revitalizes an already forgotten issue in the research of status attainment (Cameron / Heckman, 1998; Warren / Hauser 1997; Becker / Tomes, 1986):

- (1) Is there a long shadow of social origin measured by the impact of grandparents' education on the educational opportunities of their grandchildren?
- (2) How did the structure of intergenerational transmission change in the course of educational expansion across birth cohorts?

## 2. The Scope of SOEP Data

In order to reveal the long shadow of social origin measured by the impact of grandparents' education on the educational opportunities of their grandchildren, we need data which consist of the educational history of three generations at least. Since 1984, the German socio-economic panel (SOEP) provides such information (Fuchs/Sixt, 2007). In respect to our research question, this high quality database is an asset for social research on educational opportunities and their change in time. Since one of the core issues of the SOEP is the measurement of incomes and economic welfare of individuals and private households, the data provide information on both the precondition of the individuals' opportunity of education and the process and mechanisms of the intergenerational transfer of education. With a growing number of children born in the panel reaching the age of personal interviewing and even becoming parents themselves, the SOEP is able to provide rich and unique data for the analysis of educational attainment in the life course and of related intergenerational inequalities in the context of families and private household.

Due to the longitudinal design of the SOEP including the measurement of the individuals' educational and occupational careers, it is possible to consider the impact of both the parental educational upgrading and the parental social mobility on their children's opportunity of education. Therefore, we are able to analyse the impact of the socio-economic resources of the private household on their children's educational prospects across three generations. By this cohort design and from the life course perspective we get more detailed insights in the mechanisms concerning trends in both the educational expansion and the inequality of educational opportunities (Becker, 2007).

In order to get answers for our issue on the intergenerational transmission of education across three generations, we employ the following design (*figure 2*). Due to the limits of the SOEP data this analytical design remains rather simple and, of course, incomplete. The adult respondents with one or more children are the so-called focus generation G2. Their parents are the generation G1 and the children of the focus generation are the generation G3. The latter generation are the grandchildren of G1. The focus generation has been asked for information on their parents' education and social status as well as on their children's education.

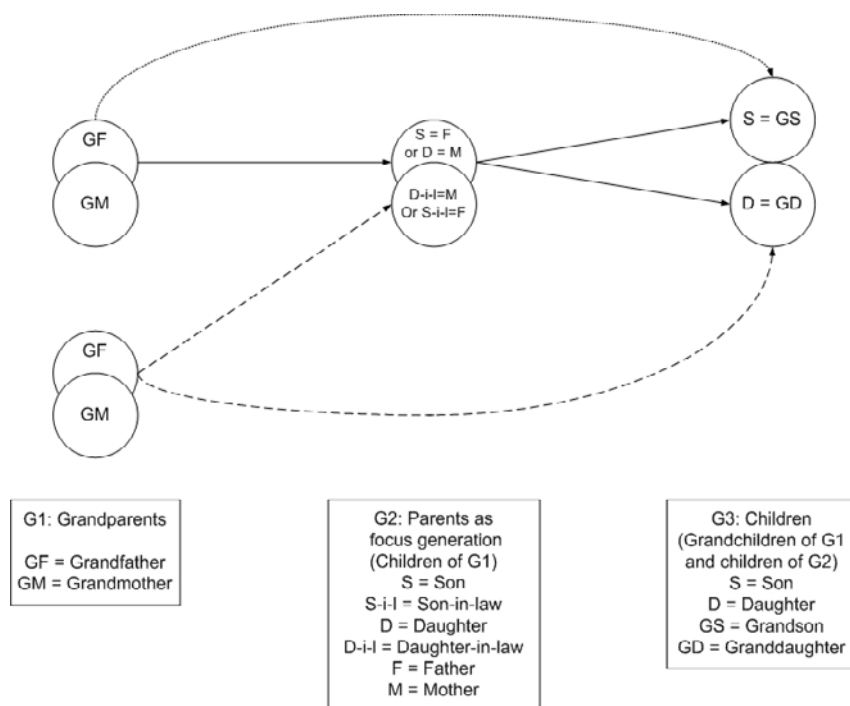


Figure 2: The actual design for the analysis of the intergenerational transmission of education across three generations

Due to the household design of the SOEP, the parents of the respondents' spouses could be taken into account. Therefore, we are able to distinguish between the paternal and the maternal line of intergenerational transmission of education across three generations. In order to reduce complexity, we focus on the paternal line from G1 to G2 and from G2 to G3 and, finally, from G1 to G3. The reasoning is that several empirical studies provide evidence that the impact of the father's characteristics on their children's educational opportunities exceeds the maternal characteristics (Stockè, 2007; Becker/Schubert, 2006, 270; Büchel/Duncan, 1998; Goldthorpe, 1983).

### 3. Empirical Findings

In order to test empirically the sustainability of educational expansion, we seek to detect if the respective generation of parents – who themselves had profited from the educational expansion – pass on their (higher) educational aspirations to their children. For the empirical analysis we employ two data

sets. On the one hand, the *German life history study* (GLHS) provide information on the intergenerational transmission of education if one consider the focus generations born around 1920, 1930, and 1940 (Becker, 2006; Mayer / Blossfeld, 1990). For the focus generations born in the 1950s and later, the *SOEP* data are used on the other hand. It has to be noted that we consider each of the children the parents in the focus generation have (Becker, 2007).

In order to abide by the scope of this contribution, the likelihood of the attainment of the secondary school certificate will be analysed. Three levels of certificates are distinguished: Intermediate secondary school certificate (*‘Mittlere Reife’*) and the upper secondary school certificate (*‘Abitur’*, e.g. higher education entrance qualification. The third certificate – the lower secondary school certificate (*‘Hauptschulabschluss’*) – is the reference category of the multinomial logistic regression.

Table 2

**Impact of educational advancement in the second generation on the educational opportunities of the third generation: Differences among the maternal and paternal line (odds ratios, multinomial logistic regression)**

	1949 – 58 (total)		1949 – 58 (maternal line)		1949 – 58 (paternal line)	
	<i>Mittlere Reife</i>	<i>Abitur</i>	<i>Mittlere Reife</i>	<i>Abitur</i>	<i>Mittlere Reife</i>	<i>Abitur</i>
<i>Gender of G3 (Children of G2 and Grandchildren of G1)</i>						
Granddaughter (Ref.)	1	1	1	1	1	1
Grandson	0.61*	0.55*	0.62*	0.55*	0.82	0.78
<i>Educational advancement of G2 (Parents = Children of G1)</i>						
No upgrading (Ref.)	1	1	1	1	1	1
Upgrading	2.15*	8.53*	1.71*	6.08*	2.10*	7.91*
<i>Level of Education of G1 (Grandparents)</i>						
Volksschule (Ref.)	1	1	1	1	1	1
Mittlere Reife	2.26	6.43*	2.09	4.88*	7.37*	3.28
Abitur	11.8*	41.5*	10.6*	29.2*	0.72	6.45*
Pseudo- <i>R</i> <sup>2</sup> (McFadden)	0.105		0.085		0.098	
<i>N</i>	654		201		453	

\* *p* ≤ 0.05 at least.

Data base: SOEP (1984 – 2000).

Children in the third generation provide privileged educational opportunities (measured by their tracking into the secondary schools or by their educational attainment) if their parents have experienced themselves educational advancement compared to the educational degree of their parents in the first generation (table 2). This is in particular true when the paternal line of the intergenerational transmission is taken into account. In the case of the fathers’ up-

grading it contribute to their children's opportunity to attain the *Abitur*. In contrast to the intergenerational transmission via the maternal line, the constraints by the grandparents' educational level are quite lower for the paternal line.

Apart from these results, the educational expansion raises some unintended consequences. They are documented for the youngest generations' likelihood to attain intermediate or upper secondary school degrees. On the one hand, taking both the maternal and the paternal line into account, the impact of the focus generations' educational gains on the educational prospects of their children in terms of attaining the highest secondary school degree (*Abitur*) has declined in the succession of the birth cohorts in the focus generation born after the First World War (table 3). If one considers the total pattern of social inequality of educational opportunities, it has to be stressed that there is no monotonic trend observable across successive birth cohorts. Nevertheless, apart of this development, the children of educationally upgraded parents provide significant opportunities to become eligible for access to higher education. On the other hand, it has to be noted across the birth cohorts that intergenerational transmissions of educational upward mobility from the parents in the focus generation to their children will be increasingly restricted by the educational level of the grandparent generation. This is due to increasing ceiling effects for the educational advancement in the course of educational expansion.

Table 3

**Impact of educational advancement on the educational opportunities  
of the third generation (odds ratios)**

Focus generation	1919–21		1929–31		1939–41		1949–58	
	<i>Mittlere Reife</i>	<i>Abitur</i>	<i>Mittlere Reife</i>	<i>Abitur</i>	<i>Mittlere Reife</i>	<i>Abitur</i>	<i>Mittlere Reife</i>	<i>Abitur</i>
<i>Gender of G3 (Children of G2 and Grandchildren of G1)</i>								
Female (Ref.)	1	1	1	1	1	1	1	1
Male	0.86	1.65*	0.66*	1.37*	0.76	0.89	0.61*	0.55*
<i>Educational advancement of G2 (Parents = Children of G1)</i>								
No upgrading (Ref.)	1	1	1	1	1	1	1	1
Upgrading	1.20*	1.46*	6.08*	13.8*	2.47*	9.53*	2.15*	8.53*
<i>Level of Education of G1 (Grandparents)</i>								
Volksschule (Ref.)	1	1	1	1	1	1	1	1
Mittlere Reife	2.60*	6.57*	2.90*	6.30*	1.42	3.78*	2.26	6.43*
Abitur	3.97*	4.59*	2.58*	12.0*	7.0*	16.9*	11.8*	41.5*
Pseudo- $R^2$	0.045		0.089		0.070		0.105	
N	1,657		1,429		1,069		654	

*Mittlere Reife* = intermediate secondary school certificate, *Abitur* = upper secondary school certificate (reference category: *Hauptschule* = lower secondary school certificate); \*  $p \leq 0.05$  at least.

Data base: German Life History Study (Max Planck Institute of Human Development, Berlin, and CIQLE, Yale University), and SOEP (1984–2000)

Indications in favour of this interpretation are found if one considers the educational level of the upgraded parents (*model 2 in table 4*). In particular, the children of the upgraded parents who attained the *Abitur* are more likely to have privileged educational opportunities than children of less educated parents. It is obvious that children of parents who had profited from the educational expansion pass on their educational gains to their children (*model 1 in table 4*). If one takes the educational level of the grandparents into account, it is evident that impact of the parents' profits from the educational expansion on their children's educational opportunities compensates the impact of the grandparents' level of education almost completely (for details: Becker, 2007).

*Table 4*  
**Sustainability of educational expansion (odds ratios, multinomial logistic regression)**

<i>Model</i>	1		2		3	
	<i>Mittlere Reife</i>	<i>Abitur</i>	<i>Mittlere Reife</i>	<i>Abitur</i>	<i>Mittlere Reife</i>	<i>Abitur</i>
<i>Gender (Granddaughter)</i>	1	1	1	1	1	1
G3: Grandson	0.75*	1.48*	0.74*	1.47*	0.75*	1.48*
<i>Social origin</i>						
G2: Prestige	1.02*	1.04*	1.02*	1.03*	1.03*	1.04*
<i>Level of Education (Volksschule)</i>	1	1			1	1
G1: <i>Mittlere Reife</i>	1.77*	3.90*	1.98*	3.70*	1.82*	4.14*
G1: <i>Abitur</i>	3.13*	5.65*	3.09*	5.66*	2.91*	4.94*
<i>Educational and prestige advancement (G2: No upgrading)</i>	1	1	1	1	1	1
G2: Educational upgrading	2.58*	4.12*				
G2: Upgrading to <i>Mittlere Reife</i>			2.96*	3.91*		
G2: Upgrading to <i>Abitur</i>			1.34	4.26*		
G2: Educational & prestige upgrading					1.81*	2.79*
<i>Cohorts (G2: 1919–21)</i>	1	1	1	1	1	1
G2: 1929–31	0.92	0.90	0.92	0.89	0.83	0.75*
G2: 1939–41	1.05	1.06	1.04	1.07	0.98	0.88
Pseudo- $R^2$	0.097		0.099		0.085	
<i>N</i>	2,725		2,725		2,725	

\* at least  $p \leq 0.05$ .

Data base: German Life History Study (Max Planck Institute of Human Development, Berlin, and CIQLE, Yale University).



Therefore, it can be concluded that children of parents who had profited from the educational expansion themselves have similar opportunities of education than children in families with an academic tradition. We have detected one of several kinds of mechanisms which provide insight into the historical process of educational expansion in West Germany. This mechanism has contributed to the acceleration of educational expansion across generations, to the educational upgrading of the social structure, and finally, to the slow decline of inequality of educational opportunities. This is why the educational expansion becomes a sustainable process of its own dynamics (Becker, 2006, 2003).

However, the argument is rational that the sustainability of the educational expansion measured by the intergenerational transmission of educational gains is compromised to the educationally upgraded parents' inability to transform their educational gain in upward social mobility (e.g. Becker, 2006; Mayer/Blossfeld, 1990). Such kind of upward mobility provides the socio-economic resources crucial for investment into the human capital of their offspring (*model 3 in table 4*). On the individual level, the sustainability of the educational expansion assumed to be guaranteed if the parents succeed in both the educational upgrading and the occupational upgrading.

This assumption is confirmed empirically, but the parents' educational upgrading singularly predicts their children's educational opportunity much better than the combination of educational and occupational upgrading. If one takes the role of the parents' occupational upgrading into account, their educational advancement is obviously the key factor for both the momentum and the sustainability of educational expansion. In sum and in contrast to other studies (e.g. Fuchs/Sixt, 2007), it could be concluded that the cohort-specific increase of educational advancements in the focus generations has contributed to both the sustainability of the educational expansion and the decline of the class-related inequality of educational opportunities.

#### 4. Limits of SOEP

In regard to our research issue on both the internal dynamics and the sustainability of the educational expansion, we are faced with several limits of the SOEP and the other databases employed in the empirical analysis. There are two categories of limits. One category refers to the design which has been employed for conducting the data. The other category is related to insufficient information crucial to test theories in regard to inequality of educational opportunities.

##### *Deficits of the Design*

Although the SOEP is a household panel, both the educational career of the generations and the intergenerational transmission of educational attainment

have to be reconstructed by the information gathered from the adult parents of the “sandwich generation”. These respondents in the so-called focus generation have to report the education of both their parents as well as their children. If they are the only offspring, no problems occur for the measurement of the intergenerational transmission of education across three generations.

However, in the case that they have siblings which do not live in the same household, the design we have employed for the former analysis will be problematic. Due to the invalid assumption that the respondents’ parents have only one child the empirical analysis of intergenerational transmission are seriously biased (Sørensen, 1986). For example, the amount of social inequality of educational opportunity will be underestimated. Such problem is also true if one pretends that the respondents have only one child. These problems have to be solved with another design. As first minimal precondition we have to define the grandparents as the focus generation (see *figure 3*). This focus generation is the starting point of the intergenerational transmission of educational attainment across the following two generations of both their children and grandchildren. Secondly, by this way, one has the opportunity to analyse the intergenerational transmission of educational upgrading across two generations. By this way, we get information on the family’s academic tradition. Thirdly, the educational attainment of all children and grandchildren in the consecutive generations has to be captured. Fourthly, if the child in the second generation is female the educational careers of the spouse and his parents have to be considered.

However, such an ideal-typical design raises some problems. First of all, it takes too much time to gather the information of all generation. Although the SOEP is a long-running household panel it is not possible to use the design suggested for the empirical analysis. Most of the individuals in the second generation are much too young to have children; in other cases, the sample is too small for multivariate analysis.

### *Insufficient Data on Respondents and their Relatives*

Some of the data-based problems – such as the definition of the appropriate focus generation, the definition of the academic tradition of a family, the analytical perspective of paternal or maternal line of educational transmission, the consideration of all children of a parental generation – arising for the statistical analysis have been discussed already. Therefore, in regard to theories explaining the social inequality of educational opportunities, the role of individuals’ abilities and achievement has to be discussed as well as the individuals’ and their family’s choice of education.

For explaining social inequality of access in continued education, the sociological inquiry differentiates between *primary and secondary effects of social*

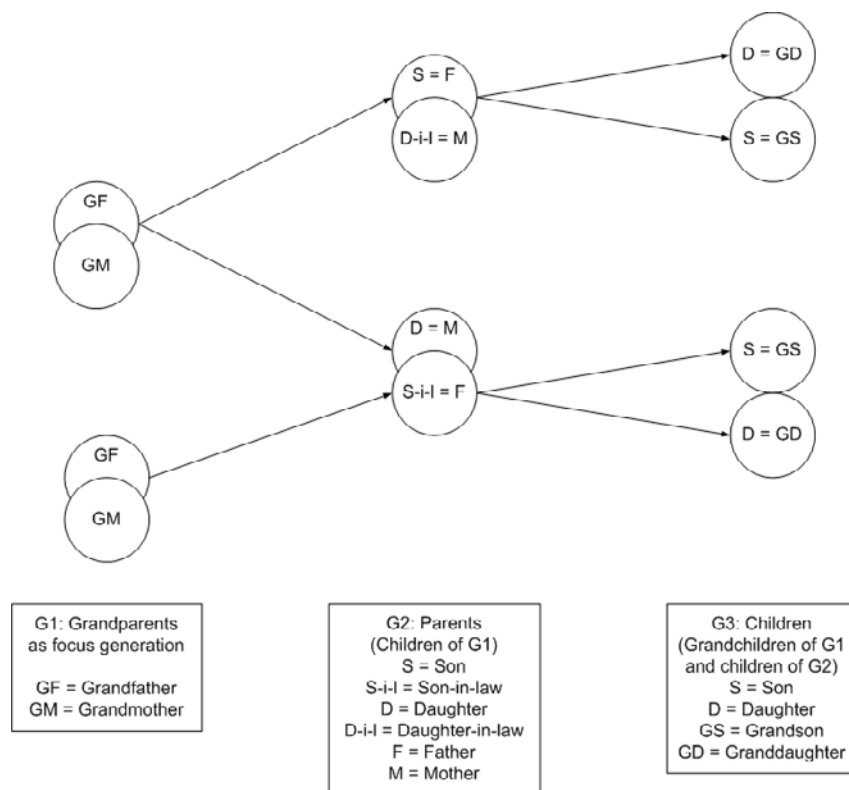


Figure 3: Heuristic ideal-typical design for the analysis of the intergenerational transmission of education across three generations

*stratification* (Boudon, 1974). While primary effects refer to the impact of social origin on the students' cognitive abilities, learning motivation, performance, and achievement, the secondary effects refer to class differences in the choices individuals and their family make in their educational careers, given the same performance in schools. On the macro level of society, the aggregate of their interplay results in the social stratification in higher education.

However, large-scale surveys such as SOEP provide no information on both the individuals' achievement at early branching points in the educational career and the educational choice (Becker, 2003). Without the information on the individuals' achievement at least, we are not able to distinguish between deserved and undeserved inequality of educational attainment (Becker, 2006). Information on the individuals' achievement and school performance are crucial to evaluate the net impact of social background on educational attainment. However, such detailed information has to be gathered by special surveys

such as the “National Educational Panel Study” (<http://www.uni-bamberg.de/en/neps/>) at University of Bamberg. This could and should not be the task of the SOEP.

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