

Social Inequality in Education: A Life-Course Perspective

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Abstract

How do social inequalities in educational attainment develop along the life course? The standard sociological approach to answer this question is to compare the amount of social selectivity measured at various transitions made along the educational career. The underlying assumption is that these transitions are strictly ordered in a population; however, this is a simplification. What happens if the times of these transitions are more dispersed and overlap? In this paper, we give a theoretical and empirical discussion of this typical aspect of 'real' educational careers. It turns out that it results in specific problems but also additional possibilities of sociological analysis.

We distinguish two main chronological dimensions in educational trajectories: first, the institutionalized sequence of transitions in the educational system; second, inter-individual variation in passing these different steps during the educational career. Both aspects are closely associated with age. Following that distinction, we discuss the weaknesses of conventional approaches to identify educational inequality. Furthermore, differences between analyses of transitions in contrast to analyses of participation are demonstrated. As an empirical case, we describe the development of social inequality along the way to university within the German educational system. To give an up-to-date account of educational inequality, we draw upon detailed longitudinal data of the most recent part of the German Life History Study.

1. Introduction

Family background clearly matters for educational attainment. A great number of theoretical papers and empirical studies have confirmed the influence of parental education ('educational inheritance') and of social status or social class on children's education (e.g., Bourdieu and Passeron 1971; Mare 1980; Erikson and Jonsson 1996b; Goldthorpe 1996). This well-known result does not mean that there are no changes in the impact of social origin on education. Most of the recent empirical studies looking at developments, however, have taken a historical perspective, discussing the question whether in most (Western) countries the influence of social origin on education has been rather stable over time (Shavit and Blossfeld 1993) or whether there have been significant trends of decreasing social selectivity (Erikson and Jonsson 1996a). But what do we know about the development of educational inequalities *within* the life course? Do they rather increase or decrease?

The evidence one can obtain from a short review of current research is rather mixed. Various sociological papers have focused on the impact of the family of origin at distinct transitions in the educational system, for example the decision for a particular track of secondary school after elementary school or from secondary to tertiary education. Blossfeld and Shavit (1993) summarize the results of their comparative study as follows: in 12 out of 13 countries the effects tend to be strongest at earlier transitions and then decline for later transitions (see also Mare 1980; Müller and Karle 1993). On the other hand, some studies have focused on rather 'uncommon', delayed educational transitions, like returning to the educational system and attaining (another) school degree or entering university after having completed vocational training. They find that the number of people undertaking these delayed transitions is far from being negligible and that the uncommon pathways to higher education can be observed more often for persons with more privileged social origins (e.g., Breen and Jonsson 2000). This suggests rather a trend of increasing inequality along with these delayed transitions. A similar observation of high social selectivity has been reported for participation in further and higher vocational education later in life (Schömann and Becker 1995).

Do these results contradict each other? In this paper we discuss different definitions of 'early' and 'late' transitions within (educational) life courses that have been used in these studies. This is done before the background of a general concept of *development* of educational inequalities within educational careers.

The standard sociological approach to study the development of social inequalities in educational attainment within the life course is to compare the amount of social selectivity measured at various transitions made along the educational career. The underlying assumption is that these transitions are strictly ordered in a population; however, this is a simplification. What happens if the times of these transitions tend to be more dispersed and overlap? And, even more general, how can we conceive of the 'development' of inequalities along educational trajectories? In this paper, we give a theoretical and empirical discussion of this important aspect of educational careers. It will turn out that the complexity of transition patterns results in specific problems but also additional possibilities of sociological analysis.

In order to highlight our general theoretical argument, we concentrate on a particular type of educational career, which is – in its ideal-type form – very simple. We carry out analyses on the 'academic track' in German secondary and higher education, i.e. the way from entering higher secondary school ('Gymnasium') to attaining a university degree. The German system is an example of an educational system containing sequential transitions, but also alternative pathways and high individual variation in educational careers. A focus on the academic track

is also reasonable for possible international comparisons. In the light of the expansion of tertiary education during the last decades (e.g., Mayer, Müller and Pollack 2003), access to higher education can be regarded as the key for full participation in the ‘knowledge society’ and is therefore an important topic for inequality research.

In order to describe the development of educational inequality, we follow a (birth) cohort during its educational career over the life course. Analyses like this make high demands on the data. Therefore, we use detailed retrospective data of two West German birth cohorts, whose educational careers can be followed from entering elementary school until their late twenties, to illustrate the dynamic development of educational inequality.

2. Theoretical concept: ‘development’ of inequality in educational careers

2.1 Two main temporal dimensions in educational careers

(1) The institutionalized sequence of transitions

Following Boudon (1974) and Mare (1980), educational careers can be conceptualized as a sequence of (conditional) transitions and episodes. At different points in the educational system, decisions have to be made between either going on in the educational career or dropping out and leaving the educational system. According to the theoretical model, education careers are split into several successive transitions that can be analyzed step-by-step by looking at the probabilities of entering the next higher level (or the ‘drop-out rate’), depending on individual and social factors. The highest educational qualification that is achieved in the end is the result of selectivity at all preceding transitions, with possibly specific influences of social origin at different transitions¹.

Theoretically and empirically, this idea – which could be called the perspective on the *institutionalized sequence* of consecutive educational transitions – has been very fruitful. Theoretically, it points to educational decisions as ‘nodal points’ of the reproduction of social inequality (cf. Breen and Goldthorpe 1997; Erikson and Jonsson 1996b). For empirical analyses of educational inequality, sequential logit models have become common practice during the 1990s (Shavit and Blossfeld 1993; Müller and Haun 1994)².

Empirically, sequential transitions in the educational career can be operationalized in different ways. Some studies have analyzed actual transitions using longitudinal life course data (e.g., Henz and Maas 1995; Lucas 2001). These studies have mostly been restricted to selected (‘typical’) transitions, for example entering a specific track of secondary school directly after elementary school. Hence, they have abstracted from the fact that in reality, it is possible to enter it later on as well. In most studies, however, there was no empirical information about the actual transitions available. Because of the lack of longitudinal data, available cross-sectional information was transformed into ‘quasi-longitudinal’ data, i.e. for each individual the highest schooling certificate that had been achieved was used to reconstruct a *synthetic*

¹ Cameron and Heckman (1998) discuss whether the decreasing effects of social origin are a statistical artifact of this method (see also Lucas 2001 for a critique of their data preparation).

² Particularly with regard to differentiated educational systems, however, the idea of a simple chain of decisions about remaining in the educational systems has been criticized as inadequate. Hence, a methodological extension has been to introduce (multinomial) logit models where more than two alternatives of decision can be analyzed simultaneously (Breen and Jonsson 2000; Schimpf-Neimanns 2000).

sequence of transitions leading to that highest educational qualification (e.g., Shavit and Blossfeld 1993).

(2) Inter-individual variation at educational transitions

The *institutionalized sequence* of educational transitions is but one important aspect of a life course perspective on educational attainment. We now consider another important aspect: the *inter-individual variation* of each of these transitions. This aspect is particularly relevant for research if complete empirical life history data are available. In that case, empirical analyses may show that the transitions analyzed with the model of an institutionalized sequence are in fact not strictly standardized by age, but have a considerable variation in terms of age.

Conceptually even more important is another aspect. One single transition of this model can consist of several transitions itself, and it can be attained along different pathways; in this respect, one may speak of ‚complex events‘ (Trappe and Rohwer 1997), which consist of a number of events themselves. In particular, relatively differentiated educational systems like the German one offer a number of options for such complex transitions. Jacob and Hillmert (2003) discuss that the same substantive transition – in this case, entering tertiary education – can occur both at different ages and in various sequences of individual educational careers.

One consequence is that the set of the individuals who are ‚at risk‘ for the particular educational transition can normally not be reasonably defined as constant between institutional stages. The number of those at risk may change because of entries, dropouts and re-entries. Research on the influence of social origin will lead to different results, depending on whether one restricts the analyses to the ‚direct‘ entries or whether also other pathways are considered, which themselves may differ in the influence of social origin.

Hence, a life course perspective is relevant in two major respects.

- First, in an individual educational career, different transitions of an *institutionalized sequence* are made step-by-step. For example, in most educational systems a formal entitlement has to be attained first before enrolling at university. ‚Typical‘ points in time (or typical ages) can either be defined by institutional regulations or estimated by empirical frequencies.
- Different from the institutionalized sequence of transitions is the *inter-individual variation* of single transitions that can be undertaken at different ages and via different alternative pathways in the educational system.

These dimensions have to be distinguished when analyzing the temporal *development* of educational inequality within a cohort, all the more when considering that both dimensions may overlap. A chronological ordering by *age* allows for a joint illustration (see Figure 1a and Figure 1b). Unlike suggested by the ideal-type institutionalized sequence of educational transitions, both ‚late‘ transitions at the first educational stage and ‚early‘ transitions at the next one may occur at the same age.

--- Figure 1 a and Figure 1b here ---

Distinguishing the two dimensions – sequential transitions and individual variation at entry – several consequences for theoretical and empirical aspects follow. We use this as a starting point to give a more systematic discussion of how to conceive of and how to analyze the *development* of social inequality along the life course.

2.2 Life-course related development in transitions and stocks

Before we come to questions of explanation, another important aspect needs clarification: the difference between the ‘development’ of social selectivity at different transitions and (as their consequence) of inequality in the participation in education.

While inequality of educational attainment normally refers to the whole population, the analyses of transitions refer only to the population at risk for this transition. In the latter case, some individuals have already left the population at risk because they decided to leave the educational system (or the particular track) before. Therefore the population at risk – those that have to decide about the next step – gets successively smaller and smaller along the educational career. In the sense of Mare (1980), *analyses of causal relationships* will concentrate on social selectivity at separate transitions.

In a policy-oriented perspective, however, studies on social inequality are also interested in the *consequences* of educational decisions for the *whole population*, i.e. for the overall participation in education. These consequences can be found in the actual participation in education or the distribution of educational credentials. Both can also be analyzed as time-dependent. The educational distribution at a particular age is the result of all educational transitions made before. Because of both the ‘typical’ temporal order of institutionalized transitions and the temporal variation of single transitions, the educational distribution is subject to continuous change.

Looking at the relationship of transitions and stocks three aspects have to be considered:

- Changes in stocks result from inflows and outflows.
- The degree to which social selectivity at particular transitions influences the shape of the educational distribution depends on the quantitative relevance of the transition in question. If it happens only rarely, the effect on the whole distribution will be rather small.
- Even more important, changes in the social distribution of participation in education depend on the social composition of different transitions, relative to the distribution at the beginning. Depending on the social composition of entrants (or dropouts), initial inequality in participation can be compensated, reproduced, or the social gap may even become wider.

Transforming transition rates into time-dependent changes of the educational distribution is not trivial. Information on transition rates, quantitative relevance and social composition of entrants and dropouts is necessary in order to get a comprehensive picture of the development

of inequality over time. Even the direction in which social inequality develops over the life course cannot be concluded just from (unweighted) transition probabilities³.

We conclude that in research there has to be awareness about the difference between effects for transitions and effects for stocks or populations. Normally, quite a lot of information is necessary to get to the proper conversion of effects of social selectivity. As a pragmatic conclusion, it seems therefore reasonable to look regularly at both, changes of transition patterns and distributional changes in the population. Both developments can be easily handled by using age as a chronological scale.

2.3 Consequences for theoretical explanations

In this paper we focus on an illustration of the different dimensions of educational inequality in a life course perspective, i.e. the correct measurement of the ‘explananda’ of educational research. Therefore we do not go into details of sociological explanations and theories of how educational inequality is generated (see, for example, Erikson and Jonsson 1996b for details). In the following, we discuss some consequences of our distinction between institutionalized sequences and individual variation for conventional theories on the development of social inequality in educational careers.

First of all, it is remarkable that the theoretical explanations of educational inequality in the literature often do not lead to competing hypotheses, but that they represent different types of explanation. There are, on the one hand, rather statistical ‘explanations’ referring to the composition of the population (1) and, on the other hand, explanations of differences in the behavior of different social groups and/or within particular institutions (2).

(1) Statistical and compositional ‘explanations’

The first group of explanations refers to a change in the social composition of the population at risk at different transitions. These are mainly used for effects of social origin under the assumption of sequential educational decisions. In the model of Mare (1980), at each transition some of the students decide not to continue education. It is assumed that the selection barriers for children from lower social classes are highest at early educational transitions. Thus, only the brightest working class children progress to higher educational levels. These cumulative selection processes of social origin and ability lead to an increasing homogeneity of the population at risk. Therefore, the influence of social origin decreases at later transitions.

Transferring an argument by Raftery and Hout (1990) concerning the development of social inequality over historical time to developments in individual lifetime may lead to a similar conclusion. Because of the so-called „maximally maintained inequality“, the influence of the family of origin decreases. The participation of advantaged groups is already high (one may speak of saturation), so that children from disadvantaged groups will more often make use of later transitions and catch up with their socially advantaged peers (see, however Lucas 2001 for the opposite conclusion). In any case, this is again rather an explanation of *how* selectivity develops and not an explanation *why* the individuals of different social groups differ in their behavior. Under the implicit assumption that everybody prefers higher education, in a model

³ For example, identical relative transition rates (odds ratios) at early and late transitions may lead to constant, increasing or decreasing inequality in stocks – depending on the initial distribution and the magnitude of the transitions rates (cf. Jacob and Hillmert 2003).

of competition the socially disadvantaged only get the chance of participation after the more privileged have achieved already a great share.

Following this argument, one would expect the amount of inequality in the (stock) educational distribution to be relatively constant with age. As we have shown above, however, it is not possible without further quantitative information to infer the development of inequality in the whole population from the simple (qualitative) trend of origin effects at different stages – and the other way round.

In general, theoretical considerations that refer to cumulative selection processes are strongly related to the formal structure of the educational system, and they assume a sequential decision structure of continuation vs. dropout, which allows an easy definition of remaining ('risk') populations after each transition. This assumption may be in opposition to the real complexity of educational careers, with changing populations at risk at each transition because of inflows and outflows between two institutionalized transitions.

(2) Explanations of differences in behavior

In contrast to considerations of selection processes that refer to aggregates and their compositions, there are several theories on social differences in individual behavior and individual educational decisions. These theories often use the argument of unequally distributed resources, and sometimes they also consider the timing of different transitions.

In principle, there are two theoretical positions. The first one states that there is considerable change in the conditions of individual decision-making, resulting from cognitive development, changes in social expectations, and institutional policies. The alternative position assumes a relatively high degree of stability on the individual level (long-term importance of families' cultural and economic capital).

A substantially decreasing influence of the family context in an individual's lifetime can be expected following the so-called life course hypothesis (e.g., Müller and Karle 1993). At the beginning of an educational career, the starting conditions, especially the economic conditions and the preferences of the parents, are very important. At later stages, students will be able to decide on their own and will rely less on their parents. In this scenario, it is assumed that at later transitions factors of individual living conditions, experience, actual material conditions, own aspirations and preferences gain in importance. Another argument in favor of decreasing selectivity has to do with cumulative information (Erikson and Johnsson 1996b). Good grades give young people a positive feedback and raise their expectations of success. This is especially important for children from lower-level social background who are initially less certain. As this sort of information is not available at the beginning of the educational career and its amount accumulates over time, the (bright) children of low origin tend to become more confident along their educational career, so that their relative disadvantage diminishes.

On the other hand, theories of the social reproduction of status often assume that there is no (or a negligible) decrease of the influence of social origin over an individual's lifetime, because both parents and children try to maintain the family's status (Erikson and Goldthorpe 1993; Breen and Goldthorpe 1997). This aspiration of parents and children lasts along the whole educational and working career, and especially in those cases where the parents' status has not already been achieved there is particular pursuit to achieve it later on. Hence, especially in delayed educational activities an influence of social origin can (once again) be observed. The considerations of Hillmert and Jacob (2003) also suggest constant or even

stronger effects of social origin at delayed educational transitions (in this case: delayed entries to university). Even when assuming that the school leavers with the highest school degree may decide quite autonomously, i.e. without a direct influence of their parents, there are still indirect influences, not least because of unequally distributed resources. As a consequence, delayed educational decisions and transition probabilities still differ with respect to social origin.

In contrast to the abovementioned statistical ‘explanations’, these substantial theories concentrate on the stability or the changes in family relations and resources. Therefore, they are less bound to the institutionalized sequence of the educational system. They focus more strongly on the (role, developmental, or resource-related) situation at different steps in the educational career and at different ages, without being able to distinguish clearly between institutional differences and individual development.

Looking at the difference between the institutional sequence of transitions (early vs. late steps) and the inter-individual variation of transitions (early vs. delayed transition), an important result is that *both dimensions* are associated with age. A first step towards explanation may be made when being able to distinguish institutional effects on social selectivity from other age-related influences.

(3) Effects of age and institutions

Looking at completely ordered, comprehensive sequences without inter-individual variation, it remains open whether age-related changes in inequality are ‘institutional effects’ or whether they are a consequence of individual development. The temporal overlap of different transitions, however, may provide a possibility to separate institutional and ‘individual’, age-related effects. Using age as a chronological scale, social selectivity can be measured and compared for an age group at two (institutionally) different transitions. Assuming that there is no interaction between age-related and institutional effects, these two can be distinguished.

In the following example (Figure 2), the interpretation in the first case (transition 2 (A), solid line) would be as follows: There is a general age-related trend – i.e. for both transitions observable – that with increasing age social selectivity is decreasing. However, transition 2, which occurs on average later than transition 1, is socially more selective than the earlier transition.

--- Figure 2 here ---

Trends and effects in the second case (transition 2 (B), dotted line in Figure 2) are not as easy to interpret. The trends of inequality with regard to age differ between the two transitions: with regard to transition 1, there is a decreasing trend of social inequality with age, whereas at transition 2, inequality increases with age.

In our empirical analyses we will apply the conceptual distinctions of this section. We will look at educational transitions in an institutionalized sequence and their inter-individual variation, their overlap and ways to integrate the analyses of several transitions. Again, the differences between looking at educational transitions versus educational participation will become clear. Before we come to these analyses, let us introduce our empirical example: the German case.

3. An empirical example: educational careers in Germany

Sequential transitions are important in all school systems, and in most cases there will be at least some age variation at transitions depending on more or less rigid institutional regulations. Some pupils may be older than their peers from elementary school on, others may repeat or skip grades. Another source of variation in age can be due to different or alternative pathways that converge at a later stage. We choose the German educational system as an example because it allows for all of these sources of variation (cf. Cortina, Baumert, Leschinsky, Mayer and Trommer 2003). Sorting students into different school tracks in the German secondary school system is a mechanism of social stratification that can be regarded to be even more salient than tracking within secondary schools (see Gamoran and Mare 1989). Moreover, this clear structure is also likely to minimize errors associated with self-assignment in empirical (tracking) research (cf. Rosenbaum 1980). As there are various dimensions in an educational system where inequality may be observed, we have to choose one particular track to illustrate our concepts.

3.1 Structure of the German ‘academic track’

The ‘academic track’ in German secondary and higher education is the way from entering higher secondary school (‘Gymnasium’) to attaining a university degree. Although the German educational system is highly differentiated, the academic track is, as an ideal type, relatively easy to identify, as the Gymnasium has got an explicit academic orientation and its leaving certificate, the *Abitur*, is the formal requirement for enrolling in university.

Hence, we select an institutionalized sequence that consists (ideal-typically) of two consecutive transitions: the transition after elementary school to higher secondary school, leading to the higher secondary school leaving certificate (*Abitur*), and the transition to university after having finished this higher secondary school successfully. Regarding individual variation, we analyze the transitions in the secondary school system and the entry into university separately.

(1) *Higher secondary school (Gymnasium)/Abitur*. There are several pathways into the Gymnasium or to achieve the *Abitur*: direct entry after elementary school, entering this track after having attended another school track or re-entering the school system after an interruption. A chronological description along an axis of age can capture all these possibilities.

(2) *Studying at university/attaining a university degree*. On that ‘second step’ of the institutionalized sequence, we look at effects resulting from different pathways of entry into university: for example, enrolment immediately after having finished school, re-entry after an interruption, and delayed entry after completing vocational training.

--- Figure 3 here ---

Figure A1 in the appendix illustrates the number of cases entering or dropping out from Gymnasium or university respectively between ages 10 and 26.

For both transitions the changing social selectivity over time will be analyzed in two aspects: transition probabilities of those at risk and social composition of the stock considering the whole cohort population. The fact that both transitions overlap in a particular age interval will give us the opportunity to make a direct comparison between the social selectivity associated with the two types of transition. Finally, we will discuss some possibilities to combine the stage-specific results.

3.2 Data, measures and analytic strategy

The analysis of educational careers over individuals' lifetime, beginning with the first day in school until finally leaving the educational system, requires information on all transitions in between, on changes of school tracks and pursued or achieved educational level. A recently collected dataset that contains all that information are the retrospective data of the 1964 and 1971 birth cohorts in West Germany⁴. The data are part of the German Life History Study located at the Max Planck Institute for Human Development, and they were collected in cooperation with the Institute of Employment Research.⁵ The current project on the two youngest cohorts has focused on education, transitions from school to work and early working careers of West German women and men born 1964 and 1971 (see Hillmert and Mayer 2004).

The analyses in this paper use data from 2636 respondents that were born in (West-)Germany or immigrated before the age of 7. In the general school system we focus on the transition to the Gymnasium as the main form of higher secondary education. Other school tracks that may also lead to the Abitur (e.g. private schools, special schools, comprehensive schools) are neglected during this stage of research. For those entitled to enter university, i.e. those persons who have actually achieved the Abitur, we do not select how and where this qualification was attained. Regarding the transition to higher education, we only look at universities (not polytechnics) to be able to define those at risk for this transition more precisely according to their schooling certificate.

As for the independent variables, we use two different measures of socio-economic origin. First, we look at the parents' educational level as a measure of 'cultural capital'. This level is defined by the highest education of mother or father. We distinguish between two groups: children of parents who have themselves got an Abitur ('academic families') and all others. With this simple dichotomous distinction between the 'higher educated parents' and the 'lower educated parents', the whole sample remains for our analyses.

Second, economic conditions of the family are represented by the father's occupation. It is measured by using a set of categories approximating EGP classes (Erikson and Goldthorpe 1993).⁶ Again, we distinguish two groups representing 'higher social class' and 'lower social class', i.e. children with fathers in the service class (EGP I/II, i.e. professionals, administrators, managers, and higher grade technicians) and other children. As a measure of social selectivity, we use the concept of odds ratios, which has become a standard measure in the research on educational inequalities (e.g., Shavit and Blossfeld 1993, Müller and Haun 1994).

⁴ For information on data collection and sampling, see the data documentation (Hillmert et al. 2004).

⁵ For most analyses, we did not split the analyses between the two cohorts in order to have a sufficient number of cases; however, we checked our results for possible cohort differences. The observation period covers educational careers up to the age of 26.

⁶ We also include stepparents. The measurement of parents' education and father's occupation refers to point of time when the child was 15 years old. It may be possible that parents switch group membership with regard to highest educational attainment or the father's occupation during the child's educational career, but for simplification we neglect these (minor) changes.

These definitions may influence the magnitude and the development of the educational inequality we measure. Therefore, even if we use various measures of social inequality, we cannot claim to show universal trends of inequality over the life course in this paper, but we will highlight the *life-course dimension* of selected educational inequalities.

4. Empirical results

4.1 First transition (transition to higher secondary school/‘Gymnasium’)

In order to account for inter-individual variation and ‘complex’ transitions, a chronological analysis along an age axis is a good means to observe the development of social inequality along the life course. First, we look at the relative rates of transition to higher secondary school (Gymnasium), i.e., we compare the relative *inflows*, measured by odds ratios. In this case, the ‘transition rate’ is calculated as the quotient of all persons of a particular group who move during an interval of two years into Gymnasium and all those who do not move, both selected on the basis that they were ‘at risk’, i.e. not (yet) in Gymnasium at the beginning of the interval. Dividing these odds of children from higher educated families (resp. from service class origin) by those of children from low educated families (resp. all other classes) leads to the *relative transition rates* measured by the odds ratio (Figure 4, light lines).

--- Figure 4 here ---

In general, the pattern of inequality for both dimensions of social origin – parental education and social class – is rather similar: We observe distinct variation in relative transition rates while the level of inequality is slightly higher when calculated on the basis of parental education.

Up to age 10, the relative probability of a child with higher educated parents to enter Gymnasium after elementary school is almost five times the probability of a child with lower educated parents. The odds ratio for the family’s social class is a little bit smaller. At that age we observe typically direct entrants after elementary school⁷. Until age 14, in both cases – education and class of parents – inequality remains almost constant at a level of around five or four respectively. At this age, two phenomena overlap: We still observe entrants into the Gymnasium, and at the same time a considerable number of dropouts change the population at risk⁸.

In the period between age 15 and the early twenties, the odds ratios decrease. In this phase of educational careers we often observe ‘late’ entrants into the Gymnasium that have already achieved a lower schooling certificate. Again, dropouts from the Gymnasium change the composition of the population at risk. With regard to parental education until the age of 22, the relative transition rate remains constant and rises again for older entrants. For social class background there is another steep decline at the age of 21 to 22, followed by a sharp increase

⁷ Because of institutional differences between the German ‘Bundesländer’ (states) the age at the end of elementary school varies between age 9 and 12. In this early time period we also observe the first dropouts of the Gymnasium.

⁸ During this age period, the number of dropouts is even higher than the number of new entrants (cf. Figure A1 in the appendix)

again. At this age we observe only a few entrants into the Gymnasium – these are typically entrants into Gymnasium with a vocational orientation or those participating in institutions of higher secondary education for adults – but obviously this is, in social terms, a highly selective group.

Apart from relative transition rates, Figure 4 also illustrates changes in the educational distribution as the *stock*, which can be regarded to be the result of all relevant educational transitions up to this particular age, participation rates and their social selectivity. For every age, the ratio is calculated between those who attend the Gymnasium or have already attained Abitur and those who do not attend Gymnasium and have not attained Abitur. Again, these odds are calculated for both socioeconomic background variables, and in either case, these odds are calculated separately for both categories of children before dividing one by the other. This quotient is a measure of *relative educational participation* of the two social origin groups (Figure 4, dark lines). The relative chance to attend a higher-level secondary school (or to hold its leaving certificate) develops in favor of children from more privileged families over the first part of the observation window. At age 10, the relative chances of children from higher educational background to attend Gymnasium are five times the chances of the other children. This ratio increases up to maximum values of more than six at age 13 to age 16. After that, there is a rather moderate decline and stabilization again at a level of around six.⁹ For children from higher social class background we observe the same pattern, but on a slightly lower level. The relative chances of children from service class families to attend Gymnasium remain relatively stable at about five times the chances of the other children.

4.2 Second transition (transition to university)

We now turn to the second transition, entry into university, restricting the analysis at first to the smaller ‚risk set’ of those who are formally *entitled to study* (i.e. the school leavers with Abitur). In an individual educational career, however, entry to university may take place on various alternative pathways, like following vocational training, temporary employment or after acquiring the necessary school qualifications later in life.

Again, we analyze this social selectivity at university entry along a chronological age axis. As these are empirical longitudinal analyses that do not condition on the finally attained degree, there is no problem in using the data of both cohorts here. The light lines in Figure 5 indicate the age-related relative chances of transition to university for children from higher educated families (or service class background respectively) compared to children from lower educated families (or all other classes). Again the pattern of variation over time is similar for both dimensions of social origin. In general, inequality is higher when looking at parents’ education, whereas the range of variation is more pronounced with regard to social class. At age 20, i.e. normally immediately after having left school, the relative chances of children (with Abitur) from higher educated families to enroll in university are about twice the chances of other children with Abitur. The relative chances with regard to social class are a little bit lower: service-class children enroll less than twice as often as other children.

For educational background, the odds ratio of relative transitions remains constant until the age of 23. For class background, the relative chances drop at age 22 even to a level of one, i.e. the relative chances are the same for service class and others. In this period, we observe different options of entry into university: on the one hand, those entitled to study that have delayed their enrolment because of military or alternate service or because of a vocational

⁹ In this case, we can clearly see that highly variable relative transitions rates can go along with constant inequality rates in stock.

training; on the other hand, there are some persons that achieved the Abitur later in their educational career (see section 4.1).

For the later transitions at age 24 and 25, social selectivity at university entry is significantly higher. This is due to the frequent use of late entry into university of children from the more privileged families, but also to changes in the population at risk because of university dropouts.

--- Figure 5 here---

Looking at the stock of university students or graduates (Figure 5, dark lines), one can see that it is also not constant across age. These fluctuations, however, are smaller than in the case of entry into Gymnasium. Until age 22, the relative participation of school leavers from ‘academic families’ in university increases more than that of other school leavers. After that, there is some convergence, and the relative distance between the two educational groups decreases. At age 25, the relative chances of school leavers from a higher educated background are about twice the chances of other school leavers.

For social class, we observe a continuous decline in social inequality in stock. At age 20, the relative participation of children from service class background is more than twice the participation of the others. At the end of our observation period, at age 25, the odds ratio is well below two.

4.3 Analysis of overlapping transitions

In Figure 1b it was illustrated that transitions to different educational stages may overlap for a set of people of the same age. We see this indeed in our empirical data (Figure A1 in the appendix). Between age 18 and 25, there is a common age span, i.e., there are both persons who enter higher secondary school and persons who enroll in university. In principle, this allows to make comparisons similar to those schematically illustrated in Figure 2.

Looking at the empirical trends in Figure 6, we see a mixed picture of the development of relative rates of transition to higher secondary school. Until age 21, the relative chances of children of more privileged backgrounds remain rather constant; they are around two or three times the chances of other children. From age 22 on, there is a marked increase in social selectivity for both variables of socioeconomic background. With regard to the transition to university, there is a moderate increase in favor of children from ‘academic families’ as well as for service class children and a slight decrease of relative chances after age 24.

--- Figure 6 here ---

Hence, we do not find a converging or diverging empirical trend for both transitions that is as clear as in the schematic illustration. During the actual overlapping period between the ages 19 and 23, the relative rates of transition to Gymnasium first decrease and then increase again, whereas inequality at transition to university increases in this period. Especially in terms of parents’ education, the overall development seems to be an increase in selectivity. In any case, and in contrast to common assumptions, there is no evidence for a general trend towards a *decrease* of social selectivity at educational transitions with age.

4.4 Analyses that integrate educational stages

Like in the conventional research, we have so far discussed separately two transitions that represent different institutional stages in the educational system. In the final part of this chapter, we discuss possible analyses that allow to compare these separate results and to combine them into a 'total effect' of the development of social origin effects along the life course. Again, we distinguish between the measurement of transition rates and stocks. Still, there are two fundamentally different ways of integrating the two transitions, 'multiplicative' integration (1) and integration by a unifying definition (2).

(1) As the first possibility, the 'total effect' can be calculated by multiplying the conditional probability of the second transition (enrolling at university) by the probability of being a member of the population at risk (i.e. having achieved the Abitur as the entitlement to enroll). Both the population at risk and the transition probabilities may change over time, so the result will be an age-dependent measure for entering university (or participation in higher education), referring to the whole population. This can be regarded to be the longitudinal version analogous to the simple ('cross-sectional') multiplication of two figures in a standard model of consecutive transitions.

In Figure 7, we can see a 'total effect' of social selectivity for the transition to university (light lines) and for the stock of people who are enrolled in university or who have already attained a university degree (dark lines). Compared to Figure 5, this analysis differs in the relevant risk set. The question of participation in university is now investigated for *all* cohort members, including those who have not attained an Abitur until age 25 or who have not studied at university although they are entitled to. As attaining Abitur is a necessary condition for entering university, however, social selectivity in these preceding transitions also enters the results of this analysis.

--- Figure 7 here ---

As expected, the trends in Figure 7 resemble the trends in relative participation of the school leavers in Figure 5. Due to the cumulating effects of both transitions, the level of social inequality (measured as relative chances) is significantly higher for both parental education and class. In addition to this, the age-related fluctuation of the relative transition rates and the gradual growth in the distance between the two social groups are more pronounced. This can be explained when looking at the previous analyses. On the one hand, children from higher educated families (or service class respectively) are more likely to attain the entitlement to study at university than other children. On the other hand, they are more likely to study when having attained the Abitur. The rise in the relative differences between the two groups after age 23 can be attributed to both processes. In contrast to this, relative participation remains rather stable. Now we observe constant participation rates even for social class, in contrast to Figure 5, where we found decreasing inequality in university enrollment. The relative chances of children from 'academic families' to study at university (or to have attained a university degree) are more than six times the chances of other children. The relative chances for service class children are about five times the others' chances.

(2) The other possibility to combine the step-wise analyses is to consider both transitions as upward mobility in the educational system. This allows calculating a single rate across the

whole time axis (i.e. the transition to the Gymnasium *or* to university); at risk are those who may undertake one or the other transition. It may be unusual to abstract from substantive differences between secondary and tertiary education. This is, however, the only way to generate a consistent indicator for ‚chances of moving upwards’ over the full age span.

Hence, we combine the two institutionally defined transitions into a single ‘event’ which could be termed ‘educational advancement’ or ‘making an educational move upwards’. This event takes place if there is either a transition to higher secondary school or to university. Both transitions mark an entry into the (next) higher educational level, and both can happen to people of the same age. A combination allows for an age-related, integrated analysis of both events, but there is no equivalent stock measure.

We first compare Figure 8 with the separate analyses of the two institutionally defined transitions. When analyzing transitions to Gymnasium and university simultaneously, the age-related fluctuations and the differences within the (overlapping) interval between age 18 and age 25 are even more significant, as the effects of the two transitions cumulate.

--- Figure 8 here ---

Summing up these analyses that integrate educational stages, we can conclude that the impact of social origin on transitions does indeed vary considerably with age. In early teen age, the chances of children from highly educated families to enter the higher school track are significantly higher than those of other children. After a convergence of relative chances around age 15 and 16, the difference reaches its maximum at age 19 to 20. At this age, the (statistical) impact of social origin on children’s educational careers is highest. Here, ‘late’ entries into Gymnasium and ‘early’ transitions to university coincide. After age 18, the relative chances of the children of higher educated parents to make an upward educational move decline before rising again between age 23 and 24.

5 Conclusions

The empirical analyses presented in this paper relate to the German educational system and its ‚academic track’, which is particularly relevant for inequality research and is relatively simple to be interpreted in its structure. It is also important for comparative research since there are equivalent pathways in other educational systems. The results already lead to a number of major conceptual conclusions.

- Institutionalized sequences vs. inter-individual variation

First, analyses always need to be precise with regard to ‘developments along the life course’: in particular, is it development across educational stages or across age what is to be analyzed? Our results show that the extent of social inequality over the life course varies considerably because of socially selective entrants (and dropouts). This applies to different stages in the educational career and also to different age groups within the same educational stage. Furthermore, we have discussed two ways of integrating the results on selectivity at two educational transitions.

As other researchers before, we find that the social differences of educational behavior are particularly distinct in the general school system and less pronounced in tertiary education. Adding both transitions up (i.e. achieving the ‘Abitur’ and actually enrolling) results in increased social selectivity. The highest level of inequality that we observe is for the total effect of access to university. Less pronounced are the differences for entering the Gymnasium (as a single effect). The lowest level of inequality we find is for the transition to university when it is restricted to those entitled to enroll. Corresponding to results from conventional analyses, inequality decreases with the institutional order in educational careers. This, however, holds true only when comparing all transitions to Gymnasium and university as a whole. In fact, there are quite remarkable variations of inequality for both transitions, and often inequality increases with age. The notion of a decreasing trend is only true if one compares different stages and does not account for variations within one stage. General statements about a clear-cut upward or downward trend related to age often prove to be too simple.

- Educational transitions and stocks of participation

The chronological analyses of transition rates as well as the analyses on the relative participation have led to rather different results. This is another indicator for the fact that these two concepts have to be clearly distinguished when describing life-course related developments, and also when comparing educational systems. With regard to the transition to higher secondary school, we found an S-shaped development of relative transition rates, consisting of an increase in inequality in the early teen age, a following reduction until age 18 and another increase of inequality in favor of those with high educated parents with ‘delayed’ transitions to higher secondary education during the mid-twenties. The analyses of educational participation lead to different conclusions. Inequality in the stock (of those currently in higher secondary school or having already achieved the ‘Abitur’) is rather constant over time. Looking at the age-related development of inequality for the transition to university, we can see that the chances of those with a higher educated family background are higher later in life than at earlier stages. This is not only true for the yearly rates of transition to university but also for the participation in higher education.

- Overlap of transitions and the question of causal effects

In our example, a comparison of the two overlapping transitions allows to identify a (rather positive) association between age and social selectivity at educational transitions. This effect is not as significant as in the schematic figure, but at least there does not seem to be a decline in social selectivity with age in both transitions. In addition to this, there is evidence for an institutional effect: the two transitions clearly differ in the level of selectivity within the common age interval.

This paper has concentrated on the amount and the changes of social inequality within educational careers in order to specify the correct ‘explanandum’. Looking at the overlap of two transitions may be a first step towards an explanation by separating institutional (stage-related) and other developmental effects, when using age as a chronological scale. The analysis of causal processes may start from here. Still further developments are needed by conducting research on the parameters that are theoretically relevant for educational decisions (competencies, resources, preferences) directly instead of inferring them from age (see also Esser 1996). Moreover, the various situations of decision have to be specified precisely with respect to the relevant educational institutions (cf. Hillmert 2004).

- Measurement issues and the need for longitudinal ‘sensitivity analyses’

Our results have shown that the extent of social inequality may vary over the life course to a considerable degree. Similar developments of inequality, either between different stages in the educational careers or within educational stages, may also be the case for other social categories (e.g., gender). From a methodological point of view, in any of these cases possible ‘measurement errors’ have to be discussed that may arise if one analyzes educational inequality at particular points in time.

Of course, there is also the competing interest of having a relatively short observation window in order to get up-to-date results about young cohorts. This can only be done if these are surveyed at comparatively young ages. Hence, ‘sensitivity analyses’ like ours may help to decide what are reasonable minimum observation ages to generate simple indicators for comparative educational research (like ‘highest level of attainment’) with an acceptable degree of simplification or error.

Is, in our example, the detailed longitudinal analysis of educational inequality necessary? We have found only minor age-related developments with regard to stocks (participation rates) but considerable fluctuations with regard to transition rates. This means that one may get a relatively good approximation of the degree of social selectivity in educational attainment or participation drawing a simple (cross-sectional) sample, even when educational activities in this cohort are still going on. In contrast to this, observing the selectivity of transitions only at particular ages (and drawing causal conclusions about the openness of educational systems on the basis of this) may lead to rather distorted results. Additional, comparative research is necessary to see in how far these conclusions can be generalized.

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Figures

Figure 1a: Institutionally ordered educational transitions in an ideal type educational system

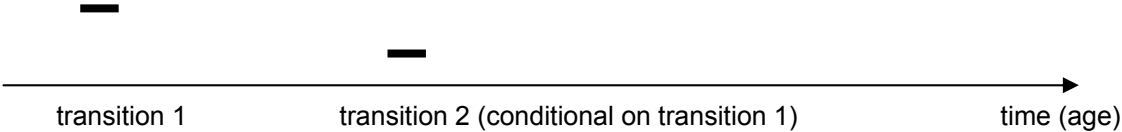


Figure 1b: Overlapping educational transitions in a ,real world‘ educational system

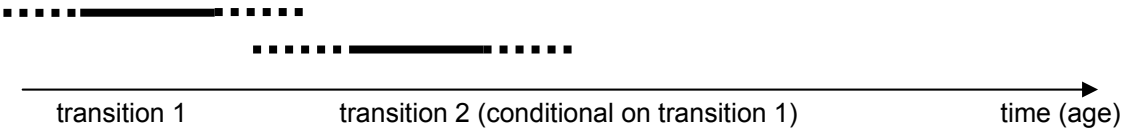


Figure 2: Comparing inequality at two temporal overlapping transitions (schematic illustration)

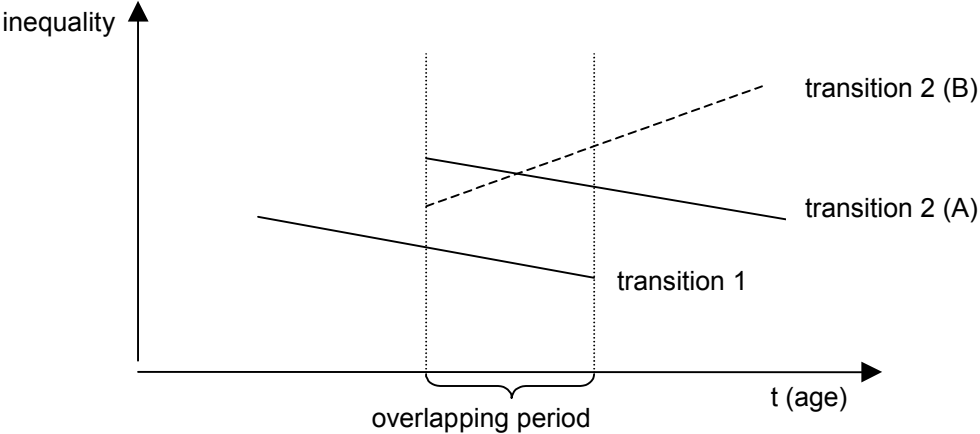
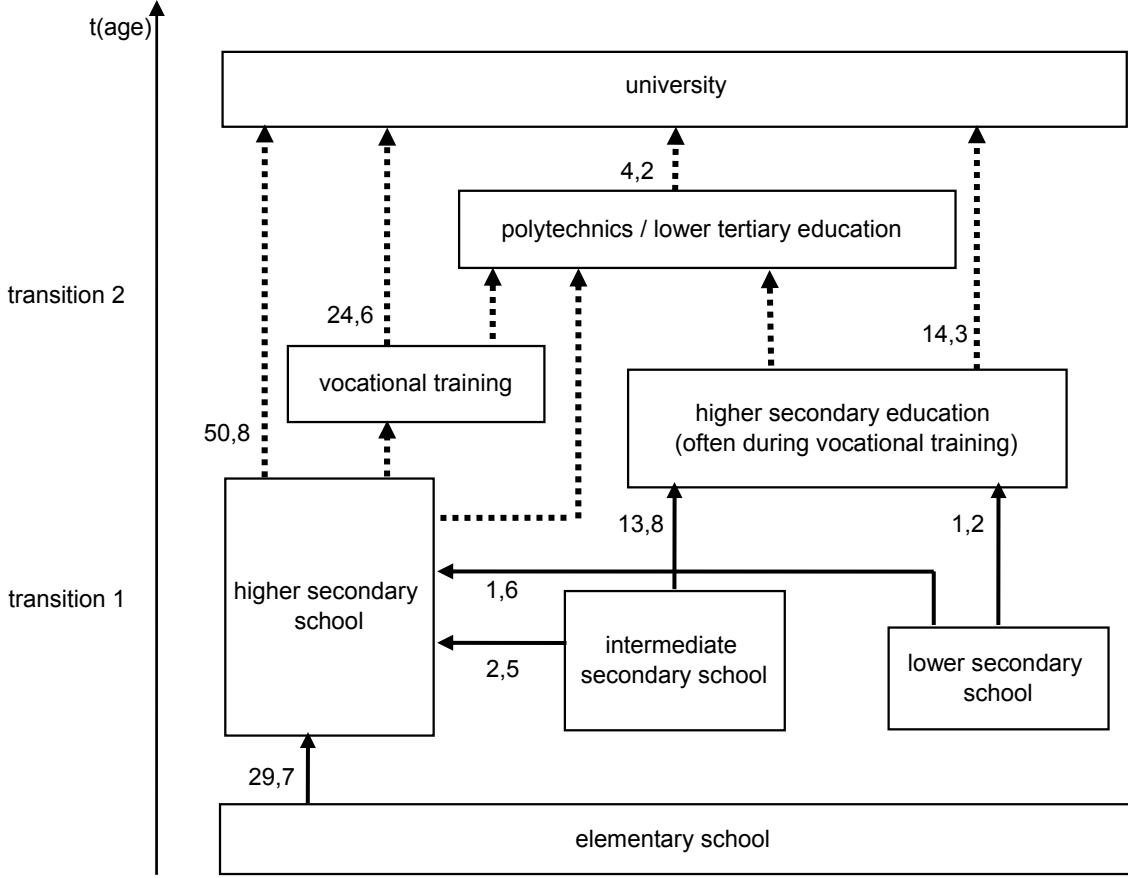
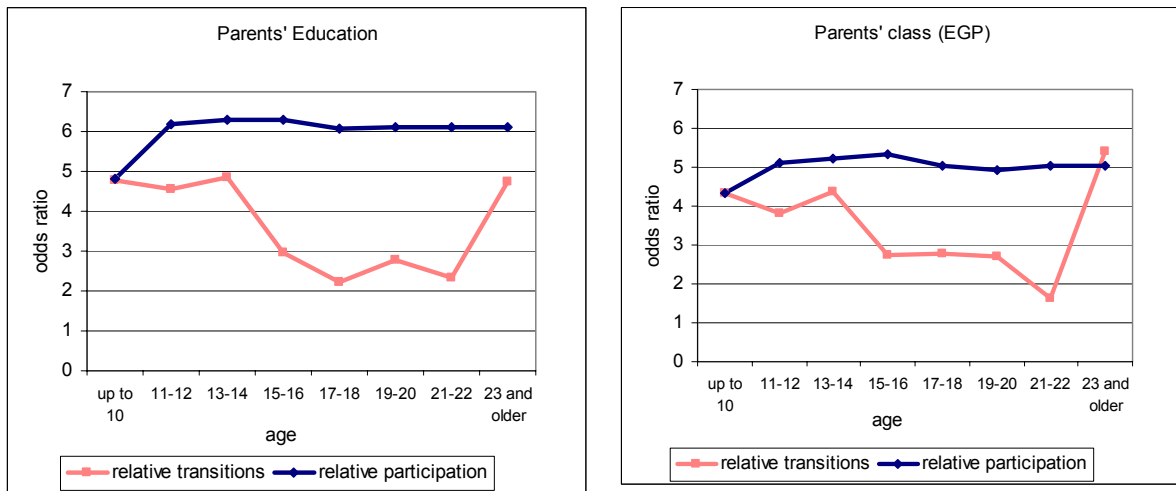


Figure 3: Different pathways to achieve Abitur (transition 1, solid lines) and enter university (transition 2, dotted lines) in the German educational system (Percentages of outflows of each population ,at risk')



Source: West German Life History Study, birth cohorts 1964/71 (own calculations).

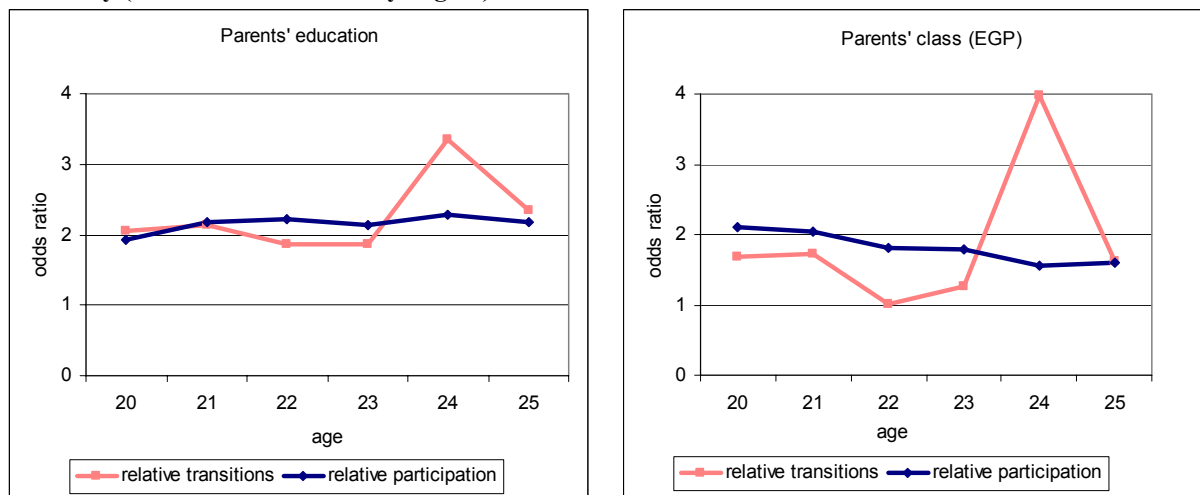
Figure 4: Relative transition rates (odds ratios) to higher secondary school (Gymnasium) and relative participation (odds ratios) in higher secondary school (incl. attained Abitur)



Compared are the relative chances of children from high-level (parents hold Abitur) versus low-level educational background (left chart) and of high-level (EGP I/II) versus low-level class background (right chart).

Source: West German Life History Study, birth cohorts 1964/71 (own calculations).

Figure 5: Relative transition rates (odds ratios) to university and relative participation (odds ratios) in university (incl. attained university degree)¹⁰

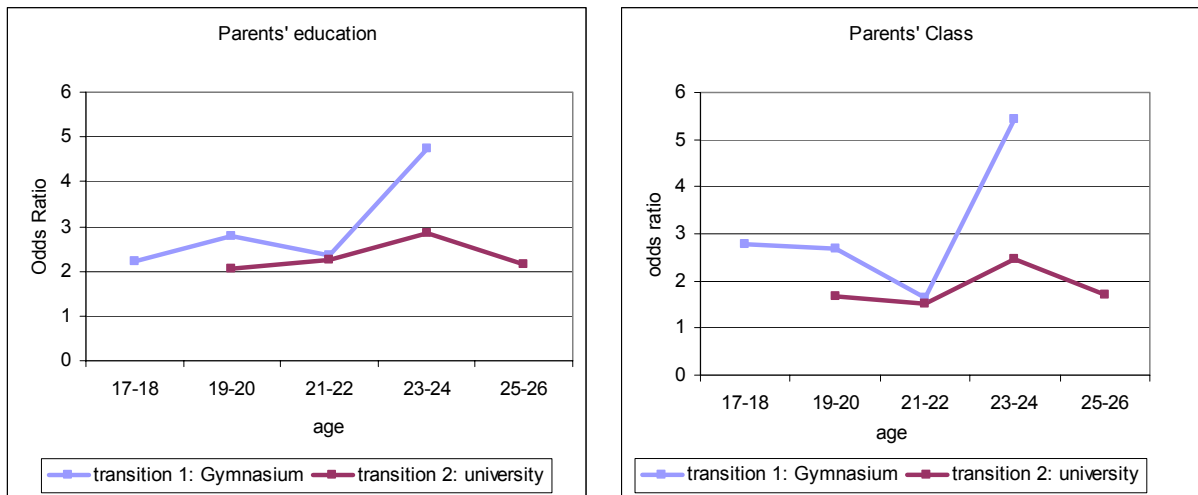


Compared are the relative chances of children from high-level (parents hold Abitur) versus low-level educational background (left chart) and of high-level (EGP I/II) versus low-level class background (right chart).

Source: West German Life History Study, birth cohorts 1964/71 (own calculations).

¹⁰ Relative participation is calculated on a monthly basis while relative transition rates are calculated on a yearly basis. Therefore, they differ slightly, although in the first interval, at age 20, they should be identical.

Figure 6: Comparing relative transition rates (odds ratios) to higher secondary school (Gymnasium) and to university in a common age interval¹¹

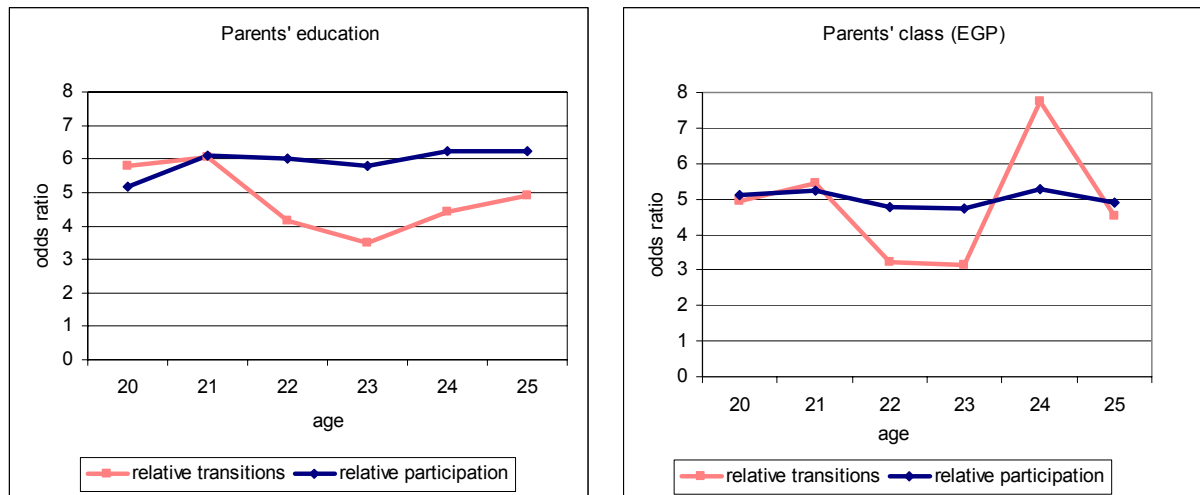


Compared are the relative chances of children from high-level (parents hold Abitur) versus low-level educational background (left chart) and of high-level (EGP I/II) versus low-level class background (right chart).

Source: West German Life History Study, birth cohorts 1964/71 (own calculations).

¹¹ Because of small numbers all transitions into the Gymnasium after age 23 have been summarised in the interval 23-.

Figure 7: Educational inequality along the life course. Relative transition rates (odds ratios) to university and relative participation (odds ratios) in university (incl. attained university degree)¹²

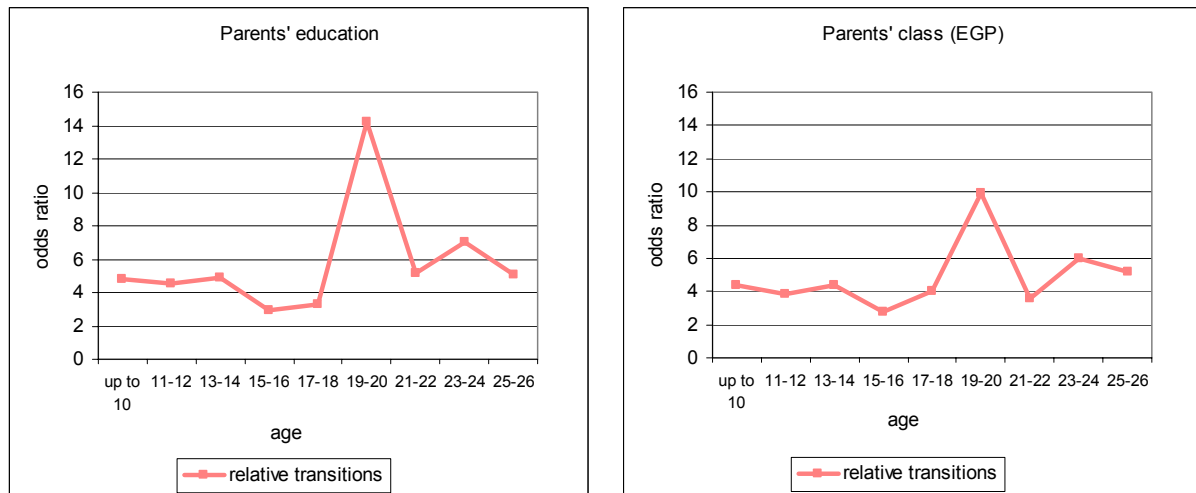


Compared are the relative chances of children from high-level (parents hold Abitur) versus low-level educational background (left chart) and of high-level (EGP I/II) versus low-level class background (right chart).

Source: West German Life History Study, birth cohorts 1964/71 (own calculations).

¹² Relative participation is calculated on a monthly basis while relative transition rates are calculated on a yearly basis. Therefore, they differ slightly, although in the first interval, at age 20, they should be identical.

Figure 8: Educational inequality along the life course. Relative transition rates (odds ratios) in the sense of 'moving upward' and relative participation (odds ratios) in university (incl. attained university degree)¹³



Compared are the relative chances of children from high-level (parents hold Abitur) versus low-level educational background (left chart) and of high-level (EGP I/II) versus low-level class background (right chart).

Source: West German Life History Study, birth cohorts 1964/71 (own calculations).

¹³ Until age 18 there are no transitions to university, so in this period the lines are identical with the lines in Figure 3.

Appendix

Figure A1: Number of entrants and dropouts ('Gymnasium' and university), by age

