

SOEPpapers

on Multidisciplinary Panel Data Research

Educational Choice and Risk Aversion: How Important Is Structural vs. Individual Risk Aversion?

Vanessa Hartlaub and Thorsten Schneider

SOEPpapers on Multidisciplinary Panel Data Research at DIW Berlin

This series presents research findings based either directly on data from the German Socio-Economic Panel Study (SOEP) or using SOEP data as part of an internationally comparable data set (e.g. CNEF, ECHP, LIS, LWS, CHER/PACO). SOEP is a truly multidisciplinary household panel study covering a wide range of social and behavioral sciences: economics, sociology, psychology, survey methodology, econometrics and applied statistics, educational science, political science, public health, behavioral genetics, demography, geography, and sport science.

The decision to publish a submission in SOEPpapers is made by a board of editors chosen by the DIW Berlin to represent the wide range of disciplines covered by SOEP. There is no external referee process and papers are either accepted or rejected without revision. Papers appear in this series as works in progress and may also appear elsewhere. They often represent preliminary studies and are circulated to encourage discussion. Citation of such a paper should account for its provisional character. A revised version may be requested from the author directly.

Any opinions expressed in this series are those of the author(s) and not those of DIW Berlin. Research disseminated by DIW Berlin may include views on public policy issues, but the institute itself takes no institutional policy positions.

The SOEPpapers are available at
<http://www.diw.de/soeppapers>

Editors:

Jürgen **Schupp** (Sociology, Vice Dean DIW Graduate Center)
Gert G. **Wagner** (Social Sciences)

Conchita **D'Ambrosio** (Public Economics)
Denis **Gerstorff** (Psychology, DIW Research Professor)
Elke **Holst** (Gender Studies)
Frauke **Kreuter** (Survey Methodology, DIW Research Professor)
Martin **Kroh** (Political Science and Survey Methodology)
Frieder R. **Lang** (Psychology, DIW Research Professor)
Henning **Lohmann** (Sociology, DIW Research Professor)
Jörg-Peter **Schräpler** (Survey Methodology, DIW Research Professor)
Thomas **Siedler** (Empirical Economics)
C. Katharina **Spieß** (Empirical Economics and Educational Science)

ISSN: 1864-6689 (online)

German Socio-Economic Panel Study (SOEP)
DIW Berlin
Mohrenstrasse 58
10117 Berlin, Germany

Contact: Uta Rahmann | soeppapers@diw.de

Educational Choice and Risk Aversion: How Important Is Structural vs. Individual Risk Aversion?¹

Vanessa Hartlaub and Thorsten Schneider

Vanessa Hartlaub
National Education Panel Study (NEPS)
Bamberg University
Wilhelmsplatz 3
96045 Bamberg
Germany

E-mail: vanessa.hartlaub@uni-bamberg.de

Corresponding author:

Thorsten Schneider
Chair of Sociology, specializing in comparative analysis of contemporary societies
Universität Leipzig
Beethovenstr. 15
04107 Leipzig
Germany

Tel: +49 (0)341-9735668

Fax: +49 (0)341-9735669

E-mail: thorsten.schneider@uni-leipzig.de

Abstract:

According to sociological theories on educational choice, risk aversion is the main driving force for class-specific educational decisions. Families from upper social classes have to opt for the academically most demanding, long-lasting courses to avoid an intergenerational status loss. Families from lower social classes by contrast, tend instead to opt for shorter tracks to reduce the risk of failing in a long-lasting and costly education and, as a consequence, entering the labor market without a degree. This argument is deeply rooted in the social structure. Yet, the importance of individual risk preferences for educational choice has been neglected in sociology of education.

We discuss these different forms of risk in the context of social inequalities in educational decision-making and demonstrate how they influence the intentions for further education of students attending the most demanding, academically orientated secondary school type in

¹ We thank Guido Heineck, Walter Müller, and the participants at the 2011 conference on “Social Inequality and Mobility in the Life-Course: Causes and Consequences of Social Stratification”, Mannheim Centre for European Social Research, Germany, for helpful comments and suggestions on earlier versions. The data used in this publication have been made available by the German Socio-Economic Panel Study (SOEP) at the German Institute for Economic Research (DIW Berlin).

Germany. According to our argument, children from upper social classes are structurally almost compelled to opt for the academically most demanding educational courses, virtually without having a choice in the matter. In contrast, working class children do have to make an active decision and, thus, individual risk aversion comes into play for these students.

For our empirical analyses, we rely on data from the youth questionnaire of the German Socio-Economic Panel Study (SOEP) collected in the years 2003 to 2010, and estimate multinomial logit models. Our empirical findings underline the importance of the structural risk aversion. Students with a higher social background are not only less sensitive to their school performance, but individual risk aversion is also completely irrelevant to their educational plans. The opposite applies to students with a lower social background: the more risk-averse they are, the more likely they are to opt for a double qualification rather than just a purely academic university degree course.

JEL-Classification: I24, D81, Z13

Keywords: educational inequality, educational decision-making, risk aversion, tertiary education, vocational training

1. Introduction

Risk aversion is the major force in models on educational choice provided by Boudon (1974) and Breen and Goldthorpe (1997). In economics, a discipline reluctant to concepts of social class, risk also comes into play, but as an individual preference (Kahnemann & Tversky, 1979; Borghans, Duckworth, Heckman & ter Weel, 2008; Dohmen, Falk, Huffman, Sunde, Schupp & Wagner, 2011). In the present paper, we discuss these different forms of risk in the context of social disparities in educational decisions, attempt to integrate both perspectives on risk and offer an empirical example. This focuses on the educational intentions of students who have obtained a general university entrance qualification in Germany.

The German educational system is characterized by a strong stratification, a high standardization, and occupational specificity (Allmendinger, 1989; Müller & Shavit, 1998; Müller & Pollak, 2010). The literature provides evidence that families from lower social backgrounds are diverted from university because they tend to opt for shorter school tracks after elementary school and after obtaining a qualification at lower secondary school level, they plan to begin a vocational training course (Müller & Pollak, 2010). But even if they follow the academic school track (*Gymnasium*) and obtain the general higher education entrance qualification (*Abitur*), social background is shown to have selective impact. School leavers with an *Abitur* show disparities in their intentions as well as in their subsequent educational participation: after graduating from *Gymnasium*, students from lower social classes are less likely to enroll in university (Allmendinger, 1989; Müller & Shavit, 1998; Müller & Pollak, 2010).

According to Büchel and Helberger (1995: 33), the *Abitur* has become a ‘general option’ for access to vocational and tertiary education following the educational expansion after World War II. Possible reasons for this could be an increase in social and/or performance-based heterogeneity of the student body at *Gymnasiums*, and also educational inflation: i.e., highly desired apprenticeship positions are increasingly allocated to persons with an *Abitur*. The choice for *Gymnasium* after the fourth grade of elementary school might no longer be preferred as a ‘ticket’ to university, but rather as a recognized certificate for further educational and occupational opportunities in a highly stratified education system.

Some persons with an *Abitur* opt for an apprenticeship, others for university study, and some intend to consecutively complete both. According to Büchel and Helberger (1995), the sequential double qualification is an insurance policy for poor performers and risk-averse

students: in the event of failing at university, these students can still rely on their first occupational qualification in order to find employment in the skilled labor market. In this article, we investigate why persons with an *Abitur* are either opting for a vocational training course, studies at a university or a university of applied sciences, or a sequential double-qualification, and the significance of aspects of risk. With regard to models of educational choice (Breen & Goldthorpe, 1997; Goldthorpe, 1996), we discuss differences in structural and individual risk aversion, and under what conditions of social background individual risk aversion might affect students' intentions for further education after finishing higher secondary school. We argue that structural risk aversion is the major force in the educational decision process, since the motive of status maintenance is pivotal in educational decision-making. Individual risk aversion comes into effect particularly for students from comparably lower social classes, since these students normally tend to maintain their status earlier than higher class students and thus need to make decisions, where individual risk aversion comes into play. Hypotheses derived from the theoretical discussion are empirically examined relying on data from the German Socio-Economic Panel Study (SOEP), which surveys education-related information in a separate youth questionnaire.

In the following sections, we briefly introduce the German education system and provide some information on educational participation of persons with an *Abitur* and on the attractiveness of the German vocational education and training (VET) system. Then, theories of educational choice and the importance of individual risk aversion are discussed and hypotheses are derived. After a brief description of the data, the operationalization, and the statistical methods used, a detailed presentation of the empirical findings follows. In the final section, we summarize the most important findings, point out some limitations, and conclude with some remarks on the need to take into consideration preferences, attitudes, and personality in inequality research.

2. The German Education System and Some Facts on Educational Participation

In most of the 16 German federal states, the first institutional separation of students to various types of secondary schools takes place after the fourth grade in elementary school. Besides special schools and in some federal states comprehensive schools, the three dominant types of school at secondary level in Germany are lower secondary school (*Hauptschule*, about 9

years of schooling), intermediate secondary school (*Realschule*, 10 years of schooling), and higher secondary school, similar to grammar schools (*Gymnasium*, between 12 to 13 years of schooling). The *Gymnasium* is the most demanding and longest lasting track of general education at secondary level. Those graduating from these schools obtain the higher education entrance qualification (*Abitur*). They can choose between three main types of further education: (1) university (*Universität*), (2) university of applied sciences (*Fachhochschule*), and (3) a position in the VET system (apprenticeship in the *Duales Ausbildungssystem* or full-time professional schools). In addition, we observe that larger proportions of students (4) first enter the VET system, complete a degree, and then begin a course in the higher education system, thus obtaining a sequential double qualification (for a condensed overview of the German education system, see Figure 1).

- Figure 1 about here -

Due to the high stratification and the attractiveness of the German VET system, Germany has a considerably low rate of people with tertiary degrees compared to most other industrialized countries (Powell & Solga, 2011; Müller & Pollak, 2010), although the proportion of eligible students has steadily increased in recent years. The proportion of eligible students is often defined as the number of school leavers that obtained the higher education entrance qualification in one year in relation to the average population size of 18 to 20-year-olds. In 2008, this proportion was 45%. Differentiated by the level of university entrance qualification, 32% of the artificial cohort hold a general university entrance qualification (*Hochschulreife*) and 13% an entrance qualification restricted to universities of applied sciences (*Fachhochschulreife*). In absolute terms, these are 310,400 and 131,700 people, respectively (Federal Statistical Office [FSO]/Statistisches Bundesamt [StaBu], 2010: 6f.).

The German micro census data indicates that the increasing share of higher education entrance qualifications over time does not lead to a comparable increase in academics. Figure 2 shows the proportion of women and men with full or restricted higher education entrance qualifications.² We interpret the age groups as birth cohorts, neglecting migration processes or social selective mortality. The number of persons holding a *higher education entrance*

² If we restrict the overview on men and women with full higher education entrance qualification and university degrees, the picture remains relatively unchanged. The main difference is the overall lower rates compared to those displayed in Figure 2.

qualification increases steadily over the birth cohorts. Women show a particularly strong increase. In younger birth cohorts, they obtain higher education entrance qualifications even more frequently than men do. In the most recent cohort, however, which is aged 20 to 25 in 2009, the figures indicate slightly lower rates. Some of them might still be in school or university, completing a degree in subsequent years.

- Figure 2 about here -

The development of the proportion of university graduates is remarkable. The rate for men is almost stable across several birth cohorts. In contrast, women born later are more and more highly qualified and catch up with men. We see that the gender gap is closed. However, the gap between those who hold an entrance qualification for higher education and those who hold a university degree increases.

It is puzzling why almost half of the younger birth cohorts with a higher education entrance qualification do not convert their ‘ticket’ into a university degree, and which educational pathway they follow instead. Conceivable causes could be university dropouts or direct labor market entries as well as those serving an apprenticeship. In this article, we focus on explaining and testing entry into vocational training or into some form of university.

2.1 The Attractiveness of the German Vocational Education and Training System for Students with a Higher Education Entrance Qualification

Of the 561,171 persons who entered a contract for a firm-based apprenticeship accompanied by part-time vocational school in 2009, 112,032 trainees held a higher university entrance qualification. This equals a share of 20% (see Table 1).

- Table 1 about here -

The temporary attractiveness of vocational training compared to higher education arises from shorter training periods, more occupational and professional orientation, and – in the case of an apprenticeship – some form of remuneration. An apprenticeship normally lasts three to

three and a half years, but may be shortened to two years depending on previous training and schooling, for instance, for trainees with an *Abitur*. Additionally, apprentices (in the *dual system*) receive money from their company. Industrial and bank clerk trainees, for example, receive an average of about EUR 814 and 813 per month, respectively in western Germany and about 798 and 747 EUR per month, respectively in eastern Germany (Bundesinstitut für Berufsbildung [BiBB], 2011).

Obtaining a vocational training degree, however, does not necessarily mean the end of an educational career. One in ten students at university has previously completed vocational training in Germany (Willich, Buck, Heine & Sommer, 2011: 74f.).

2.2 Costs and Benefits of Sequential Double Qualifications

The benefits of double qualification were debated between Büchel and Helberger on the one side and scientists from the Higher Education Information System (HIS) on the other side in the mid-1990s. While the latter drew on their own survey data, the former analyzed SOEP data. According to Büchel and Helberger (1995), those with a double qualification have lower transition rates into appropriate employment and no higher earnings than students who immediately go to university (without completing a vocational training beforehand). Thus, the returns to education are higher for those with the direct path from full-time schooling to higher education, as the sequence of vocational training followed by university study prolongs the number of years in the education system.

Lewin, Minks and Uhde (1996) zoom in on the positive consequences of a double qualification: a potential loss of time can be compensated by focused university study, and those with a double qualification have smoother education-to-work transitions. They find a position in the labor market more quickly and have more stable and therefore more satisfying first jobs.

In a follow-up study, Büchel (1997) shows that persons with a double qualification are initially more often in regular employment and in suitable positions. However, taking into account the further occupational career, those students who accessed university directly are at an advantage. Four and a half years after graduating from university, they have significantly better positions than those with a double qualification. Having additional vocational training often leads to a smooth labor market entry after completing university study, as these persons

might have work experience as well as company contacts (social capital) from the training period. However, in the long run, these persons have a less successful career.

3. The Interaction of Structural and Individual Risk in Educational Choice

According to sociological theories on educational choice, risk aversion is the main driving force for class-specific educational decisions (Boudon, 1974; Breen & Goldthorpe, 1997). Families from upper social classes have to opt for the academically most demanding, long-lasting courses to avoid an intergenerational loss of status. Families from lower social classes, by contrast, more often go for easier and/or shorter options in order to reduce the risk of failing in a long-lasting track and entering the labor market without any (vocational) degree. This argument is deeply rooted in the social structure. In addition, this choice pattern tends to be particularly strong in countries with a highly stratified education system and a ‘well-functioning’ vocational and educational training system.

Besides structural risk aversion, the effects of individual risk aversion on educational choice have been neglected in sociology of education to date, in contrast to economics and psychology. Individual risk preferences are not bound to social classes, but instead, they can be theorized as individual features of students.

3.1 Sociological Theories on Educational Choice: Status Maintenance as Structural Risk Aversion

Boudon’s (1974) model of educational choice is pivotal in explaining social inequalities in educational participation and outcomes. He distinguishes between primary and secondary effects of social origin. Primary effects describe the relationship between parents’ socio-economic status and the child’s skills, knowledge, and effort. As a consequence of socio-economic and cultural conditions in the family, children experience different levels of support and encouragement while developing their cognitive skills, which is reflected in their (school) performance. Secondary effects refer to the class-specific choice between alternative courses of education for people having comparable achievements, but belonging to different classes.

In the 1990s, Boudon’s (1974) model of educational choice was revived in slightly modified versions (Goldthorpe, 1996; Breen & Goldthorpe, 1997; Erikson & Jonsson, 1996; Esser,

1999: 266ff.). What the original and the latest models have in common is that the actors are hypothesized to assess the (direct and indirect) costs and benefits of different educational courses and also take into account the expectations to complete these courses successfully and to achieve the returns to education. In contrast to economic approaches, which focus on income returns (Becker, 1964; Schultz, 1961), the professional position and associated social status are behind the motivation for educational participation in sociological theories on educational choice. Avoidance of an intergenerational loss of status is of particular importance. Taking costs, benefits, and success probabilities into account, the actors choose the alternative that is expected to have the greatest net benefits (Erikson & Jonsson, 1996; Esser, 1999: 266ff.).

Success probabilities differ according to primary effects.³ In addition, upper classes assess their chances of successfully completing a demanding educational course as higher, even with poor school performances: these children can still rely on their previously experienced parental support. Their parents might also inform them that no exceptional intelligence is required to obtain a university degree (Erikson & Jonsson, 1996).

Moreover, in order to remain in the education system, the lower social classes have to bear increasing financial burdens of direct and indirect costs. The absolute costs might be comparable between classes, but the lower classes face less financial capabilities and, therefore, have higher relative and/or subjectively assessed costs. Thus, investments in education in particular have to pay off for these groups within a shorter time horizon (Hillmert & Jacob, 2003).

Furthermore, families try to avoid an intergenerational loss of status by ensuring that the child attains at least a social status comparable to that of the parents. Educational decisions are rather motivated by avoiding status loss than by the prospect of status advancement (Breen & Goldthorpe, 1997). The motive of status maintenance leads to relative risk aversion, which is structurally based in the social position of the family. The choice of an academic path may be risky because in the event of failure, one is facing entry into the unskilled labor market and low social status. While for the upper social classes, an academic educational course is almost

³ One can raise concerns whether high school students' (*Abiturienten*) performance varies by social background in a highly stratified education system. Children from lower social classes only enroll for the academically oriented school type (*Gymnasium*) if they are particularly high-performing (Stocké, 2007). Additionally, children from lower classes have the highest dropout rate of this school type (Schneider, 2008). According to Mare's (1980) selection hypothesis, children from lower classes only complete long-lasting, high demanding school tracks if they are particularly high-performing and motivated. Nevertheless, there is a slight negative correlation between social background and academic performance at the age of 15 at the academically oriented school type in Germany (Baumert & Schümer, 2001: 370).

the only alternative for status maintenance, families with lower and middle social status tend to more often opt for a shorter, less risky form of training (Breen & Yaish, 2006; Need & de Jong, 2001; Tieben, 2011; van de Werfhorst & Hofstede, 2007).

Müller and Pollak (2010) ask, “Why are there so few working-class children in Germany’s universities?” and put the diversion thesis at the center of their rationale. According to the diversion thesis, the early tracking of children, the high stratification and the low permeability of tracks, and the specific attractiveness of vocational education deflects persons from the lower social classes. Non-tertiary vocational training alternatives provide attractive opportunities to gain qualifications for graduates with a non-academic background: a vocational training course is characterized by a comparably shorter duration and it offers practical orientation and a high probability of success (Reimer & Pollak, 2010). Despite the fact that labor market vocational training degrees are a distinctly lower qualification than tertiary degrees, they offer relatively stable labor market returns without the financial burdens and risks of university studies (Schindler & Reimer, 2010). These highly attractive alternatives of vocational training divert from tertiary education in particular those graduates who have an average probability of successfully completing university and dispose of a small time horizon for compensating their invested costs (Hillmert & Jacob, 2003). The diversion thesis can be seen as a specification of what are known as the bridge hypotheses by considering the given institutional structure. It is not (necessarily) an alternative, rather a more specific form of the models of educational choice discussed above.

Becker and Hecken (2007, 2009) analyze the choice between university studies and vocational training (2007) and examine the diversion thesis (2009), relying on data collected from students in school tracks awarding higher education entrance qualifications in Saxony. They conclude that the subjective success probability and the training costs are mainly responsible for the fact that working-class school leavers more often decide against tertiary education. The motive of status maintenance also comes into effect here: the intergenerational status maintenance is considered to be instrumental in the educational decision, since for working-class students, university studies are not necessary for maintaining their status.

3.2 Insurance Policy and Individual Risk Aversion

Before studying at university, some high school graduates complete an apprenticeship immediately after their *Abitur*. According to the literature, these young people want to

achieve a balanced mix of theory and practice with the combination of vocational training and university studies (Lewin et al., 1996; Pilz, 2009). According to Büchel and Helberger (1995), especially young people who are poor performers and/or risk averse pursue this double qualification.

Instead of immediately beginning their university education after graduating from *Gymnasium*, children from lower and middle social classes instead opt for a vocational apprenticeship. This indicates that school performance and/or risk aversion affect the immediate educational choice after the *Abitur* (Büchel & Helberger, 1995). In terms of performance, the argument focuses on the previously described primary effects of origin: the performance of children from lower social classes is, on average, lower and therefore they more often decide to undertake some form of training with or without subsequent university studies.

After completing vocational training, poor performers and risk-averse graduates (persons with an *Abitur*) have a secure base and can embark upon university studies. If they drop out of university, they do not have to enter the labor market for unskilled workers. This educational behavior is interpreted as an insurance policy (Büchel & Helberger, 1995). The cumulative educational strategy may also increase subsequent success: individuals with a double qualification can profit if the apprenticeship and field of university study are related (for instance, an apprenticeship for bank clerks followed by a degree in business studies) and should have better labor market opportunities thanks to prior job experience (Büchel & Helberger, 1995; see also Hillmert & Jacob, 2003; Bellmann & Janik, 2010).

This individual risk aversion may be regarded as a personal attitude affecting the expected success probabilities in addition to (school) performance and parents' social status. Thus, it is distinct from the structural risk aversion in the models of educational choice.

According to Kahnemann and Tversky (1979), decisions taken under uncertainty are biased towards loss avoidance. Even if gains and losses are perceived as equally probable, people's behavior tends to be risk averse, i.e., to avoid losses instead of seeking gains. Especially in economics, the individual risk tolerance is an established construct to explain decisions in various areas such as financial investment, labor market behavior and performance, and even health behavior (Borghans et al., 2008; Dohmen et al., 2011). Empirical studies show that individual risk aversion and risk tolerance correlate with education and labor market participation. Using data from the National Register of Scientific and Technical Personnel,

Weiss (1972) investigates the influence of risk aversion on human capital investments and returns to education in a sample of university graduates. He detects a negative relationship: even with a moderate increase in risk aversion, the incentive to invest in education decreases significantly. Brown, Ortitz, and Taylor (2006) reveal in their study with data from the US Panel Study of Income Dynamics (PSID) significant positive correlations between the degree of risk tolerance and the level of formal education achieved. The authors also examine the relationship of adults' risk preferences and investments in human capital, as well as the relationship between parental risk preference and their children's results in standardized tests. The higher the parents' risk tolerance, the better the math and reading skills of their children. Heineck and Wölfel (2010) analyze data from the SOEP and do not find any consistent pattern for parental risk attitudes and child's enrollment in higher secondary school. The authors report, however, significant effects for mothers' risk aversion: children with risk-averse mothers tend to more often attend the least demanding and shortest track of secondary school (i.e., the *Hauptschule*). This relationship is particularly pronounced in mother-daughter constellations.

Uhlig, Solga and Schupp (2009) analyze the phenomenon of *underachievement* in Germany, comparing a student's result in a cognitive test and her/his school attendance with the cognitive potential of the student bodies in the different tracks of secondary school (*Hauptschule*, *Realschule*, and *Gymnasium*). They focus on the question to what extent personality traits come into effect and how this depends on social origin. In addition to the 'classical' *Big Five*, they take individual risk taking into account.⁴ Children with parents who have not graduated from university are more often hit by *underachievement* compared to those with highly qualified parents. Children with graduate parents have a higher risk of *underachievement* if their personality structure diverges from the middle-class habitus, especially in the dimensions of *conscientiousness* and *openness to experience*. The higher risk of *underachievement* for children from socially disadvantaged families, however, cannot be explained either by differentials in the distribution of academically advantageous or

⁴ In personality psychology, the *Big Five* are a recognized classification scheme of personality characteristics containing the dimensions of *extraversion*, *agreeableness*, *conscientiousness*, *neuroticism*, and *openness to experience* (John & Srivastava, 1999): *Extraversion* describes a person's way of interacting with his or her (social) environment and the pleasure of interaction. The *agreeableness* emphasizes altruism and helpfulness while interacting. While the dimension of *conscientiousness* subsumes facets such as accuracy, sense of duty, reliability, and self-discipline or responsibility, the dimension of *neuroticism* includes emotional stability, irritability, anxiety, and fearfulness of an individual. The dimension of *openness to experience* covers, inter alia, creativity and interest in the aesthetic and in new things and experiences.

disadvantageous personality characteristics (including risk aversion), nor by a generally stronger influence of personality traits for these children (Uhlig et al., 2009).

Furthermore, there are several results from employment research relying on SOEP data: accordingly, a positive relationship between risk tolerance and income, job satisfaction, and attitudes to fixed-term contracts or temporary employment agencies is reported (Pfeifer, 2009), and risk-averse people are more likely to have an employment relationship with little variance in the salary (Bonin, Dohmen, Falk, Huffman & Sunde, 2007). Analyzing the intergenerational transmission of risk attitudes, Leuermann and Necker (2011) investigate the choice of occupation and hence the willingness of children to take the same income risks their parents do. They find that the fathers' risk propensity is a strong predictor of children's occupational risk, especially with respect to the sons' risk attitudes.

The individual risk aversion as a personal attitude tends to influence not only the subjective probability of successfully completing training, but also the subjective probability of finding suitable employment shortly after completing training. The interpretation of an actor's behavior as risk-averse or risk-tolerant can, however, be ambiguous: since the future returns to educational investment are unknown, decisions have to be made under uncertainty. Therefore, one can assume that risk-averse people are less adventurous, choose the less dangerous path, and invest less time and money. On the other hand, persons who greatly appreciate the value and benefits of education act in a risk-averse manner by investing in education because they are convinced they will improve their employment opportunities, income, and status through education. Thus, individual risk aversion might lead to investments in order to avoid the risk of not investing. However, such a strategy can be economically irrational if expenditures on education exceed the (expected) returns. According to the predominant view in the literature, risk-averse individuals tend to avoid investments with an uncertain outcome (Heineck & Wölfel, 2010).

3.3 Integrating Structural and Individual Risk Aversion

According to Boudon (1974) as well as Breen and Goldthorpe (1997), risk aversion is the main driving force for class-specific educational decisions, whereby the motive of status maintenance leads to relative risk aversion. In contrast, the individual risk aversion is regarded as a personal attitude which affects the expected success probabilities in addition to actual (school) performance and parents' social status.

Integrating the structural and individual risk aversion, we assume that the structural risk aversion dominates the individual risk preference. According to Boudon (1974), the motive of status maintenance is equally strong for all social classes, since it is always relative to the current class position. The status of maintenance is the major dominant force for class-specific educational decisions.

Since the structural risk aversion is the main driving force for class-specific educational decisions, children from upper social classes have no alternative but to seek the academically most demanding educational courses. Thus, for upper classes, factors such as individual risk aversion, costs, or subjective expected utilities should have a minimal impact on their educational choice. The individual risk aversion might be irrelevant for these students anyway because they still can rely on their parents' help and support in educational matters.

In contrast, working-class children face a broad range of possibilities to maintain the status of their parents. Therefore, all factors of costs, benefits, and the subjective expected utility are relatively more important. Attaining the *Abitur* working-class children have not yet maintained the status: with a highly professionalized labor market in Germany, the *Abitur* itself is not sufficient without additional vocational training.

Summarizing, children from upper social classes are structurally almost compelled to opt for the academically most demanding educational courses, almost without having a choice. In contrast, working-class children have to do choose between various options.

3.4 Hypotheses on Educational Intentions

We assume the following hypotheses on structural and individual risk aversion, on school performance and financial resources.

Insurance policy for students with high individual risk aversion and poor performance

Risk-averse graduates from higher secondary school tend to complete a vocational training before beginning university. In doing so, they intend to increase their chances of success at university and, in the event of failure, they still have opportunities for a skilled labor market position (hyp. 1a).

The same reasoning applies to higher secondary school graduates with comparably weak academic performance (hyp. 1b).

Social origin, risk aversion, and performance

According to the motive of status maintenance, students from upper social classes are almost compelled to obtain a university degree (hyp. 2a). One exception might be persons with an *Abitur* and such poor academic performance that this calls into question success in tertiary education. It is more likely that these students first seek to pursue a vocational training course in order to increase their probability of success at university (hyp. 2b).

High school graduates from lower and middle social classes do not necessarily need a university degree to maintain their status. Those with exceptionally good grades or being risk-loving are expected to go to university (if they interpret their good grades as a high probability of success at university). Those with a poor school performance or being risk-averse are likely to apply for vocational training, as this is a safe way to avoid intergenerational loss of status. High school graduates from lower and middle social classes with average school performance are more likely to opt for the sequential double qualification. Thus, the vocational training serves as an insurance policy, i.e., still providing good labor market prospects in the event of failure at university (hyp. 2c).

For graduates from upper social classes, the motive of status maintenance, i.e., the structural risk aversion, might outweigh the individual risk aversion, which could therefore be irrelevant for educational decisions. Additionally, risk-averse students from upper social classes can rely on better social networks during the transition from university to labor market and on better financial opportunities thanks to their parents (hyp. 2d).

Figure 3 shows the predicted relationship between class, individual risk preference, and school performance.

- Figure 3 about here -

Costs of Education

The better the parents' financial situation is, the lower are the constraints on financing long-lasting educational courses. The longest and most cost-intensive training routes are not to be expected to result from directly entering university, but rather from a double qualification. Additionally, for children from low-income families, opportunity costs increase if children

continue to study while having already finished vocational training: in that case, the gap between parents' income and the child's potential labor market income is presumably very small (hyp. 3).

4. Data and Methods

For the empirical analyses, we rely on data from the German Socio-Economic Panel Study (SOEP), which is one of the largest major panel studies worldwide. The areas of focus of the SOEP are employment, income, family formation, housing, time use, and satisfaction with various aspects of life. All members of a household who are at least 17 years old are interviewed individually using a personal questionnaire. In addition, there is one household questionnaire for every household containing questions, for instance, about school attendance of (younger) children. Since 2000 there has been a supplementary questionnaire for 17-year-olds including information on school biography and activities, on current school performance, and also on future plans and steps (Wagner, Frick & Schupp, 2007). The following analyses rely mainly on the information provided by these youth questionnaires from 2003 to 2010. Thus, we pool information collected in different years using the same instrument, but every individual is taken into account once only.

4.1 Sample and Variables

Since the *Gymnasium* is the school track that prepares students for higher tertiary education, we restrict the analysis to the 17-year-olds who were attending a *Gymnasium* at the time of the survey. In addition, these 17-year-old high school students are close to finishing *Gymnasium* and obtaining their *Abitur*.

First, the youngsters are asked: "In the future do you intend to hold a vocational diploma or university degree?" Those students answering "yes" or "yes, maybe" form the sample; 57 persons are excluded from the sample as they explicitly give negative responses to the questions on further education plans. In a second step, students report their intended educational and occupational qualifications, with multiple answers being possible. From these data, we assign students to one of the four "educational pathways":

1. university (UNI)
2. university of applied sciences (UAS)
3. a combination of vocational training and higher education/double qualification (DBL)
4. vocational training: apprenticeship or full-time vocational course (VET)

We distinguish between university and university of applied sciences because training at the latter is shorter, more occupationally oriented, and normally well structured, but generally leads to somewhat lower earnings and status. Thus, studies at a university of applied sciences can be more attractive for young people from lower and middle social classes (Müller & Pollak, 2010). For a double qualification, we assume a sequential pattern: first vocational training, and then university. Due to the sample size, we cannot differentiate the population intending to obtain a double qualification according to whether they complete an apprenticeship or full-time vocational training or whether they attend a university or university of applied sciences. Students seeking a double qualification, however, mention university three times more often than university of applied sciences.

The school performance of students at *Gymnasium* is measured by the grade point average of the subjects German, mathematics and the first foreign language. As an indicator of the family's social status, we use the highest parental level of education according to the CASMIN scheme (Braun & Müller, 1997). We differentiate between lower secondary school qualification (*Hauptschulabschluss*) with or without vocational training (CASMIN 1), intermediate school qualification (*mittlere Reife*) or higher education entrance qualification (*Abitur*) with or without vocational training (CASMIN 2), degree from a university of applied sciences (CASMIN 3a), and university degree (CASMIN 3b). The financial situation of the family and the means to finance long-lasting education is operationalized with the disposable household income. This income information is adjusted first for purchasing power to the year 2006, and then weighted with the inverse of the square root of household size in order to take economies of scale into account. We take the logarithm of this income measure and finally subtract the average income. Thus, the value zero indicates persons with average income. We also construct variables for respondent's gender and region of residence (eastern vs. western Germany).

To capture individual risk aversion, we rely on the answers to the question, "How do you see yourself: Are you generally a person who is fully prepared to take risks or do you try to avoid

taking risks?” This question is accompanied by the following guidelines for completing the form: “Please tick a box on the scale, where the value 0 means: ‘unwilling to take risks’ and the value 10 means: ‘fully prepared to take risk’. With the values in between, you can graduate your estimation” (for detailed analysis on the validity of this instrument see Dohmen et al., 2011). This question was first asked in 2004 in the personal interview and then again in 2006, 2008, and then every year. In addition, it is a standard question in the youth questionnaire from 2006 onwards. In order to maintain a reasonable sample size, we rely on reports on risk preference at the ages of 17 and 18, and calculate the average. Figure 4 provides an overview showing in which years respondents of different cohorts were asked on risk preference in the youth (Y) or personal questionnaire (P).

- Figure 4 about here -

4.2 Multiple Imputation

Some variables have missing values due to item non-response or by design, as in the case of risk preference. For example, for 17-year-olds interviewed in 2003 and 2005, we only have direct reports provided one year later at the age of 18. Thus, we impute values for 2003 and 2005. For all missing values, we conducted multiple chained equation imputations. We specify a background model including the variables from the subsequent analysis models and, additionally, the following information: satisfaction with school performance in the subjects German, mathematics, and first foreign language; individual grades in the subjects German, mathematics, and first foreign language (instead of the grade point average); two factors extracted from a principal components analysis on the beliefs about relevant factors for social promotion/success; active music making; participation in sports competitions; frequency of reading for leisure; migration background (first and second-generation); year of survey; charging of tuition fees at time of interview in the relevant federal state (*Bundesland*). Overall, using the Stata add-on program “ice,” we were able to generate 100 complete datasets. The variance of the predicted missing values from the regression-based imputation is increased by receiving an error term from the posterior distribution and by a random drawing of the regression coefficients from the distribution resulting from the estimated coefficients and associated standard errors (Royston, 2005).

4.3 Multinomial Logit Model

The dependent variable on further educational career is categorical with four outcomes. Thus, we estimate multinomial logit models (Long, 1997: 148-168). Therefore, three equations are estimated simultaneously: first, the logarithm of the probability of education at a university of applied sciences compared to university education (see eq. 1.1), second, the logarithm of the probability of vocational training plus higher education compared to university education (see eq. 1.2), and third, the logarithm of the probability of vocational apprenticeship compared to university education (see eq. 1.3). Thus, for analyzing the influence of a characteristic on the intended training route, three coefficients are estimated. Using these logit coefficients, it is possible to calculate the probabilities of all four future educational pathways (see eq. 2.1 - 2.4).

		Alternative j
$\ln\left(\frac{p_2}{p_1}\right) = x_k \beta_{k,21}$	Eq. 1.1	1 = university studies (<i>UNI</i>)
$\ln\left(\frac{p_3}{p_1}\right) = x_k \beta_{k,31}$	Eq. 1.2	2 = studies at a university of applied sciences (<i>UAS</i>)
$\ln\left(\frac{p_4}{p_1}\right) = x_k \beta_{k,41}$	Eq. 1.3	3 = vocational training plus higher education/ double qualification (<i>DBL</i>)
		4 = vocational education and training (<i>VET</i>)

$$p_1 = P(Y = \text{UNI} | x_k) = \frac{1}{1 + \exp(x_k \beta_{k,21}) + \exp(x_k \beta_{k,31}) + \exp(x_k \beta_{k,41})} \quad \text{Eq. 2.1}$$

$$p_2 = P(Y = \text{UAS} | x_k) = \frac{\exp(x_k \beta_{k,21})}{1 + \exp(x_k \beta_{k,21}) + \exp(x_k \beta_{k,31}) + \exp(x_k \beta_{k,41})} \quad \text{Eq. 2.2}$$

$$p_3 = P(Y = \text{DBL} | x_k) = \frac{\exp(x_k \beta_{k,31})}{1 + \exp(x_k \beta_{k,21}) + \exp(x_k \beta_{k,31}) + \exp(x_k \beta_{k,41})} \quad \text{Eq. 2.3}$$

$$p_4 = P(Y = \text{VET} | x_k) = \frac{\exp(x_k \beta_{k,41})}{1 + \exp(x_k \beta_{k,21}) + \exp(x_k \beta_{k,31}) + \exp(x_k \beta_{k,41})} \quad \text{Eq. 2.4}$$

with $p_1 + p_2 + p_3 + p_4 = 1$.

probability of intended educational path j:	p_j
covariate k:	x_k
logit coefficient for covariate x_k :	β_k

5. Empirical Findings on Educational Intentions

After imputation, the dataset comprises complete information on 881 students at higher secondary school (*Gymnasium*). Table 2 shows the educational pathway students aim for by all characteristics used in the multivariate analyses. (For a distribution of these figures before imputation, see Table A.1 in the Appendix).

- Table 2 about here -

Overall, 67% of the students have the objective of a university education, 8% to enroll at a university of applied sciences, 13% to obtain a double qualification, and 11% to follow a vocational training course. The intentions vary greatly by school performance. The better the average grades, the more students strive for university, the less for university of applied sciences or vocational education and training. As regards a double qualification, there is a non-linear relationship, with lowest proportions for both the excellent and the poorest students. For risk tolerance, there is no such clear pattern in the bivariate statistics. Looking at parental education and disposable household income, we see that higher positions in these dimensions go hand in hand with more students reporting the objective of a university course and lower reports on all other options. Students with low qualified parents do not fit into this overall pattern regarding their statements on double qualification. The group of students with low qualified parents is small in absolute terms, which might cause this irregularity.

Now, we discuss the results of the multinomial model estimations. Model 1 in Table 3 only includes the grade point average of the subjects German, math and first foreign language (hyp. 1b). The grade point average of 1 means excellent, the average of 4.7 means really poor. Three positive effects are estimated, significant at the 1% or 5% level. The worse the grade point average, the more likely students are to opt for a university of applied sciences, a double qualification or a vocational training course rather than a university education. However, the probability of striving for a double qualification might decrease with worse grades, since the coefficient for double qualification vs. university education (0.31) is considerably smaller than the coefficients for university of applied sciences education and vocational training vs. university education (0.86 and 1.04). Consequently, we calculate the probability for all four educational pathways as a function of the grade point average (Figure 5).

- Table 3 about here -

- Figure 5 about here -

As Figure 5 clearly shows, when students have poorer grade point averages, the intention to pursue a university education decreases, and the intention to study at a university of applied sciences or take a vocational training course increases. Conversely, the probability of a double qualification is slightly curvilinear, with the grade point average of about 3 at its peak (see also the bivariate distribution in Table 3).

In Model 2, we include all covariates relevant to our hypotheses and the controls for gender and region. The estimates for the importance of grades on educational intentions are similar to those in the previous model. The coefficient for the variable on personal risk tolerance (hyp. 1a) is statistically significant (at the 5% level) for the equation vocational training vs. university course, indicating that risk-loving persons more often favor university and less frequently the shortest educational route, vocational training. The two other coefficients for risk tolerance (university of applied sciences or double qualification vs. university) are close to zero and not significant. A preference for a double qualification in the group of risk-averse high school students, as predicted by hypothesis 1a, cannot be confirmed. As an indicator of structural risk aversion, we rely on parental education (hyp. 2a). Due to low case numbers, students with parents belonging to CASMIN 1 are grouped together with CASMIN 2. Students with such parents form the reference category. In all three equations, there are negative and statistically significant effects for students with university graduate parents (CASMIN 3b), indicating a higher interest in university education and definitely a lower interest in vocational training and education compared to students with lower educated parents.

According to hypothesis 2d, the impact of individual risk aversion should vary with respect to social origin. Therefore, we rerun Model 2 with sub-samples containing students with graduate parents or with lower educated parents. Model 3, which is based on students with highly educated parents (CASMIN 3a and 3b), does not show significant coefficients for individual risk propensity.⁵ By contrast, Model 4 for students with parents' education below

⁵ In addition, the average log-likelihood of Model 3 without the variable on risk tolerance is only 1.7 less. To our knowledge, no formula is available for conducting log-likelihood ratio tests for models based on imputed data.

tertiary education reveals three statistically significant (at least at the 10% level) effects, fairly equal in size (between -0.20 and -0.28). The more risk-loving a student from a low or middle social class is, the more likely she/he is to seek to pursue a university education and the less likely the student is to aim for an alternative educational pathway, including a double qualification. Thus, the results support hypothesis 2d.

Hypothesis 2b and 2c claim differences in the importance of school performance on educational pathway intentions. In Model 3, only the coefficient for the probability of vocational training and education vs. university is statistically significant, while in the case of students from lower social backgrounds, all three coefficients are significant.

We use the estimates of Model 3 and 4 to illustrate the results for the main interesting features, namely grades, risk tolerance, and parental education, by calculating the probabilities. The calculations are based on the reference categories of the other variables. The probabilities refer to a male student coming from a family with average disposable income, living in western Germany.

Figure 6 displays the educational intentions of students with highly educated parents (CASMIN 3b) on the left-hand side and those with lower educated parents on the right-hand side. The rows differ by students' school performance, starting with the excellent ones (grade point average 1.0) and ending with rather low performers (4.0). The x-axis of each graph indicates the individual risk tolerance, ranging from risk-averse (0) to risk-loving (10). The shaded areas display the proportion of students striving for one of the four educational pathways. The dotted area represents those striving for university, the diagonal shaded area those striving to study at a university of applied sciences, the area with vertical lines those intending to obtain a double qualification, and the horizontal shaded area those in favor for vocational education and training.

The left column of Figure 6 demonstrates that the majority of students of highly educated parents intend to enroll at university, even if their grades are poor. However, the proportion of students heading to other forms of further education increases with lower school performance. The figures might give the impression that risk-loving students are less in favor of university but tending more towards university of applied sciences or double qualification. As already

The ordinary calculation using averages does not take into account the increase of variation by imputation. Consequently, results may be biased by overestimating statistical significance. In our case, a log-likelihood ratio test would lead to a chi-square value of $(2 \cdot 1.7 =) 3.4$ with 3 degrees of freedom, which indicates no model improvement by including risk tolerance in any case.

mentioned above, Model 3 does not reveal any statistical significant influence of risk tolerance.

Looking at the right-hand column: students at higher secondary school with excellent school performance are overwhelmingly in favor of an immediate university education, even if their parents are less educated. Vocational training and courses at a university of applied sciences, in contrast, are not considered to be alternative educational pathways. The alternatives to university become more and more popular with lower school performance. In addition, there is a pronounced relationship between risk tolerance and educational intentions in the right-hand column. The more risk-loving a student of lower social background is, the more often he/she strives for a university education, the less so for studies at a university of applied sciences.

What does this mean for the importance of insurance policy and structural risk aversion (hypotheses 1a, 2c)? Poor academic performance does not automatically lead to pursuing a double qualification, as the thesis on insurance policy suggests. Instead, high school students with poor performances from lower and middle social classes strive in particular for vocational training. For higher secondary school students from upper social classes, obtaining a university degree is the dominant aim. Yet, if their school performance is low, they want to first complete vocational training before starting university. These results support the structural risk aversion instead of the insurance policy thesis.

Future educational intentions vary considerably for students with lower academic performance with respect to parental education. Students from non-graduate families mention vocational training or studies at a university of applied sciences as often as or even more frequently than university education, while poorly performing students from families in which at least one parent holds a university degree still mainly favor university enrollment.

The four educational pathways differ with regard to their time consumption and entail different direct and indirect costs. The double qualification in particular is associated with high costs (see hypothesis 3). Consequently, we incorporate the parental financial situation in Models 2 to 4. Only the estimated coefficients of the probability of studying at a university of applied sciences vs. pursuing a university education are statistically significant in Models 2 and 3. This means - especially for students with a professional class background - that the better the parental financial situation is, the less frequently a university of applied sciences and the more frequently a university is favored. There is no difference between students

preferring a double qualification and those aiming for university education by household income. Thus, with higher parental income, students more frequently seek to pursue a university education as well as a double qualification. This contrasts with hypothesis 3, which puts forward stronger preferences for the double qualification in comparison to the university education, the higher the household income. Moreover, the multivariate models controlling for parental education and for grades indicate that the attractiveness of vocational training, characterized inter alia by the shortest training time and monthly pay, does not decrease with increasing household income (in comparison to a university education). This can be deduced by the insignificant estimation coefficient. These findings are unexpected from a theoretical viewpoint.

Finally, the control variables on gender and region in Models 2 and 3 are completely in line with previous findings (Heine, Quast & Beuße, 2010): young women and East Germans are less likely to enter university and more likely to opt for vocational training. In addition, both groups more often strive for a double qualification than for a university education. In Model 4, which is restricted to students from lower social backgrounds, the gender effect is not visible.

6. Summary and Conclusion

In this paper, we investigated students' intentions concerning their further education, focusing on those attending the German *Gymnasium* which awards students with a general university entrance qualification. These students are a selective group: most of them attend the *Gymnasium* from the fifth grade (about age 10) onwards. The university education can be considered a stringent continuation of academic-oriented educational pathways. In our analyses, we not only focus on the question "university or vocational training?" but also on the issue of double qualification, i.e., the sequential completion of vocational training and university studies. Thus, we discussed and examined empirically whether the intended educational pathways are the result of a structural risk aversion, i.e., based on parents' social class position, or the result of an insurance policy for risk-averse or weak students.

The findings give some indication that the motive of status maintenance, i.e., structural risk aversion, influences the further educational pathways of students. With respect to parental education, linked to the family's social status, there are clear differences in the intention to

enroll at university. These correlations are particularly evident for students at higher secondary school (*Gymnasium*) with poor school performance.

Regarding individual risk preference, we argued that risk-averse high school students should have a lower tendency to pursue a university education and, instead, strive to precede university education with vocational training. This is in line with the insurance policy, as these students have a safety net in case they fail at university. These students should have an increased probability of success at university if the university subject is related to the vocational training. Referring to the model of educational choice, we argued that these patterns should only be observable for students at *Gymnasium* with a non-academic parental background because otherwise the motive of status maintenance would dominate. The empirical findings provide evidence for our argument because individual risk tolerance proved to be influential only for students with a non-academic parental background. These young people are more likely to pursue a double qualification rather than immediately enroll at university, the more risk averse they are. Moreover, they also more frequently seek to pursue 'only' vocational training or 'only' studies at a university of applied sciences. Finally, the lack of empirical evidence for the relationship between the risk preference of students of higher social class backgrounds and their intended further education can be interpreted, again, as an indication of the importance of the motive of status maintenance.

Derived from the theoretical model of educational choice, we investigated the impact of costs for the various educational alternatives. Our analysis provides evidence that the higher the disposable equivalent household income is, the more likely the students are to seek to pursue a university education or double qualification. Our results also suggest this relationship for vocational training. Only for studies at a university of applied sciences did we find an inverse relationship. These relationships are partly unexpected from a theoretical point of view.

Yet, the study presented has its limitations. First, we assume sequential training courses for the double qualification: first an apprenticeship and then university. In recent years, some projects emerged that provide a combination of vocational training and tertiary studies (e.g., integrated or cooperative degree programs) which we cannot take into account. Second, for a more reliable testing of educational choice theories, it would be useful to have information that is more specific: how do young people estimate their probability of successfully completing studies at a university of applied sciences or at university with or without a prior apprenticeship? The same applies to the subjective assessment of status maintenance and the financial burden.

Third, our specification of risk aversion refers to a general assessment of the individual respondents. It could be argued that a more specific assessment of risk aversion, such as risk aversion regarding educational and occupational decisions, would increase the explanatory power in the statistical models. In fact, risk aversion was surveyed domain-specific in the SOEP in the years 2004 and 2009. From a theoretical point of view, we prefer risk aversion as a general preference and a non-specific risk measure. In addition, the concept and measurement of general risk preference is more distinct from success probability than education-specific risk preference.

Fourth, we investigate the intentions of students and not their actual educational behavior. It is quite possible that some students cannot realize their plans, for instance, if they do not get a place in the vocational and educational training system due to poor grades or stiff competition, they might be “forced” to enroll at university. On the other hand, students might get their desired apprenticeship but feel unchallenged and underpaid. Changing their mind, they might decide to invest more and go to university. Others may plan to go to university after completing vocational training but starting a family might cause them to abandon further career plans after obtaining a vocational degree. The current educational behavior might also depend to some extent on supply and demand in the education system and in the market for apprenticeships, on new experiences and changing preferences of young adults, on their family plans, and interdependent life courses. However, it is useful to examine the intentions because the models of educational choice refer to the current situation, the current perceived benefits, costs, and success probabilities. In addition, there are close links between high school graduates’ intentions and their actual enrollment at university (Maaz & Waterman, 2010).

To conclude, previous research has shown that various dimensions of personality, attitudes and preferences influence different aspects of educational success (see Section 3.2). If the relationship between educational attainment and personal attitudes were independent of sociological relevant categories such as social class, migration background, or gender, it would not be too problematic to disregard them. Since our findings indicate that this is not the case, such aspects have to be integrated into theory building and surveys.

References

- Allmendinger, J. (1989). Educational systems and labor market outcomes. *European Sociological Review*, 5, 231-250.
- Baumert, J., & Schümer, G. (2001). Familiäre Lebensverhältnisse, Bildungsbeteiligung und Kompetenzerwerb. In Deutsches PISA-Konsortium (Eds.), *PISA 2000. Basiskompetenzen von Schülerinnen und Schülern im internationalen Vergleich*. (pp. 323-407). Opladen: Waxmann.
- Becker, G.S. (1964). *Human Capital*. New York: Columbia University Press.
- Becker, R., & Hecken A.E. (2007). Studium oder Berufsausbildung? Eine empirische Überprüfung der Modelle zur Erklärung von Bildungsentscheidungen von Esser sowie Breen und Golthorpe. *Zeitschrift für Soziologie*, 36, 100-117.
- Becker, R., & Hecken A.E. (2009). Why are Working-class Children Diverted from Universities? An Empirical Assessment of the Diversion Thesis. *European Sociological Review*, 25, 233-250.
- Bellmann, L., & Janik F. (2010). Abitur and What Next? Reasons for Gaining Double Qualifications in Germany. *Schmollers Jahrbuch*, 130, 1-18.
- Bonin, H., Dohmen, T., Falk, A., Huffman, D., & Sunde, U. (2007). Cross-sectional earnings risk and occupational sorting: The role of risk attitudes. *Labor Economics*, 14, 926-937.
- Borghans, L., Duckworth, A.L., Heckman, J.J., & ter Weel, B. (2008). The Economics and Psychology of Personality Traits. *Journal of Human Resources*, 43, 1-164.
- Boudon, R. (1974). *Education, opportunity, and social inequality: Changing prospects in Western society*. New York: Wiley.
- Braun, M., & Müller, W. (1997). Measurement of Education in Comparative Research. *Comparative Social Research*, 16, 163-201.
- Breen, R., & Goldthorpe, J.H. (1997). Explaining Educational Differentials Towards a Formal Rational Action Theory. *Rationality and Society*, 9, 275-305.
- Breen, R., & Yaish, M. (2006). Testing the Breen-Goldthorpe Model of Educational Decision Making. In S.L. Morgan, D.B. Grusky, & G.S. Fields (Eds.), *Mobility and inequality. Frontiers of research in sociology and economics* (pp. 232-258). Stanford, CA: Stanford University Press.
- Brown, S., Ortiz, A., & Taylor, K. (2006). Educational Attainment and Risk Preference. *Sheffield Economic Research Paper Series No. 200602*. University of Sheffield.
- Büchel, F., & Helberger, C. (1995). Bildungsnachfrage als Versicherungsstrategie. *Mitteilungen aus der Arbeitsmarkt- und Berufsforschung*, 28, 32-42.
- Büchel, F. (1997). Berufseinmündung und erste Karrierephase von Akademikern mit einer beruflichen Zusatzqualifikation. Ein Beitrag zur bildungspolitischen Kontroverse „HIS versus Büchel/Helberger“. *Mitteilungen aus der Arbeitsmarkt- und Berufsforschung*, 30, 620-634.
- Bundesinstitut für Berufsbildung [BiBB] (Federal Institute for Vocational Education and Training) (Eds.) (2011). Datenbank Ausbildungsvergütungen. <http://www.bibb.de/dav>.
- Dohmen, T., Falk, A., Huffman, D., Sunde, U., Schupp, J., & Wagner, G.G. (2011). Individual Risk Attitudes: Measurement, Determinants, and Behavioral Consequences. *Journal of the European Economic Association*, 9, 522-550.
- Erikson, R., & Jonsson, J.O. (1996). Explaining Class Inequality in Education: The Swedish Test Case. In R. Erikson, & J.O. Jonsson (Eds.), *Can education be equalized? The Swedish case in comparative perspective* (pp. 1-63). Boulder, CO: Westview Press.

- Esser, H. (1999). *Soziologie. Spezielle Grundlagen, Band 1: Situationslogik und Handeln*. Frankfurt/Main: Campus.
- Goldthorpe, J.H. (1996). Class analysis and the reorientation of class theory: The case of persisting differentials in educational attainment. *British Journal of Sociology*, 47, 481-505.
- Heine, Ch., Quast, H., & Beuße, M. (2010). Studienberechtigte 2008 ein halbes Jahr nach Schulabschluss. *HIS: Forum Hochschule Nr. F03/2010. Übergang in Studium, Beruf und Ausbildung*. Hannover: HIS.
- Heineck, G., & Wölfel, O. (2010). Parental Risk Attitudes and Children's Secondary School Track Choice. *SOEPpapers No. 344*.
- Hillmert, S., & Jacob, M. (2003). Social Inequality in Higher Education: is vocational training a pathway leading to or away from university? *European Sociological Review*, 19, 319-334.
- John, O.P., & Srivastava, S. (1999). Big Five Trait Taxonomy. History, Measurement, and Theoretical Perspectives. In L. Pervin, & O.P. John (Eds.), *Handbook of Personality: Theory and Research* (pp. 102-139). New York, Guilford.
- Kahneman, D., & Tversky, A. (1979). Prospect-Theory: An Analysis of Decision under Risk. *Econometrica*, 47, 263-91.
- Leuermann, A., & Necker, S. (2011). Intergenerational Transmission of Risk Attitudes – A Revealed Preference Approach. *SOEPpapers No. 412*.
- Lewin, K., Minks, K.-H., & Uhde, S. (1996). Abitur – Berufsausbildung – Studium. Zur Strategie der Doppelqualifizierung von Abiturienten. *Mitteilungen aus der Arbeitsmarkt- und Berufsforschung*, 29, 431-454.
- Long, S.J. (1997). *Regression Models for Categorical and Limited Dependent Variables*. Thousand Oaks (CA), London, New Dehli: Sage.
- Maaz, K., & Watermann, R. (2010). Soziale Herkunft und Hochschulzugang – eine Überprüfung der Theorie des geplanten Verhaltens. In W. Bos, E. Klieme, & O. Köller (Eds.), *Schulische Lerngelegenheiten und Kompetenzentwicklung. Festschrift für Jürgen Baumert* (pp. 311-329). Münster: Waxman.
- Mare, R.D. (1980). Social Background and School Continuation Decisions. *Journal of the American Statistical Association*, 75, 295-305.
- Müller, W., & Pollak, R. (2010). Weshalb gibt es so wenige Arbeiterkinder in Deutschlands Universitäten? In R. Becker, & W. Lauterbach (Eds.), *Bildung als Privileg. Erklärungen und Befunde zu den Ursachen der Bildungsungleichheit* (pp. 305-344). Wiesbaden: VS-Verlag.
- Müller, W., & Shavit, Y. (1998). The Institutional Embeddedness of the Stratification Process. A Comparative Study of Qualifications and Occupations in Thirteen Countries. In Y. Shavit, & W. Müller (Eds.), *From School to Work. A Comparative Study of Educational Qualifications and Occupational Destinations* (pp. 1-48). Oxford: Clarendon.
- Need, A., & De Jong, U. (2001). Educational Differentials in the Netherlands. *Rationality and Society*, 13, 71-98.
- Pfeifer, Ch. (2009). Risk Aversion and Labor Market Outcomes - Evidence from German Survey Data. *Empirical Economics Letter* 8 (3).
- Pilz, M. (2009). After Abitur, first an apprenticeship and then university? *European Journal of vocational training*, 46, 41-65.

- Powell, J.J.W., & Solga, H. (2010). Why are higher education participation rates in Germany so low? Institutional barriers to higher education expansion. *Journal of Education and Work*, 24, 49-68.
- Reimer, D., & Pollak, R. (2010). Educational Expansion and Its Consequences for Vertical and Horizontal Inequalities in Access to Higher Education in West Germany. *European Sociological Review*, 26, 415-430.
- Royston, P. (2005). Multiple Imputation of Missing Values: Update of ice. *Stata Journal*, 5, 527-536.
- Schindler, S., & Reimer, D. (2010). Primäre und sekundäre Effekte der sozialen Herkunft beim Übergang in die Hochschulbildung. *Kölner Zeitschrift für Soziologie und Sozialpsychologie*, 62, 623-653.
- Schneider, T. (2008). Social Inequality in Educational Participation in the German School System in a Longitudinal Perspective: Pathways into and out of the most Prestigious School Track. *European Sociological Review*, 24, 511-526.
- Schultz, T.W. (1961). Investment in Human Capital. *American Economic Review*, 51, 1-17.
- Statistisches Bundesamt [StaBu] (Federal Statistical Office [FSO]), (2010). Hochschulen auf einen Blick. Ausgabe 2010. Wiesbaden
- Stocké, V. (2007). Explaining Educational Decision and Effects of Families' Social Class Position: An Empirical Test of the Breen-Goldthorpe Model of Educational Attainment. *European Sociological Review*, 23, 505-519.
- Tieben, N. (2011). Parental Resources and Relative Risk Aversion in Intra-secondary Transitions: A Trend Analysis of Non-standard Educational Decision Situations in the Netherlands. *European Sociological Review*, 27, 31-42.
- Uhlig, J., Solga, H., & Schupp, J. (2009). Bildungsungleichheiten und blockierte Lernpotenziale. Welche Bedeutung hat die Persönlichkeitsstruktur für diesen Zusammenhang? *Zeitschrift für Soziologie*, 38, 418-440.
- van de Werfhorst, H.G., & Hofstede, S. (2007). Cultural capital or relative risk aversion? Two mechanisms for educational inequality compared. *British Journal of Sociology*, 58, 391-415.
- Wagner, G.G., Frick, J.R., & Schupp, J. (2007). The German Socio-Economic Panel Study (SOEP) – Scope, Evolution and Enhancements. *Schmollers Jahrbuch*, 127, 139-169.
- Weiss, Y. (1972). The Risk Element in Occupational and Educational Choices. *Journal of Political Economy*, 80, 1203-1213.
- Willich, J., Buck, D., Heine, Ch., & Sommer, D. (2011). Studienanfänger im Wintersemester 2009/10. *HIS: Forum Hochschule Nr. F06/2011. Wege zum Studium, Studien- und Hochschulwahl, Situation bei Studienbeginn*. Hannover: HIS.

Table 1: Frequency of all new training contracts in 2009, by areas of responsibility (not including shipping) and proportion of persons with university entrance qualification

	all areas	industry and trade	crafts	liberal professions	agri- culture	public sector	domestic work
in absolute numbers	561,171	332,232	155,589	40,917	15,006	13,500	3,924
percentage with university entrance qualification	20%	26%	6%	23%	11%	42%	1%

Source: Federal Institute for Vocational Education and Training (2010). Own calculations.

Table 2: Frequency distribution and relative frequencies of different intentions regarding further education (after imputation)

	proportion pursuing				
	frequency	UNI	UAS	DBL	VET
frequency distribution	881.0	590.0	73.9	117.7	99.4
relative frequencies		67%	8%	13%	11%
grade point average^a					
<= 2.0 (excellent)	172.8	82%	4%	11%	4%
2.33-2.66	300.7	73%	6%	13%	9%
3.0-3.33	259.6	58%	11%	17%	14%
>= 3.66 (poor)	148.0	53%	15%	12%	20%
risk tolerance^a					
<= 4.5 (very low)	231.8	65%	9%	14%	13%
5	192.6	63%	7%	15%	15%
6	195.8	70%	8%	12%	10%
7	157.7	71%	7%	14%	8%
>7.5 (very high)	103.2	67%	13%	11%	9%
parental education					
CASMIN 1	71.0	58%	12%	11%	19%
CASMIN 2	309.1	55%	11%	18%	17%
CASMIN 3a	134.7	67%	9%	14%	11%
CASMIN 3b	366.2	79%	6%	10%	5%
household income^a					
1 st quartile	220.3	55%	13%	16%	17%
2 nd quartile	220.3	62%	11%	12%	15%
3 rd quartile	220.2	70%	8%	13%	9%
4 th quartile	220.2	81%	2%	12%	5%
region					
west	673.0	71%	8%	12%	9%
east	208.0	54%	10%	18%	18%
gender					
boy	415.0	70%	10%	11%	9%
girl	466.0	64%	7%	16%	13%

Sources: SOEP 2003-2010. Own calculations relying on 100 completely imputed datasets.

^a Put into larger categories for descriptive statistic only.

Abbr.: UNI: university. UAS: university of applied sciences. DBL: sequence of VET + tertiary education. VET: vocational education and training.

Table 3: The importance of individual risk aversion and household income on the plans for future educational pathway of students obtaining a general university entrance qualification

	M 1		M 2		M 3 Parents CASMIN 3		M 4 Parents CASMIN 1, 2	
	b	s.e.	b	s.e.	b	s.e.	b	s.e.
UAS/UNI								
grade point average	0.86	0.19 **	0.91	0.21 **	0.39	0.31	1.32	0.30 **
risk tolerance (0-10)			-0.03	0.09	0.19	0.14	-0.22	0.13 +
parental level of education (CASMIN 1 or 2)								
CASMIN 3a			-0.15	0.39	0.53	0.42		
CASMIN 3b			-0.63	0.31 *				
household income (ln)			-0.82	0.27 **	-1.64	0.41 **	-0.15	0.41
gender (boy)								
girl			-0.08	0.27	-0.25	0.42	0.01	0.37
region (west)								
east			0.71	0.30 *	1.04	0.41 *	0.17	0.51
constant	-4.54	0.58 **	-4.46	0.80 **	-5.03	1.23 **	-4.37	1.07 **
DBL/UNI								
grade point average	0.31	0.15 *	0.42	0.16 *	0.27	0.23	0.63	0.24 *
risk tolerance (0-10)			-0.04	+	0.10	0.11	-0.20	0.11 +
parental level of education (CASMIN 1 or 2)								
CASMIN 3a			-0.39	0.32	0.67	0.33 *		
CASMIN 3b			-1.04	0.26 **				
household income (ln)			0.28	0.24	0.14	0.34	0.42	0.35
gender (boy)								
girl			0.51	0.22 *	0.60	0.31 +	0.43	0.32
region (west)								
east			0.96	0.24 **	0.85	0.34 *	0.97	0.35 *
constant	-2.46	0.42 **	-2.58	0.60 **	-4.01	0.90 **	-2.26	0.82 *
VET/UNI								
grade point average	1.04	0.17 **	1.29	0.19 **	1.27	0.33 **	1.39	0.25 **
risk tolerance (0-10)			-0.17	0.08 *	-0.04	0.14	-0.28	0.11 *
parental level of education (CASMIN 1 or 2)								
CASMIN 3a			-0.48	0.36	1.02	0.41 *		
CASMIN 3b			-1.43	0.31 **				
household income (ln)			-0.24	0.26	-0.59	0.43	0.04	0.35
gender (boy)								
girl			0.59	0.25 *	0.88	0.42 *	0.45	0.32
region (west)								
east			1.42	0.27 **	1.71	0.41 **	1.13	0.37 **
constant	-4.82	0.53 **	-4.78	0.74 **	-7.20	1.34 **	-4.19	0.90 **
number of cases (overall)	881		881		498-504		377-383	
LogLik (finale) (mean)	-844.6		-787.15		-362.24		-409.69	
Pseudo-R ² (mean)	0.03		0.10		0.11		0.08	

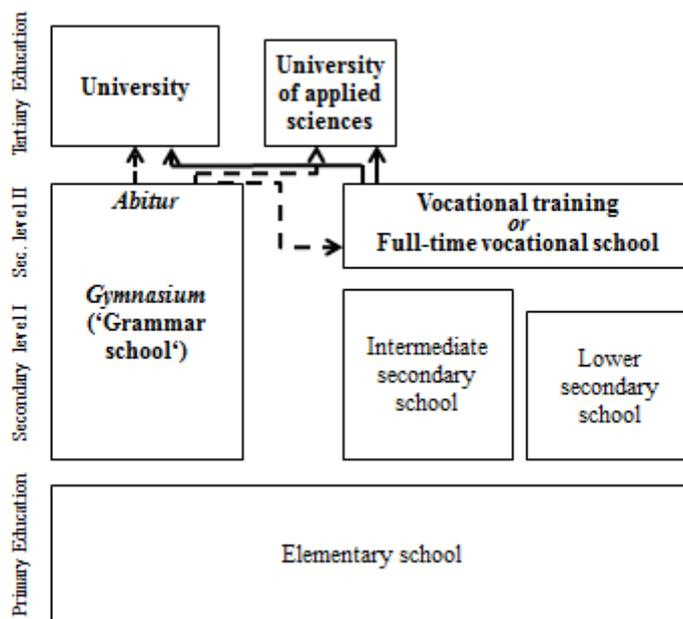
Sources: SOEP 2003-2010. Own calculations relying on 100 completely imputed datasets.

Significance level: ** $\alpha < 0.01$. * $\alpha < 0.05$. + $\alpha < 0.1$;

Reference categories: in brackets and italic.

Abbr.: UNI: university. UAS: university of applied sciences. DBL: sequence of VET + tertiary education. VET: vocational education and training.

Fig. 1: Schematic structure of the German education system and the transitions under study (arrows)



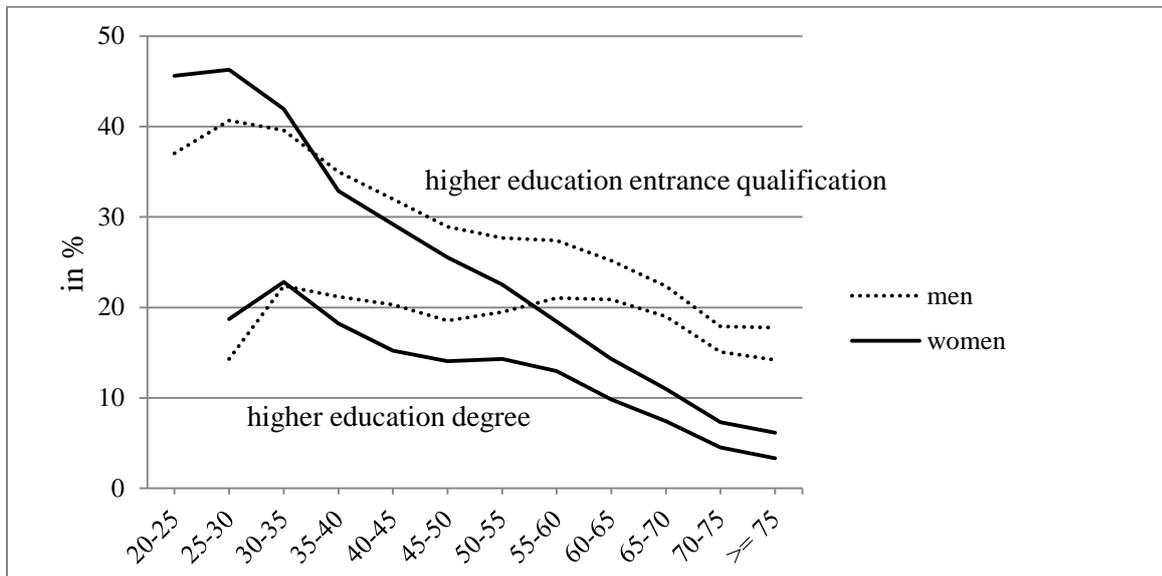
Notes:

Dotted arrows: first transitions after receiving general university entrance qualification (*Abitur*).

Solid lines: transitions to tertiary education after “detour”.

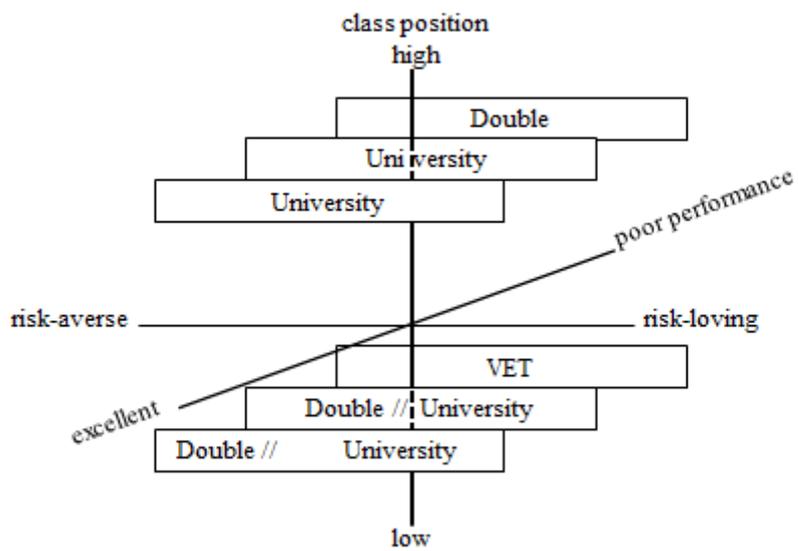
Source: own illustration.

Fig. 2: Proportion of people with (restricted or full) higher education entrance qualifications and with university (of applied sciences) qualification by gender and age groups. Germany, 2009



Source: German Micro Census 2009; special analysis by the Federal Statistical Office of Germany. Own illustration.

Fig. 3: Hypotheses on the importance of individual risk aversion and school performance on educational intentions by family's class position



Abbr.: UNI: university. UAS: university of applied sciences. DBL: sequence of VET + tertiary education. VET: vocational education and training.

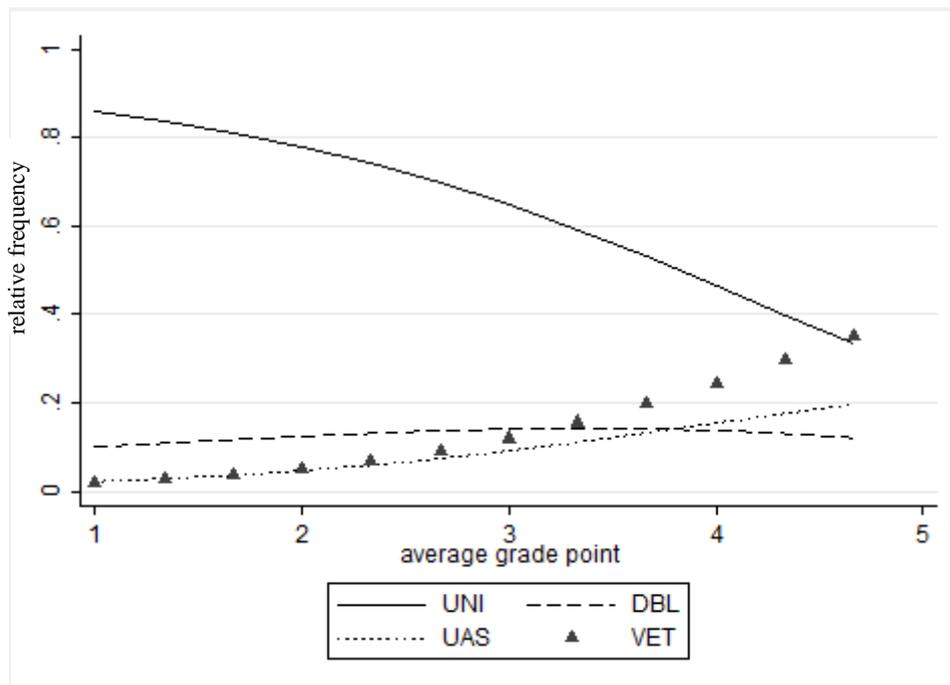
Fig. 4: Reports on risk preference by age, year, and survey instrument

age	17	///	P		P		P	P	P	P
[in years]	18		P		Y	Y	Y	Y	Y	///
year		2003	2004	2005	2006	2007	2008	2009	2010	2011 ^a

Abbr.: P: personal questionnaire; Y: youth questionnaire; /// ineligible for our sample selection.

^a Preliminary data version

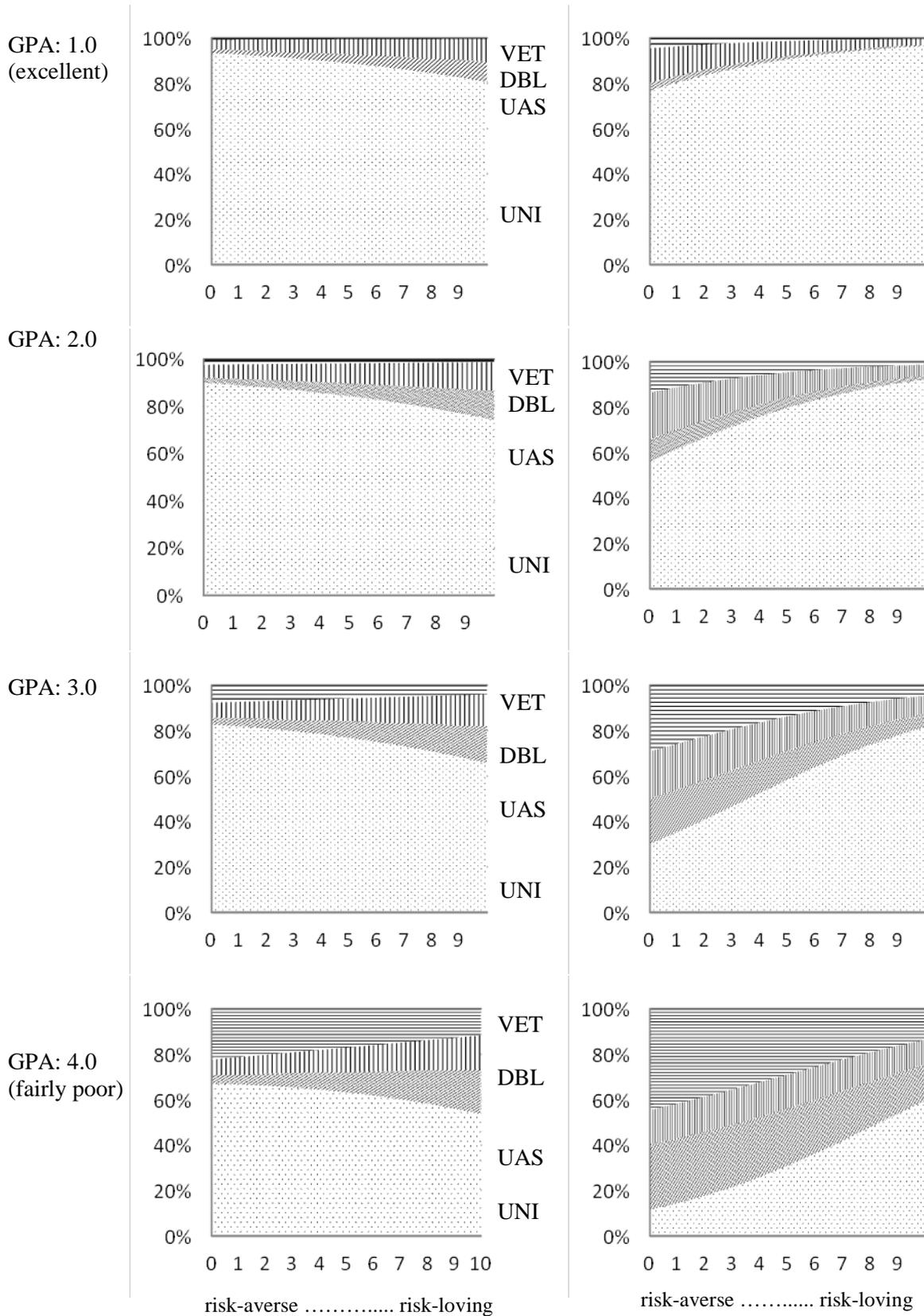
Fig. 5: Importance of grades for future educational pathway (calculated by Model 1, Table 3)



Sources: SOEP 2003-10, predictions based on Model 1, Table 3.

Abbr.: UNI: University. UAS: University of applied sciences. DBL: sequence of VET + tertiary education. VET: Vocational education and training.

Fig. 6: Intended educational pathway by grade and risk aversion for students with highly educated parents (CASMIN 3b, left-hand column) and low-educated parents (right-hand column)



Sources: SOEP 2003-10, 17-year-olds, predictions based on Model 3 and 4, Table 3, calculated for a male youth in western Germany.

Abbr.: UNI: university. UAS: university of applied sciences. DBL: sequence of VET + tertiary education. VET: vocational education and training.

Appendix

Table A.1: Frequency distribution and relative frequencies of different intentions regarding further education (before imputation)

	proportion pursuing					missing values
	frequency	UNI	UAS	DBL	VET	
frequency distribution	881	581	72	115	97	16
relative frequencies		66%	8%	13%	11%	2%
grade point average^a						
<= 2.0 (excellent)	172	81%	3%	10%	4%	0.6%
2.33-2.66	298	72%	5%	13%	9%	0.3%
3.0-3.33	258	57%	10%	16%	14%	2.3%
>= 3.66 (poor)	147	51%	14%	11%	19%	4.8%
Missing values	6					
risk tolerance^a						
<= 4.5 (very low)	99	64%	11%	10%	13%	2.0%
5	78	63%	5%	15%	17%	0.0%
6	80	71%	9%	9%	9%	2.0%
7	72	71%	6%	18%	6%	0.0%
>7.5 (very high)	40	57%	20%	10%	13%	0.0%
missing values	512					
risk tolerance^a at least one point of measure						
<= 4.5 (very low)	224	65%	9%	13%	12%	1.0%
5	196	59%	6%	17%	16%	2.0%
6	159	70%	9%	10%	8%	3.0%
7	138	72%	6%	15%	6%	1.0%
>7.5 (very high)	135	67%	11%	10%	10%	2.0%
missing values	29					
parental education						
CASMIN 1	68	57%	12%	10%	18%	2.9%
CASMIN 2	304	54%	10%	17%	16%	2.3%
CASMIN 3a	133	65%	8%	14%	11%	2.3%
CASMIN 3b	362	78%	6%	10%	5%	1.1%
missing values	14					
household income^a						
1 st quartile	220	54%	12%	16%	16%	1.8%
2 nd quartile	220	60%	11%	12%	14%	2.7%
3 rd quartile	220	70%	8%	13%	9%	0.5%
4 th quartile	220	80%	2%	11%	5%	2.3%
missing values	1					
region						
west	673	70%	8%	12%	9%	1.9%
east	208	53%	10%	18%	18%	1.4%
gender						
boy	415	69%	10%	11%	9%	1.7%
girl	466	63%	7%	15%	13%	1.9%

Sources: SOEP 2003-2010. Own calculations.

^a Put into larger categories for descriptive statistics only.

Abbr.: UNI: university. UAS: university of applied sciences. DBL: sequence of VET + tertiary education. VET: vocational education and training.