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Educational Decisions as Rational Choice? An Empirical Test of the Erikson-Jonsson Model for Explaining Educational Attainment

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Abstract

This article tests the prediction from the Erikson-Jonsson (EJ) rational-choice model that altogether eight financial as well as non-financial dimensions of costs and returns of education, as well as the probability of being able to successfully realise educational credential simultaneously explain educational decisions. Among the included returns is a new measure for the families' motive to avoid intergenerational status demotion. Furthermore, we test the pivotal assumption of instrumental rationality being the mechanism underlying educational selections. In this case, pupils do not take returns and success probabilities independently, but mutely weighted and in interaction into account. We test these hypotheses with data from the Mannheim Educational Panel Study about the decision between secondary school tracks in Germany. Results show that the probability of success, one financial but five non-financial kinds of costs and returns associated with educational degrees simultaneously explain educational decisions. Returns from reduced unemployment risks and financial costs prove to be irrelevant. Actors are more sensitive to all relevant returns if the respective educational track is more likely to be successfully completed. Results provide strong evidence for instrumental rationality being one important mechanism underlying educational decisions.

Keywords: Educational decisions; educational costs and returns; instrumental rationality; interaction effects; motive of status maintenance; rational choice theory.

Introduction

In recent years, rational-choice theory (RCT) has become one of the most widely applied theoretical frameworks in the field of sociology of education (e.g., Hansen 2007; Raftery and Hout 1993). Aside from other versions of this theoretical approach (e.g. Breen and Goldthorpe 1997; Morgan 1998), the Erikson-Jonsson (EJ) model (Erikson and Jonsson 1996) has become particularly prominent in this field of research. The EJ-model explains educational outcomes as resulting from instrumentally rational selections between institutionally defined pathways through the school system. The theory particularly aims at explaining differences in educational decisions for children with the same academic abilities. When making these decisions, the actors simultaneously take the expected costs and benefits of educational investments into account. Standard human capital theory assumes financial expenses and labour-market income to be the only relevant sources of costs and benefits of education (Becker 1964). Furthermore, pupils are regarded to be perfectly informed and, thus, the perceived costs and returns are assumed to be completely consistent with their objective values. In contrast, the EJ-model has a more comprehensive conception of costs and benefits as well as a more realistic view on the actors' cognitive resources. Here, the cost of educational credentials is the anticipated cumulative burden from using any scarce and valued resources during the time spent in school. Equivalently, educational returns are all positively evaluated consequences of education for the pupils' life chances in future.

A lot of research has found associations between proxy measures for the objective monetary costs and returns of education with educational outcomes (e.g., Wilson, Wolfe and Haveman 2005). Whether these associations are created by the actors' subjective evaluations in combination with cost-benefit calculations is rarely empirically addressed. Only a few studies analyse directly the effect of subjective costs, returns, and success probabilities on educational outcomes (Becker 2003; Meier Jæger 2007; Need and de Jong 2000; Stocké 2007). However, none of the available studies tested exhaustively the simultaneous relevance of financial as well as non-financial costs and returns, controlling for the effect of subjective probabilities for successfully being able to complete educational careers.

The EJ-model assumes the satisfaction of the families' motive to reach status maintenance (MSM) to be the most important non-economic return to education and a pivotal determinant for educational decision. Accordingly, families are expected to select educational careers which they believe are necessary and sufficient to ensure their offspring to reach at least the families' social status. Thus, as already assumed in social position theory (Boudon 1974; Keller and Zavalloni 1964), educational degrees are differently evaluated, depending on the

families' location in the status hierarchy. This important theoretical assumption has undergone only few empirical tests (see for exceptions: Breen and Yaish 2006; Davies, Heinesen and Holm 2002; Stocké 2007; van de Werfhorst and Hofstede 2007). In none of the nevertheless available studies, the effect of the MSM has been tested net of the relevance of the other factors assumed to relevant in RCT.

Whereas costs of a selected educational career are realised with certainty, returns do so only if educational tracks are successfully completed. Thus, starting an educational career is a risky investment decision. Therefore, the EJ-model assumes the subjective probability of being able to successfully complete educational tracks to be another important determinant of educational decisions. Several studies have utilised the children's proven academic competencies as proxies for their prospects to realise ambitious educational degrees (e.g., Light and Strayer 2000). However, it can be argued that competencies influence, but by no means determine, the pupils' expectation of educational success in the future. Only a few studies have measured subjective success probabilities and tested their effect on educational outcomes (cf. Need and de Jong 2000; Stocké 2007).

The EJ-model assumes instrumentally rational actors to select school tracks which lead to educational degrees with positively evaluated consequences *and* which are likely to be successfully completed at the same time (Erikson and Jonsson 1996). Thus, increasing returns and success probabilities associated with a particular educational degree are simultaneously expected to lead to a higher disposition to select an educational track leading to this degree. However, both factors are not expected to have independent effects. Instead, the possible returns of educational degrees are discounted with their probability of becoming realised and, thus, how strongly the same returns affect educational decisions is a function of the success probability. In the extreme case of this probability being zero, even infinitely high returns will not motivate instrumentally rational actors to invest in the respective educational career. From this reasoning, it follows that returns and success probabilities *in interaction* should explain educational decisions. The existence of this interaction effect is of great importance to distinguish between outcome-oriented 'instrumentally rational' and expressive oriented 'value rational' types of social behaviour (Weber 1978). Whereas in the latter case, subjects follow unconditionally their beliefs about the beneficial nature of higher education, they are expected in the former one to take the relative likelihood of different outcomes into account. Despite the importance of the described interaction effect for the appropriateness of the EJ-model and RCT in general, it has never been tested empirically yet.

The Erikson-Jonsson-Model

In the EJ-Model, pupils are expected to form beliefs about the value of all available educational options with respect to the relevant dimensions of costs, benefits, and about the probabilities to successfully complete these degrees (Erikson and Jonsson 1996). On this basis, the educational options are evaluated according to the following formula (Erikson and Jonsson 1996):

$$U = pB - C \qquad\qquad\qquad \text{Equation 1}$$

This formula can be rewritten in a more differentiated way as follows:

$$SEU\,(D_i) = p_i \bullet U_{ij} - C_{ik} \qquad\qquad\qquad \text{Equation 2}$$

The theory assumes that the actors' total evaluation of an educational degree D_i can be expressed as subjective expected utility $SEU\,(D_i)$. This evaluation is *firstly* a function of the subjective probability p_i that children are expected to successfully complete the educational degree i. *Secondly*, the parameter U_{ij} represents the educational returns associated with degree i with respect to the actors' goal j. *Thirdly*, the parameter C_{ik} captures the costs expected to be necessary to realising degree i with respect to a particular kind of burden k. Whereas the negative effect of costs is assumed to be simply additive with respect to the total evaluation of educational options, the success probability p_i and each of the different educational returns U_{ij} are assumed to be multiplicatively combined. This formally represents the prediction that increasing returns to education exert a stronger effect on the probability to select a particular degree if the chances of success are becoming higher.

The probability p_i of school success in the future is, aside from other factors, as for example the parents' ability and willingness to support their children's learning, a function of the children's present academic abilities and their development in the past. The returns U_{ij} to educational degrees embrace labour market-related as well as social consequences of education. Research has shown that more education leads to higher labour-market income (Wilson 2001), to lower unemployment risk (Lauer 2005), and is associated with higher prestige (Mani and Mullin 2004). It can be argued that these return dimensions are salient to the decision maker and that they take them into account when selecting between secondary school degrees. An important non-economic dimension of educational returns is the actors' motive to maintain the family's social status (Erikson and Jonsson 1996). Consistent with one of the core assumptions of prospect theory (Kahneman and Tversky 1979), the families' status position is assumed to define the reference point, relatively to which their offspring's anticipated status is evaluated as improvement or deterioration. It is assumed that families from all social classes are equally strongly motivated to minimise the risk of inter-generational downward

mobility, whereas the chance of upward mobility is much less an incentive for educational investments. Taking this motive into account requires the formation of beliefs about how likely children will reach at least the parental status, conditional on having realised different educational degrees. This is done on the basis of implicit theories about the role of education in the status-attainment process. The resulting beliefs about the suitability of educational degrees for maintaining the parental status constitutes the returns attributed to these degrees.

The parameter C_{ik} is a function of all direct and indirect costs which are expected to be incurred when children are realising differently demanding educational degrees. Direct costs embrace all school-related expenses necessary for completing educational careers, as for example books and other material needed for school. Furthermore, indirect or opportunity costs refer to forgone labour-market income, which is higher for more ambitious and thus long-standing educational degrees. However, completing different educational degrees not only causes economic costs, but other kinds of burden as well. Visiting a different school than friends may cause alienation, loss of friendship ties and, consequently, social costs. Furthermore, visiting the different school types can be expected to cause more or less time effort and inconveniences. Aside from the time and effort necessary for visiting classes and studying, pupils need to commute between home and school. Under the condition of an unequal regional supply of school types, the commuting costs for visiting them may vary substantially.

Previous Research

A great number of studies provide evidence about factors affecting educational decisions which may be regarded as objective antecedence conditions for the factors the EJ-model regards as relevant. *Firstly*, studies utilise available resources as proxy-measures for the costs of education. It is found that the families' income exerts a positive effect on the children's completed years of schooling (Conley 2001) and the probability of completing college (Light and Strayer 2000). However, the families' economic resources do not affect educational outcomes in all studies (e.g. Arum 1998). A study from Norway shows that the varying effect of the parental economic resources on educational attainment over time is explained by the development of economic insecurity associated with the unemployment level in the country: Available resources have stronger effects in times when the income level is more threatened by unemployment (Hansen 2007). The number of siblings, influencing the per capita available financial as well as time resources and thus the burden for obtaining higher education, increases the probability of primary-school dropout (Peraita and Pastor 2000), decreases the chances of completing college (Light and Strayer 2000) and the realised years of schooling

(Biblarz and Raftery 1999). Objective values of opportunity costs, caused by forgone labour-market income, predict the probability to continue education after secondary education, but not the probability to enter university (Beneito et al. 2001).

Secondly, objective differences in the financial returns from education, as a proxy indicator for the actors' expectations in this respect, are associated with educational outcomes as well. Differences in income when completing or not completing high school in one sample, conditional on different characteristics of the individuals, explain the probability of high-school dropout of other students with the same combination of characteristics (Wilson, Wolfe and Haveman 2005). A study from Denmark tested the effect of the MSM on the probability of continuing education at several branching points after the 9th grade (Davies, Heinesen and Holm 2002). The probability to continue schooling is expected to depend on whether the parental level of education has already been reached. The hypothesised kind of non-linearity in transition probabilities is found only in 5 out of 17 analyses. In another study, conditional probabilities of an older cohort to reach the parents' class position when having obtained different educational credentials were utilised in order to proxy the beliefs about how likely educational options will avoid intergenerational downward mobility in a younger cohort (Breen and Yaish 2006). Three hypotheses about the probability of different classes to continue school after completed O-levels in Britain were tested, but only one confirmed. This may result from the untested assumption being unwarranted that the subjective beliefs about returns from the MSM are consistent with the objective chances different educational degrees offer in this respect.

Thirdly, indicators for the children's academic competencies, as one important determinant for their perceived prospects to successfully complete educational degrees, prove to be associated with educational outcomes. The students' standardised test scores explain the decision to drop out during elementary and middle school (Alexander and Entwisle 2001) as well as the probability to enter college (Light and Strayer 2000). Furthermore, grade points exert strong effects on educational attainment (e.g., Jackson et al. 2007).

A few studies test for the effects of subjective measures for the relevant theoretical parameters. A study from the Netherlands shows that, although the grades of secondary school students affected their subjective beliefs to be able to successfully complete post-secondary education, these beliefs, under control of the significant effects of the grades, did not predict school-continuation decisions (Need and de Jong 2000). Another study tests the effect of different subjective measures for the costs, benefits, and probabilities of success on the educational plans after primary school in Germany (Becker 2003). The costs are represented by

how much the family has to worry about the financial situation, the expected returns from realising the MSM by how much the parents desire educational degrees for their children that are higher than their own ones, and the probability of success by whether the parents believe that their children are good students. All theoretical parameters predict the intentions to select an upper secondary school track, but whether they explain educational behaviour remains unclear. A study from the Netherlands finds the strength of the MSM to be associated with the aspirations of third-year secondary school students for their educational careers, but do not explain the actually selected type of secondary school (van de Werfhorst and Hofstede 2007). However, the EJ-model predicts the perceived suitability of educational degrees for status maintenance rather than the intensity of this motive to explain educational decisions. A Danish study collected subjective indicators for educational returns retrospectively three years after the actual decision and utilised them to explain the decision to continue on secondary school (Meier Jæger 2007). One indicator for educational returns is how relevant the students found their friends' educational choices for their own one. Although this factor is significantly correlated with the educational decision, it is difficult to see why the importance of friends' educational decisions explains the target persons' selections without including the kind of education the friends were choosing. Furthermore, the observed associations may be an artefact of rationalising the decisions when reporting the perceived educational returns three years after these decisions have been made. Another study tests the Breen-Goldthorpe version of RCT with data from Germany and finds the decision between secondary school tracks to be explained by the parents' subjective probability that their children will be able to successfully complete the degrees under consideration (Stocké 2007). Furthermore, the results show that the subjective probability that a particular degree will be able to maintain the status position of the parent with the highest status in the family explains the educational decisions. However, in this study, the effect of no other educational returns is simultaneously analysed.

Empirical Study

Sample and Method

We test the predictions of the EJ-model using data from the Mannheim Educational Panel Study (MEPS) with families who in 2003 had children in the third grade of one of 48 randomly selected primary schools in the federal state Rhineland-Palatinate, Germany. Among the 2,186 families representing this population, altogether 989 and thus 45.2 per cent participated in the first wave of the study when the children were in the middle of the third grade. Follow-up interviews were conducted after the children received the mid-term report card of

the fourth grade, which was shortly before the families had to decide about on which secondary school track the children should continue. The third panel wave took place at the end of the fourth grade in summer 2005 after the children had to be registered in a particular type of secondary school. About one month after the second wave of the questionnaire study, the children completed standardised school-achievement tests in a classroom setting. Since the children were on average just 10.2 years old at the time of the educational decision, the parents are assumed to play the pivotal role for these decisions and, thus, we utilise data provided by the parent who was declared to mainly deal with the school-related issues of the target child. Among the 820 families we have sufficiently complete data about, this was in 93.6 per cent of the cases the mother, in 6.0 per cent the father, and in .4 per cent another person.

Operationalization

The educational decisions and the parameters assumed to be relevant within the EJ-model are operationalized as follows:

  - *Selected type of secondary school:* The decision options consist of three school tracks, which, when successfully completed, lead to clearly defined educational degrees. These are (1) lower secondary school ('Hauptschule'), completed after the ninth grade, (2) intermediate secondary school ('Realschule'), taking ten years of schooling, and (3) upper secondary school ('Gymnasium'), which, when completed after the thirteenth grade, entitles children to enter university. In other, more comprehensive school types, which include 'Gesamtschule', 'Waldorfschule', and 'Regionalschule', different degrees can be obtained, depending on which tracks are chosen within the schools and on how long the children stay at school. We regard the 14.6 per cent (N=120) of families who selected a comprehensive school type as not having decided about the educational degree they aspire for their children yet and are excluded from our analysis. Among the 700 families left for the analysis, 5.4 per cent selected a lower, 26.7 per cent an intermediate, and 67.9 per cent an upper secondary school for their children.

  - *Families' occupational status:* The families' occupational status is operationalised by their position on a three-category EGP-class scheme (Erikson, Goldthorpe and Portocarero 1979). Following Goldthorpe (2000), we differentiate between pure service (upper (I) and lower (II) service class), pure labour (lower sales services (IIIb), skilled (VI) and unskilled (VII) manual worker), and mixed class positions (routine non-manuals (IIIa), small proprietors (IV) and supervisors (V)). If the respective parent did not participate in the labour market at the time of the interview, but was gainfully employed before, the class position of this for-

mer occupation is utilised. This is the case for 3.1 per cent of the fathers and 44.6 per cent of the mothers. The resulting class positions are the following: Father: Service: 47.7 per cent, mixed: 17.0 per cent, working: 24.0 per cent, missing: 11.3 per cent; Mother: service: 41.7 per cent, mixed: 36.4 per cent, working: 17.7 per cent, missing: 4.1 per cent.

- *Students' academic competencies:* The EJ-model claims to explain educational decisions net off the effect of the children's academic competencies. We utilised the students' standardised test scores, collected using the 'Educational Counselling Test for Third and Fourth Grades' (Ingenkamp 1996) in order to control for scholastic achievement. This test is a reliable and valid indicator for children's school-related competencies (Borchert, Knopf-Jerchow and Dahbashi 1991: 175). The test consists of three parts with 20 tasks in each test domain: (a) understanding word meanings, (b) handling numbers, and (c) solving brain-teaser tasks. On average, the children solved the tasks correctly with a probability of .83 (std.=.14).

- *Probability of successfully completing educational degrees:* The parents were asked to indicate for each educational track how likely they expect their children to successfully complete it. The responses are recorded on a scale from one (very unlikely) to seven (completely sure) and then normalised into a value range between zero (low probability of success) and one (high probability of success).[2] The parents perceive on average a relatively high probability of .68 that their children will successfully realise the most demanding upper secondary school degree. This is regarded to be substantially less likely, compared with the success probability of .91 and .98 in the case of the intermediate and lower secondary school degrees, respectively (cf. Table I).

-- Table I about here --

- *Motive of status maintenance:* The parents utilise their knowledge about the instrumental value of education on the labour market in order to form expectations about how likely different educational degrees will enable the children to reach an at least as favourable occupational status as their own one. The probability with which the degrees are expected to satisfy the MSM is assessed by asking for each degree how likely it will enable the children to reach an occupation which is at least as prestigious as the respondents'.[3] The responses ranged between one (this is impossible) and seven (this is absolutely sure). The same questions were answered with respect to their partner's occupation as a reference point. After rearranging the answers in a way that the variables represent the probability of status maintenance with respect to the mothers' and fathers' status, they are normalised into a range between zero (low probability) and one (high probability). The perceived probability to maintain the mothers' as well as the fathers' status increases strongly with the level of the educational degrees (cf. Table I). Re-

spondents have not much faith in a lower secondary school degree to avoid downward mobility with respect to the mothers' as well as the father's occupational status, represented by values of .27 and .28, respectively. These probabilities were perceived to be .67 and .60 in the case of an intermediate and even .90 and .89 in the case of an upper secondary school degree.

- *Labour-market returns to education:* We assume the parents to take three dimensions of labour-market returns into account when evaluating the educational options. The *first* and non-economical dimension is expected prestige returns. These are measured by asking the parents about how likely they expect their children, being endowed with each of the three educational degrees, to reach a highly prestigious occupation.[4] The *second* dimension is the financial returns to education, which are measured by asking the parents to indicate how likely they expect their children to obtain a well-paid job after having completed the different educational degrees.[5] *Third*, the parents judged their children's risk of becoming unemployed during their work-life, conditional on having received the different educational levels.[6] In the case of all three return dimensions, the response scale ranges between one ('very unlikely') and seven ('very likely'). In order to mach the poling of the other dimensions, the perceived unemployment risk is first reverse coded, and afterwards all return indicators are normalised on a value range between zero ('low returns') and one ('high returns'). Parents perceive the possible returns to increase on all three return dimensions when more high-standing educational degrees are under consideration: Whereas a lower secondary school degree is evaluated with values of .22, .18, and .29 with respect to prestige, financial and job security returns, these values increased to .62, .60, and .50 in the case of an intermediate and even to .84, .83, and .57 in the case of an upper secondary school degree (cf. Table I). Whereas the prestige and financial returns increases very similarly with the level of degrees, the parents did not perceive much improvement in avoiding unemployment if their children obtained an upper instead of an intermediate secondary school degree.

- *Costs of education:* In our study, we analyse the relevance of three kinds of burden, associated with completing different educational tracks. These are *first* financial costs based on direct expenditures and forgone labour-market income, incurred when completing educational degrees. The parents report for each of the educational degrees the financial burden they expect if their children completed these degrees.[7] The response scale ranged from one (hardly any burden) to seven (high burden). *Second*, the time effort and inconvenience caused by daily commuting to school is assumed to be cumulatively over the secondary school time a factor families take into account when selecting between secondary school tracks. Although efforts have been undertaken to provide equal regional supply of all school types in Germany,

higher level schools are still less available and, thus, visiting them requires more commuting effort (Klemm 2003). These commuting costs are assessed by using the parents' reports about the distance in kilometres between their place of residence and the nearest school of each type. *Third*, it is assumed that parents take social costs for their children into account when selecting between secondary school types. Although the transition from primary to each kind of secondary school is associated with a disruption of the children's social ties, the degree of these social cost differs according to how many of the children's friends intend to visit the respective school type. Thus, parents reported in the panel wave after the selection between school tracks which percentage of their child's friends will visit a lower, intermediate or upper secondary school in the following school year. We assume that this transition propensity of the children's network has been anticipated at the time of the decision. We utilised the complementary value, representing the percentage of friends not visiting the respective school type, as an indicator for its social costs.

Except for the kilometre distances to the school types, the costs are normalised on a value range between zero (low cost) and one (high cost). As can be expected, the parents anticipate a higher financial burden if their children selected a more ambitious educational track: While a lower secondary school degree is judged to cause low costs with a value of .17, this value increases considerably to .30 in the case of an intermediate and to .54 in the case of an upper secondary school degree (cf. Table I). The same pattern is found with respect to commuting costs: The children would have to travel on average a minimum of 2.9 kilometres in the case of a lower, 4.1 kilometres when visiting an intermediate, and 4.7 kilometres to reach the next upper secondary school. Whereas, thus, the financial and commuting costs increase with the level of secondary schools, the anticipated social costs are decreasing: On average, the children's friends are expected not to visit a lower secondary school with a probability of .86, whereas the social cost proves to be .67 in the case of an intermediate and only .51 in the one of an upper secondary school track.

Results

Determinants of Decisions between Secondary School Tracks
In a first step, we test for the net-effects of the factors predicted within the EJ-model to simultaneously explain educational decisions. This is done using a series of hierarchical conditional logit models (Ben-Akiva and Lerman 1994). This method of analysis was developed for empirical applications of decision theories. It is appropriate in our case since the outcome variable consists of the decision among three mutually exclusive options, and the explanatory

variables are defined by evaluations of each option by all respondents. In the case of generic explanatory variables, which are constant across options and vary only between respondents, the conditional logit model is a special case of the multinomial logit model. The conditional logit model requires the data to be organised in a way that the evaluations of the three educational options are pooled. The resulting data contains three (educational options) times 700 (families) and thus 2,100 observations. Dummy variables indicate to which type of educational degree the respective observation belongs. In order to avoid sample-selection bias due to a list-wise deletion of missing values, missing dummies are included for both parents' social class in all analyses, but estimated parameters are not reported.

In a *first* step, we control for the effect of parental class on the educational decisions (cf. Table II, model 1). Consistent with other studies (e.g., Kalmijn 1994), our results indicate that the fathers' ($\chi^2(4)=28.7$; p<.01) and the mothers' ($\chi^2(4)=60.8$; p<.01) social class exert significant net-effects on the decisions between school tracks. The standardised multinomial odds ratios with the lower secondary school as reference outcome indicate that families with either a father or a mother from the working class are less likely to select an intermediate school by a factor of .42 and .37, respectively. For selecting an upper secondary school, the chances are even lower by a factor of .16 and .08.

Second, in order to control for the students' academic competencies, we added their standardised test scores into the regression equation (cf. Table II, model 2). We find that the children's academic competencies exert a very strong effect on the educational decisions: When the students' likelihood to solve the test tasks increases by one standard deviation, the probability to select an intermediate instead of an lower secondary track is higher by a factor of 3.05, and the one to select an upper secondary track even by a factor of 9.05.

Third, our results have shown that the subjective probability that the children will be able to successfully complete the different educational tracks exerts a strong effect on the educational decisions (cf. Table II, model 3): Increasing the success probability of a degree by one standard deviation leads to a 2.9 times higher selection probability. Please note that although the net-effect of the test scores is reduced after introducing the success probabilities, this factor continues to have a significant effect on the selection probabilities. Thus, neither the effect of success probabilities can be sufficiently captured by indicators of academic abilities, nor is the effect of the students' ability completely moderated by the expectation of success.

-- Table II about here --

Fourth, we add the measure for how likely the different educational degrees are expected to maintain the fathers' and mothers' social status. We found both sub-dimensions of returns to

exert similarly strong and statistically significant net-effects on the educational decisions (cf. Table III, model 4). When a degree is perceived more likely to satisfy the MSM by one standard deviation, this increases the selection probability by a factor of 1.32 if the father and by 1.45 if the mother defines the reference point for when downward mobility is avoided.

Fifth, when testing for the effect of the different dimensions of labour-market returns, without taking interactions with the success probability into account, we find only the prestige returns to be a significant determinant of educational decisions (cf. Table III, model 5). If an educational degree is perceived to lead more likely to a prestigious job by one standard deviation, the selection probability increases by a factor of 1.87. Neither the financial returns nor those from avoiding unemployment alone are relevant for which educational track is selected. Please note that when controlling for the motivational relevance of prestige returns, the formerly significant effect of the MSM with respect to the fathers' status loses its significance. Accordingly, the motivation to maintain the fathers' status is associated with the desire to reach a high occupational prestige for the children.

Sixth, testing for the effect of different kinds of costs of education, we find that, although the parents perceive clear differences in the economic burden between the educational degrees, the families do not take this dimension into account when choosing secondary school tracks (cf. Table III, model 6). In contrast, secondary school tracks are less likely selected by a factor of .75 when the burden from commuting to school increases by one standard deviation. Net of this effect, increasing social costs of the same magnitude reduces the selection probability by a factor of .71.

-- Table III about here --

Interaction between Probability of Success and Educational Returns

In the second step of our analyses, we test the pivotal prediction from the EJ-model that the effect of educational returns depends on the level of subjective probability to successfully complete the educational degrees. Controlling for the effect of both parents' class position and the one of the test scores (parameters not shown), we include multiplicative terms between each of the returns and the success probability into the regression equation. We did not test all five interaction terms simultaneously since this would introduce a high degree of multicollineiarity into the analysis. We find significant positive interaction effects between the success probability and all but one of the five dimensions of educational returns to explain the educational decisions (cf. Table IV, models 7–12). This applies also for the financial returns, which were not found to be significant before the heterogeneity with respect to the chances of realising the educational degrees were taken into account (cf. model 11). Furthermore, the effect of

the returns from maintaining the fathers' status, which is absorbed by the prestige returns in the purely additive model 5, again proves in interaction with the success probability to have significant net-effects on the secondary school choices when the main effect of prestige returns is controlled (cf. model 8). This is also the case if the significant probability times prestige returns interaction is simultaneously included into the equation (cf. model 10). However, the returns from avoiding unemployment do not explain secondary school choices even if the success probability is taken into account (cf. model 12).

-- Table IV about here --

For interpreting the significant interaction effects, we compute selection probabilities for the three secondary school tracks assuming either low or high educational returns, and compare their sensitivity for conditions of low and high probability of success. Low probabilities are defined by one standard deviation below the average and high probabilities by the average success probability in the sample. Low educational returns represent average returns on the respective dimension and high returns are defined by one standard deviation above the average. This asymmetric, instead of an around the mean values centred definition of "low" and "high" values is chosen in order to avoid negative returns and success probabilities higher than one. The other variables in the regression equation were, in the case of categorical variables, fixed at the sample distribution, and for continuous variables at the sample mean. Because of space limitations and because the structure of results is identical for the other return dimensions, we only present the results for the prestige and financial returns to education, which show nearly the same and strongest interaction effects.

When assuming an upper secondary school degree to be relatively unlikely to be successfully completed, actors are only weakly sensitive to increasing prestige returns (cf. Table V.I): The selection probability increases from .694 to .736 when the returns increase by one standard deviation; this is an effect of +.042 points on the probability scale. The same difference in returns has a much larger effect of +.081 probability points if the success probability is high. In the case of the intermediate and lower secondary school tracks, we find a very similar pattern of results. Under the condition of relatively low success probabilities, the actors' sensitivity for increasing prestige returns is +.020 in the case of an intermediate and +.002 in the case of a lower secondary school track. This sensitivity increases to +.113 and +.016 probability points, respectively, under the condition of a higher success probability.

-- Table V.I about here --

We find the same structure of results in the case of the financial returns. Here, under the condition of low prospects of success, the sensitivity of the selection probabilities to increas-

ing returns is practically zero, even with a slight tendency to be negative (cf. Table V.II): This sensitivity is -.039, -.013, and -.002 in the case of the upper, intermediate, and lower secondary school tracks, respectively. If, however, the actors perceive better chances for completing the degrees, increasing returns lead to +.053, +.061, and +.010 higher selection probabilities of an upper, intermediate, and lower secondary school track, respectively.

-- Table V.II about here --

Summary and Discussion

In this paper, we test predictions from the Erikson-Jonsson (EJ) model about the determinants of educational decisions and their non-additive interplay. Consistent with human capital theory, pupils are assumed to instrumentally rationally decide between educational options (Becker 1964). Unlike human capital theory, the EJ-model predicts, aside from financial costs and returns, multiple and non-economic aims to motivate educational behaviour. Results from our study confirm this broad conception of the motivation to select secondary school tracks to be empirically appropriate. Aside from the financial returns to education, we find the parents' subjective beliefs about how likely a completed degree promises the maintenance of the mothers' and the fathers' social status as well as the prospects to gain prestigious jobs in work life to exert significant net-effects on the selection between secondary school tracks. However, although the parents believe in the beneficial role of more education in avoiding unemployment, they do not take these returns into account.

With respect to the costs of education, only the non-economic burden proves to be relevant: Secondary school types were less likely selected if the next school of the respective type is more far away and if less of the children's friends are visiting these school types. Thus, parents minimise commuting costs and social cost for their children. However, although the parents perceive more advanced degrees to be financially more costly, this factor does not predict the educational decisions. At least for secondary school education, the often observed negative effect of insufficient economic resources on educational outcomes is unlikely to operate through a higher anticipated economic burden (e.g., Conley 2001). Comparing the strength of the net-effect of the different explanatory factors, the beliefs about the students' probability of educational success proves to be the strongest single predictor for the selected secondary school track. Unexpected by the perspective of the EJ-model, this effect does not explain the relevance of the students' tested academic abilities. Thus, RCT does not predict the mechanism how academic abilities affect educational decision exhaustively.

Furthermore, the theory assumes the actors to go beyond a purely additive integration of success probabilities and educational returns. If instrumental rationality governs educational decisions, parents do not simply follow their judgments about the value of education or their beliefs about the chances to realise degrees, but simultaneously take both dimensions into account (Erikson and Jonsson 1996). In a statistical sense, a positive interaction effect between the two parameters is expected. In our study, we find this interaction between all five relevant dimensions of returns and the probability of success to explain the educational decisions: The effect of increasing returns is significantly stronger if the respective educational degree is expected to be more likely to be successfully completed. This result confirms the theoretical assumption that educational decisions are instrumentally rational and not value-rational in nature.

We find that the MSM with respect to the fathers' status as well as the financial returns do not significantly predict educational choices before the heterogeneity of parents' probability judgments are taken into account. Thus, a purely additive and incomplete specification of the theoretical model carries the risk of inappropriate conclusions about the motivational basis of educational decisions. This may be the reason for the partly mixed evidence about the relevance of educational returns in the literature (cf. for example Breen and Yaish 2006).

According to our results, the predictions from the EJ-model are empirically appropriate to a large extent. However, much evidence in favour of other and theoretically contradictory approaches for the explanation of educational decisions is available as well. For instance, research in the tradition of the Wisconsin Model has shown that educational outcomes are affected by the level of educational aspirations, created by socialisation and imitation of the peer-group (e.g. Seginer and Vermulst 2002). Social reproduction theory assumes educational success to result to a substantial degree from families being equipped with symbolic resources associated with cultural capital and a certain habitus of social classes (Bourdieu 1977). These factors were found to explain educational outcomes (Sullivan 2001). Whether RCT or one of the other explanations is more valid can only be judged in comparative studies where all the factors predicted within the different theories are simultaneously measured and their effect empirically tested.

In cross-sectional or even retrospective studies, it is difficult to determine whether an observed association is due to a causal effect or whether respondents rationalise their decision behaviour ex post. This is why we utilised panel data, where the hypothesised determinants of educational decisions are measured before the decision is made. Nevertheless, we cannot exclude the possibility that some families already reached an anticipatory educational decision

at the time they reported their subjective beliefs and evaluations. In this case, the strength of observed associations would overstate the real causal effect.

In contrast to school systems of other federal states in Germany, we tested the EJ-model in an institutional context where the school type recommendation of the elementary schools is not binding. As parents are provided with a maximum of freedom of choice here, the observed explanatory power of the EJ-test can be regarded as at the upper limit of what can be expected in other more restrictive school systems. Furthermore, Turner (1960) introduced the differentiation between school systems where either sponsored or contest mobility prevails. The German school system clearly represents a case of sponsored mobility, where the students are channelled into separate tracks at an early point in their school careers, and after this, changing between these tracks is highly limited. Whether and to what degree our results can be generalised to other kinds of institutional settings remains an open question, which should be answered in future research.

Notes

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2. Question wording: ‚If you take your child's present school achievement and its development in the last years into account, what do you believe is the chance that your child will be able to successfully complete a [lower/intermediate/upper] secondary school degree?'

3. Question wording: 'How likely do you regard your child, endowed with a [lower/intermediate/upper] secondary school degree, to be able to reach an at least as prestigious occupation as [you/your partner]?'

4. Question wording: 'Despite the same payment, the occupations in our society are not equally prestigious. What do you think, how likely will your child be able to obtain a highly prestigious job if he/she obtains a [lower/intermediate/upper] secondary school degree?'

5. Question wording: 'If you think about the future of your child with different school degrees, how likely will your child obtain with a [lower/intermediate/upper] secondary school degree a well-paid job?'

6. Question wording: 'In the present labor-market situation, one cannot take for granted that everybody will get a job without problems. How highly do you evaluate the risk of being unemployed with a [lower/intermediate/upper] secondary school degree?'

7. Question wording: ‚As long your child visits school, there are necessary expenditures, as for example for books and other school materials. Furthermore, your child cannot earn money and will thus be unable to contribute to its own subsistence. How do you evaluate this burden if your child realised a [lower/intermediate/upper] secondary school degree?'

8. In all models, the effect of the father's as well as the mother's EGP-class and the children's standardised test scores are controlled. The parameters are not reported due to space limitations.

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Tables and Figures

TABLE I: *Descriptive statistics for the operationalization of the theoretically predicted determinants of educational decisions*

	Lower Secondary Degree	Intermediate Secondary Degree	Upper Secondary Degree
	Mean (STD)	Mean (STD)	Mean (STD)
Probability [a)]			
Probability of Successfully Realising Degrees	.98 (.12)	.91 (.16)	.68 (.24)
Returns [b)]			
Returns from Maintaining Mother's Status	.27 (.33)	.67 (.29)	.90 (.17)
Returns from Maintaining Father's Status	.28 (.34)	.60 (.33)	.89 (.18)
Prestige Returns	.22 (.21)	.62 (.16)	.84 (.16)
Financial Returns	.18 (.19)	.60 (.16)	.83 (.16)
Job Security Returns	.29 (.26)	.50 (.17)	.57 (.25)
Costs			
Financial Costs [c)]	.17 (.22)	.30 (.25)	.54 (.30)
Commuting Costs (Distance in Kilometres)	2.9 (2.5)	4.1 (2.9)	4.7 (3.6)
Social Costs [c)]	.86 (.19)	.67 (.21)	.51 (.27)

Notes: N=700; [a)] Values between 0 'low success probability' and 1 'high success probability'; [b)] Values between 0 'low returns' and 1 'high returns; [c)] Values between 0 'low costs' and 1 'high costs'.

TABLE II: *Effects of theoretically predicted determinants on the selected type of secondary school (conditional logistic regression analysis)*

	Model 1		Model 2		Model 3	
	Standardised Odds Ratio (z)		Standardised Odds Ratio (z)		Standardised Odds Ratio (z)	
	Inter. vs. lo. sec. school	Upp. vs. lo. sec. school	Inter. vs. lo. sec. school	Upp. vs. lo. sec. School	Inter. vs. lo. sec. school	Upp. vs. lo. sec. School
Father's EGP-Class [a)]						
- Working Class	.42(-1.7)[+]	.16(-3.7)[**]	.36(-1.8)[+]	.15(-3.2)[**]	.37(-1.7)[+]	.17(-2.9)[**]
- Mixed Class	.57(-0.9)	.43(-1.4)	.31(-1.7)[+]	.22(-2.0)[*]	.30(-1.6)	.28(-1.6)[+]
Mother's EGP-Class [a)]						
- Working Class	.37(-1.8)[+]	.08(-4.6)[**]	.33(-1.8)[+]	.09(-3.9)[**]	.35(-1.7)[+]	.09(-3.8)[**]
- Mixed Class	1.17(0.3)	.38(-1.7)[+]	1.24(0.3)	.45(-1.3)	1.47(0.6)	.53(-1.0)
Constant	14.5(4.6)[**]	118.1(8.4)[**]	71.9(5.5)[**]	561.4(8.1)[**]	118.8(5.8)[**]	3107(9.3)[**]
Test Scores	--	--	3.05(5.3)[**]	9.05(9.4)[**]	2.66(4.2)[**]	7.85(8.0)[**]
Theoretical Parameters						
Probability of Success	--		--		2.91(8.7)[**]	
McFadden's R-Squared	.38		.49		.55	
Log-Likelihood	-480.6		-391.0		-345.0	
Observations (N of Households)	2100 (700)		2100 (700)		2100 (700)	

Notes: Significance: [+] $p \le .10$, [*] $p \le .05$, [**] $p \le .01$. Reference Category: [a)] Service Class.

TABLE III: *Effects of theoretically predicted determinants on the selected type of secondary school (conditional logistic regression analysis)*

	Model 4		Model 5		Model 6	
	Standardised Odds Ratio (z)		Standardised Odds Ratio (z)		Standardised Odds Ratio (z)	
	Inter. vs. lo. sec. School	Upp. vs. lo. sec. school	Inter. vs. lo. sec. school	Upp. vs. lo. sec. school	Inter. vs. lo. sec. school	Upp. vs. lo. sec. school
Father's EGP-Class [a]						
- Working Class	.36(-1.7)[+]	.22(-2.4)[*]	.39(-1.5)	.24(-2.2)[*]	.41(-1.4)	.25(-2.1)[*]
- Mixed Class	.30(-1.6)	.34(-1.4)	.25(-1.8)[+]	.29(-1.6)	.28(-1.6)	.35(-1.3)
Mother's EGP-Class [a]						
- Working Class	.51(-1.1)	.14(-3.0)[**]	.42(-1.3)	.10(-3.3)[**]	.42(-1.3)	.12(-2.9)[**]
- Mixed Class	1.64(0.8)	.59(-0.8)	1.20(0.3)	.41(-1.3)	.90(-0.2)	.36(-1.4)
Constant	53.5(4.8)[**]	838.8(7.5)[**]	32.3(4.0)[**]	345.7(6.1)[**]	34.1(3.9)[**]	313.0(5.7)[**]
Test Scores	2.58(4.1)[**]	7.51(7.9)[**]	2.65(4.2)[**]	7.78(7.9)[**]	2.65(4.1)[**]	7.54(7.7)[**]
Theoretical Parameters						
Probability of Success	2.88(8.5)[**]		2.91(8.4)[**]		3.01(8.3)[**]	
Returns						
- MSM – Mother's Status	1.45(2.4)[*]		1.40(2.1)[*]		1.43(2.2)[*]	
- MSM – Fathers' Status	1.32(2.0)[*]		1.25(1.6)		1.15(1.0)	
- Prestige Returns	--		1.87(2.8)[**]		1.74(2.4)[*]	
- Financial Returns	--		1.03(0.1)		1.08(0.3)	
- Job Security Returns	--		1.18(1.5)		1.18(1.4)	
Costs						
- Financial Costs	--		--		1.07(0.4)	
- Commuting Costs	--		--		.75(-2.6)[**]	
- Social Costs	--		--		.71(-4.9)[**]	
McFadden's R-Squared	.56		.57		.60	
Log-Likelihood	-336.3		-327.5		-311.3	
Observations (N of Households)	2100 (700)		2100 (700)		2100 (700)	

Notes: Significance: [+] $p \leq .10$, [*] $p \leq .05$, [**] $p \leq .01$. Reference Category: [a] Service Class.

TABLE IV: *Theoretically predicted interaction effects between probability of success and the different dimensions of educational returns on the selected type of secondary school (conditional logistic regression analyses)* [8]

	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
	Stand. Odds Ratio (z)	Stand. Odds Ratio (z)	Stand. Odds Ratio (z)	Stand. Odds Ratio (z)	Stand. Odds Ratio (z)	Stand. Odds Ratio (z)
Theoretical Parameters						
Probability of Success (p)	2.33(5.4)**	2.30(5.6)**	2.12(5.7)**	1.89(4.5)**	2.13(5.6)**	2.81(7.5)**
Returns						
- MSM – Mother's Status (MSM_{Mother})	1.37(1.9)*	1.42(2.2)*	1.39(2.0)*	1.40(2.1)*	1.39(2.0)*	1.40(2.1)*
- MSM – Fathers' Status (MSM_{Father})	1.17(1.1)	1.11(0.8)	1.12(0.7)	1.09(0.6)	1.16(1.0)	1.16(1.0)
- Prestige Returns ($U_{Prestige}$)	1.77(2.5)**	1.73(2.4)*	1.98(2.9)**	1.93(2.7)**	1.48(1.6)+	1.75(2.4)*
- Financial Returns ($U_{Financial}$)	1.07(0.3)	1.09(0.4)	1.03(0.1)	1.05(0.2)	1.45(1.5)	1.11(0.4)
- Job Security Returns ($U_{Security}$)	1.20(1.6)	1.21(1.7)+	1.20(1.6)	1.21(1.6)+	1.24(1.8)+	1.22(1.7)+
Costs						
- Commuting Costs	.72(-2.8)**	.73(-2.8)**	.75(-2.5)**	.74(-2.5)**	.76(-2.4)*	.74(-2.6)**
- Social Costs	.71(-4.9)**	.70(-5.0)**	.72(-4.6)**	.71(-4.7)**	.73(-4.4)**	.72(-4.8)**
Interactions						
- p • MSM_{Mother}	1.41(2.8)**	--	--	--	--	--
- p • MSM_{Father}	--	1.47(3.3)**	--	1.28(2.0)*	--	--
- p • $U_{Prestige}$	--	--	1.70(5.1)**	1.57(4.1)**	--	--
- p • $U_{Financial}$	--	--	--	--	1.72(5.2)**	--
- p • $U_{Security}$	--	--	--	--	--	1.13(1.6)
McFadden's R-Squared	.60	.60	.61	.61	.61	.60
Log-Likelihood	-307.7	-306.4	-300.2	-298.3	-299.5	-310.2
Observations (N of Households)	2100 (700)	2100 (700)	2100 (700)	2100 (700)	2100 (700)	2100 (700)

Notes: Significance: + $p \le .10$, * $p \le .05$, ** $p \le .01$.

TABLE V.I: *Effect of increasing prestige returns on the probability to select an upper, intermediate and lower secondary school track under conditions of high and low probability of success (predicted values from regression model 9)*

Selection probability of upper secondary track			
	Returns		
Probability of success	Low	High	Sensitivity
Low	.694	.736	+.042
High	.811	.892	+.081
Selection probability of intermediate secondary track			
	Returns		
Probability of success	Low	High	Sensitivity
Low	.098	.118	+.020
High	.170	.284	+.113
Selection probability of intermediate secondary track			
	Returns		
Probability of success	Low	High	Sensitivity
Low	.010	.012	+.002
High	.018	.034	+.016

Notes: The predicted values are computed for one standard deviation under (low) the sample mean and for the average probability of successfully realising the educational degrees in the sample. With respect to returns 'low' represents subjects with average returns and 'high' subjects with one standard deviation above the sample mean of the prestige returns observed for the educational degrees. The other returns and costs as well as the test scores were fixed at the sample means and the parental class position on the sample distribution.

TABLE V.II: *Effect of increasing financial returns on the probability to select an upper, intermediate and lower secondary school track under conditions of high and low probability of success (predicted values from regression model 10)*

	Selection probability of upper secondary track		
	Returns		
Probability of success	Low	High	Sensitivity
Low	.611	.649	-.039
High	.798	.851	+.053

	Selection probability of intermediate secondary track		
	Returns		
Probability of success	Low	High	Sensitivity
Low	.093	.080	-.013
High	.179	.241	+.061

	Selection probability of intermediate secondary track		
	Returns		
Probability of success	Low	High	Sensitivity
Low	.011	.009	-.002
High	.023	.033	+.010

Notes: The predicted values are computed for one standard deviation under (low) the sample mean and for the average probability of successfully realising the educational degrees in the sample. With respect to returns 'low' represents subjects with average returns and 'high' subjects with one standard deviation above the sample mean of the financial returns observed for the educational degrees. The other returns and costs as well as the test scores were fixed at the sample means and the parental class position on the sample distribution.

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