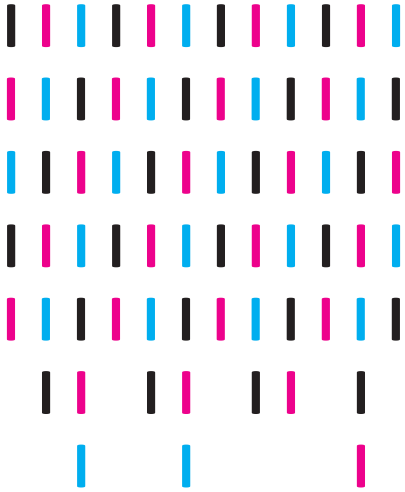

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Hannah Steinberg and Kerstin Hoenig

MEASURING RATIONAL EDUCATIONAL CHOICES IN NEPS

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Measuring rational educational choices in NEPS

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Rational Choice Theory in the NEPS

Abstract

Models based on rational choice theory have emerged as the most prominent explanation of educational inequality. These approaches explain systematic differences in educational decisions between students and parents from different social backgrounds by pointing out differences in the respective cost benefit calculations. However, few studies have tried to assess the perceived costs, benefits and success probabilities of different educational options directly. This paper provides an overview of the operationalization of these parameters for all starting cohorts of the NEPS. It also presents empirical results from Starting Cohort 4 and provides information on data handling and modeling strategies.

Keywords

Rational choice theory, social inequalities, educational decision, decision-making process, class position

1. Introduction

In the German educational system, social class of origin exerts substantial effects on children's educational outcomes. Even after educational expansion and the increase in educational participation rates among all social classes, class differences in levels of achieved educational credentials are still high in Germany and children's educational opportunities highly depend on their parents' social background (e.g. Becker, 2003; Shavit and Blossfeld, 1993). These social inequalities manifest at several branching points of the educational system throughout the life course. For instance, children with a less favorable social background are less likely to attend early childcare institutions (Fuchs-Rechlin and Bergmann, 2014; Geier and Riedel, 2009; Kreyenfeld and Krapf, 2016) and spend less time there (Becker and Lauterbach, 2007; Schober and Spieß, 2012). At the end of elementary school these children tend to select less ambitious secondary school tracks than children with a more advantaged background (Büchler, 2016; Dollmann, 2011; Neugebauer, 2010). Even after reaching a higher level of secondary education (*Abitur*), children with a lower social origin are more likely to enter vocational training instead of tertiary education (Becker and Hecken, 2009; Mayer, Müller and Pollak, 2007; Schindler and Lörz, 2012; Schindler and Reimer, 2008). Finally, a lower social origin is linked to a lower participation rate in adult education (Schönmann and Becker, 1995).

Differences in academic performance—due to class differences in access to cultural, social and economic resources, as well as institutional structures such as an early stratification after elementary school—are one reason for Germany's high level of educational inequality. Following Boudon's (1974) terminology, these performance differences are typically referred to as primary effects. But even at the same level of academic performance we can observe systematic differences in educational decisions between families from different socioeconomic backgrounds. Explaining these secondary effects of educational inequality is one prominent aim of educational stratification research.

Rational Choice Theory (RCT) has emerged as the most prominent theory in this field (e.g. Becker, 1962; Breen and Goldthorpe, 1997; Erikson and Jonsson, 1996; Esser, 1996; Stocké, 2007). It provides a set of assumptions about the mechanisms generating and reproducing educational inequality. Investigations about social mechanisms of persistent educational inequalities among social classes based on the RC paradigm have become more and more popular in recent years. However, a closer look at the literature shows two shortcomings. Firstly, the majority of these studies investigate only two educational decisions: the transition from elementary to secondary school (e.g. Becker, 2003; Breen and Jonsson, 2000; Davies, Heinesen and Holm, 2002; Stocké, 2007) and access to tertiary education (e.g. Becker and Hecken, 2009). Secondly, most empirical contributions can only indirectly test the theoretical assumptions. RCT relies on the assumption that different social classes perceive systematic differences in the costs, benefits, and success probabilities of different educational options, but there are hardly any surveys that include explicit operationalizations of these parameters. In order to provide data that are able to close these research gaps, NEPS incorporates RC instruments at several branching points of the educational system over the whole life course. These instruments are included in each of the six Starting Cohorts of the NEPS and focus on several important transitions and decisions, from choice of early education and care arrangements shortly after a child's birth to the

choice to participate in lifelong learning after leaving formal education (cf. Stocké, Blossfeld, Hoenig and Sixt, 2019).

This paper aims to give an overview of these RC instruments. To this end, the next section briefly summarizes the tenets of popular sociological RC models that form the theoretical background of the NEPS instruments. Subsequently, we introduce the educational decisions investigated by these instruments as well as the operationalization of the underlying theoretical constructs. In a further section, characteristics of the data as well as strategies for empirical analyses that might be helpful for data usage are explained. For the purpose of a better illustration, this paper exemplarily uses Starting Cohort 4 data on the decision between vocational education and training (VET) versus tertiary education, which respondents have to face at the end of upper secondary school.

2. Theoretical Background[1]

Sociological RCT models actors' subjective expected utility (SEU) as a result of their expected benefits, costs and success probabilities. RCT assumes that actors choose the action with the highest SEU (Esser, 1996). In contrast to economic human capital theory (Becker, 1964), sociological RCT does not try to express all costs and benefits in monetary terms and does not assume perfect information. Thus, it emphasizes the subjective nature of the actors' evaluations of costs and benefits, as well as their estimation of the probability of success.

Within the field of sociology of education, the RCT debate has been shaped by the works of Erikson and Jonsson (1996), Breen and Goldthorpe (1997), and Esser (1996), who each propose an RCT model of educational decision making. These models are not identical in their particulars, but they are all based around the central constructs of benefits, costs, and probabilities of success within the context of a given educational system. Facing different—often institutionally defined—educational options, individuals have to make a decision between educational careers based on the evaluation of these factors. Returns can include labor market benefits such as income, job security, or job prestige, as well as personal enjoyment of the chosen option and future access to other educational options (e.g., only the highest secondary degree opens access to a tertiary degree). The motive of status maintenance (MSM) is another important subjective benefit. It refers to actors' ability to maintain their families' educational and social status. Assuming that actors are risk-averse, Breen and Goldthorpe (1997) and Esser (1996) posit that individuals are motivated to achieve a class position that is congruous with their family background to avoid the risk of intergenerational downward mobility, whereas the chance of upward mobility provides much less incentive for educational decisions. In consequence, high educational degrees are of special importance to actors from a middle and upper class background because they rely on those degrees to maintain their social status. Since less privileged classes are likely to avoid status demotion with less ambitious degrees, individuals from these classes leave the educational system earlier than middle and upper class actors.

The cost dimension includes direct as well as indirect costs for completing one of the educational alternatives. Direct costs embrace all financial expenses, which accrue for example for textbooks, teaching materials, or tuition fees. Non-financial burdens, such as

[1] This section is primarily based on considerations of Stocké et al., 2019.

social, time, or effort costs, are also part of the direct cost dimension. Indirect or opportunity costs refer to foregone benefits that could have been realized during the time of further education, most importantly missed earnings from labor market participation. Since lower class families are less endowed with economic resources, they may experience the same objective expenditures or missed earnings as more burdensome.

Another key component of the rational decision-making process is the subjective expected probability of success. Since returns can only be realized if the aspired educational option is successfully completed, individuals take their success probability for each option into account. Earlier academic performance is often the basis of this evaluation. Class differences in academic performance due to a more restricted access to cultural, economic, and social resources for lower-class families lead to differentiations in the subjective probability of educational success.

Combining these parameters leads to the following utility function for educational option A_n:

$$U(A_n) = p_n(B_n + q_n \times MSM) - C_n$$

where p denotes the probability of success, B the benefits, MSM the motive of status maintenance, q the probability that status can be maintained, and C the costs.

The theory assumes that class differences in educational attainment result primarily from different perceptions of p, q, and C. This is true even after educational expansion, which did not affect the balance between these parameters. Thus, educational inequality persists.

3. Measurement concept and operationalization of Rational Choice Parameters in the NEPS

The following section describes the operationalization of the RC parameters. Our goal was to develop an instrument that firstly ensures comparability across all stages and secondly is tailored to the decisions specific to each stage. Furthermore, we had to take into account that, when trying to explain educational decisions over the life course, the relative importance of different actors changes during this time. In early stages, mainly parents make educational decisions, whereas the importance of the children increases over time. Therefore, data collection has to concentrate on the appropriate decision agents. As a result, we survey both parents' and children's estimation of RC parameters for the majority of children's school career. Three German panel studies that track the transition from elementary to primary school served as inspiration for the NEPS RC modules: "Educational Processes, Competence Development and Selection Decisions in Pre- and Primary School Age" (BiKS), "Kompetenzaufbau und Laufbahnen im Schulsystem (competence development and education careers in the school system)" (KOALA-S), and the "Mannheim Educational Panel Study" (MEPS). There were no prior measures of RC constructs for other educational transitions in the German context. The NEPS RC modules were therefore newly developed using quantitative pre-pilot and pilot studies as well as extensive cognitive pretesting.

As mentioned above, content varies according to the respective decision. Nevertheless, our aim was to ensure the comparability across all stages. Therefore, we kept the question format (including sentence structure, word choice, and response options) as constant as

possible. Furthermore, since all measurements of RC parameters are strictly prospective, we focused on the most important upcoming decision. Against this background, the following overview shows the different educational decisions, which the surveys of the different Starting Cohorts take into account.

Table 1: Educational Decisions Covered by the NEPS RC Modules

Starting Cohort	Wave	Age / Grade	Educational decision	Informant
SC 1	1	6-8 months	Decision about early child care arrangements	parent
	2	12-14 months	When to enter Kindergarten	parent
SC 2	5	Grade 3	Choice of secondary degree	parent, target
	7, 8, 9	Grade 5,6,7	Change of school type	parent, target
SC 3	2, 4, 6, 7	Grade 6, 8, 9, 10	Choice of secondary degree	parent, target
	8	Grade 12	Choice between vocational education and training or university	parent, target
SC 4	1, 3	Grade 9, 10	Choice of secondary degree	parent, target
	7	Grade 12	Choice between vocational education and training or university	parent, target
	from wave 3 onwards	First year of VET	Discontinuation or change of vocational education and training	target
	from wave 3 onwards	First year of career prep	Discontinuation or change of career preparation program	target
	from wave 9 onwards	First year of study	Discontinuation or change of field of study	target
SC 5	1	First year of study	Discontinuation or change of field of study	target
	5	Third year of study	Choice of obtaining a master's degree	target
	10	Fifth year of study	Choice of obtaining a doctorate	target

SC 6	4, 8, 12	All adults	Participation in nonformal education and training	target
	4, 8, 12	All adults	Choice of obtaining an additional educational degree	target

As Table 1 shows, the NEPS covers many different educational decision processes. In line with RCT, we always measure the cost and benefit dimensions as well as the success probability for each of these decision alternatives.[2] The following description refers to the most relevant determinants of these dimensions. For a better understanding of these measurements, *Table 2* shows exemplarily the operationalization of these parameters for the educational decision between vocational education and training (VET) and tertiary education in Starting Cohort 4 (for the measurement of all other educational decisions see the Appendix). The following data sections also refer to this educational decision.

Benefits. The benefit that is most often mentioned in the literature are labor market returns (Becker, 1962; Breen and Goldthorpe, 1997; Erikson and Jonsson, 1996; Esser, 1996). Depending on the age of the target person, we assess labor market returns with a one-item measurement (likelihood of obtaining a good job), or four items that capture income, job prestige, interesting tasks at work, and job security. Questions refer to the probability of realizing these benefits when choosing one of the possible alternatives. Answers are recorded on a response scale from 1 (very poor) to 5 (very good), with the exception of the question referring to job security, which is recorded from 1 (very hard) to 5 (very high). We also include other benefits, depending on the educational decision. These include mothers' labor market participation, social and cognitive competence development (early child care arrangements, when to enter Kindergarten), enjoyment of and overall satisfaction with the educational option (change of school type, discontinuation or change of vocational education and training/career preparation program/field of study), prestige of the degree (change of school type), and its instrumentality for participants' further educational career (discontinuation or change of career preparation program). Respondents might also differ in how they rate these benefits for their overall utility. For instance, part-time workers might consider the prospect of future career advancements as less important to their overall well-being than someone who works full time. Therefore, we also ask respondents how important each of these potential benefits is to them for selected decisions.

Status Maintenance. Most RC models assume benefits such as future labor market success to be unaffected by social background. This is not true for the MSM, which is therefore assessed in great detail. We consider four dimensions: the type of status (educational and occupational status), the reference point (mother's and father's status), the subjective

[2] There are several educational decisions where there is no clearly defined set of decision alternatives or where there is a large choice set of extremely heterogeneous options. This is most often the case when the decision concerns whether to continue with the current option (e.g. the current field of study) or whether to abandon it. In these cases, abandoning the current option typically entails a large variety of alternatives (e.g. enrolling in another field, starting vocational training, entering the job market, etc.). For these decisions, we only ask respondents about the costs, benefits and success probability of the current option. The assumption is that the probability of abandoning the current option in favor of an unspecified alternative increases the more unfavorably respondents rate the current option.

importance of maintaining status, and the probability that status can be maintained with the given educational option. Firstly, we assess the subjective importance of SM for the target person for both occupational and educational status of each parent. The responses range between 1 (very unimportant) and 5 (very important). Secondly, for occupational status the respondents had to answer how likely mother's or father's status can be maintained when each of the possible educational alternatives is chosen. The response scale varies between 1 (very poor) and 5 (very good). This approach provides researchers with the possibility to model the interaction between importance and likelihood of SM. Furthermore, in Starting Cohort 1 to 4 targets person's parents are asked about their motive that their child should maintain their status. Thus, data users can compare parents' and target persons' attitudes with respect to the motive of SM. Collecting data on both parents allows users to test various models of parental social status and compare the importance of fathers and mothers (cf. Korupp, Ganzeboom, and Van Der Lippe, 2002). In Starting Cohort 6, we also assess the MSM with regard to respondents' own status and their colleagues' status.

Costs. The direct cost dimension is measured by asking respondents to think about the difficulty to cover direct expenditures (e.g. travel costs, books, fees) for each of the educational alternatives. They report how strongly the expenditures for the different careers would pose a financial burden for them as well as their family. Answers are recorded on a response scale from 1 (very hard) to 5 (very easy). Furthermore, opportunity costs are operationalized by how high the loss of income would be for each of the decision alternatives. On a 5-point-scale the responses range between 1 (very low) and 5 (very high). Depending on the respective stage, relevant cost dimensions can also include social costs such as losing friends who go to a different school as well as time and travel costs.

Success probability. The expected success probability is measured by asking how likely respondents perceive their chances to successfully complete each of the educational alternatives. The response scale varies between 1 (very unlikely) and 5 (very likely).

Table 2: Operationalization of the Rational Choice Parameters for the Educational Decision Between Vocational Education and Training and Tertiary Education (SC 4)

Theoretical construct	**Measurement Concept**	**Codification / Variables**
Subjectively expected benefits		
Labor market		
Income	How favorably would you judge your prospects of getting a well-paid job …	1 = very poor; 5 = very good
	… if you obtained a vocational training qualification?	t30251a
	... if you completed a higher education program?	t30241a
Job prestige	And how good would be the prospects of getting a socially prestigious job ...	1 = very poor; 5 = very good
	… if you obtained a vocational training qualification?	t30251b
	... if you completed a higher education program?	t30241b

Interesting job	How favorable would you judge your prospects of getting an interesting job ...	1 = very poor; 5 = very good
	… if you obtained a vocational training qualification?	t30251c
	... if you completed a higher education program?	t30241c
Job security	What would be the risk of becoming unemployed …	1 = very low; 5 = very high
	… if you obtained a vocational training qualification?	t30251d
	... if you completed a higher education program?	t30241d
Status maintenance		
Importance	How important is it for you in future to obtain a job as good as or better than ...	1 = very unimportant; 5 = very important
	... your mother?	t30560a
	… your father?	t30560b
Probability Mother	What would be the prospects of a job as good as or better than that of your mother ...	1 = very poor; 5 = very good
	... if you obtained a vocational training qualification?	t30751a
	... if you completed a higher education program?	t30741a
Probability Father	What would be the prospects of a job as good as or better than that of your father ...	1 = very poor; 5 = very good
	... if you obtained a vocational training qualification?	t30751b
	... if you completed a higher education program?	t30741b
Subjectively expected costs		
Direct costs	During a vocational training program or higher education, certain things have to be paid for, e.g. travel costs, books, or even fees. How difficult would it be for you and your family to cover these costs if you ...	1 = very hard; 5 = very easy
	... took up vocational training?	t30351a
	... embarked on higher education?	t30341a
Opportunity costs		
	Similarly, during vocational training or higher education you will only have limited opportunities to earn money in order to cover your living costs. How great would be your loss of income if you ...	1 = very low; 5 = very high
	... took up vocational training?	t30451a
	... embarked on higher education?	t30441a
Subjectively expected success probability		
	How likely is it in your opinion that you ...	1 = very unlikely; 5 = very likely
	... could successfully complete vocational training?	t30051a
	... could successfully complete higher education?	t30041a

4. Characteristics and usage of the Rational Choice parameters

The following section gives an overview of the data's descriptive characteristics, which are typical for the NEPS' RC parameters. Several possibilities of building factor scores of the measured benefit-parameters are also discussed. Since the theory predicts that classes differ in the perception of RC parameters, these antecedence conditions are reported in a further step. Additionally, multivariate analysis methods in order to investigate the association between the RC parameters and the educational decision are shortly described.

4.1 Data characteristics and descriptive results

Low values for "don't know"- as well as "refused"-replies are a typical characteristic of RC items in the NEPS. However, distributions of the answers are often right- or left-skewed and values at the edge are often poorly filled. For instance, Figure 1 and Figure 2 display the distributions of the Starting Cohort 4 labor market benefit-items for the educational choice of VET and tertiary education, respectively.[3]

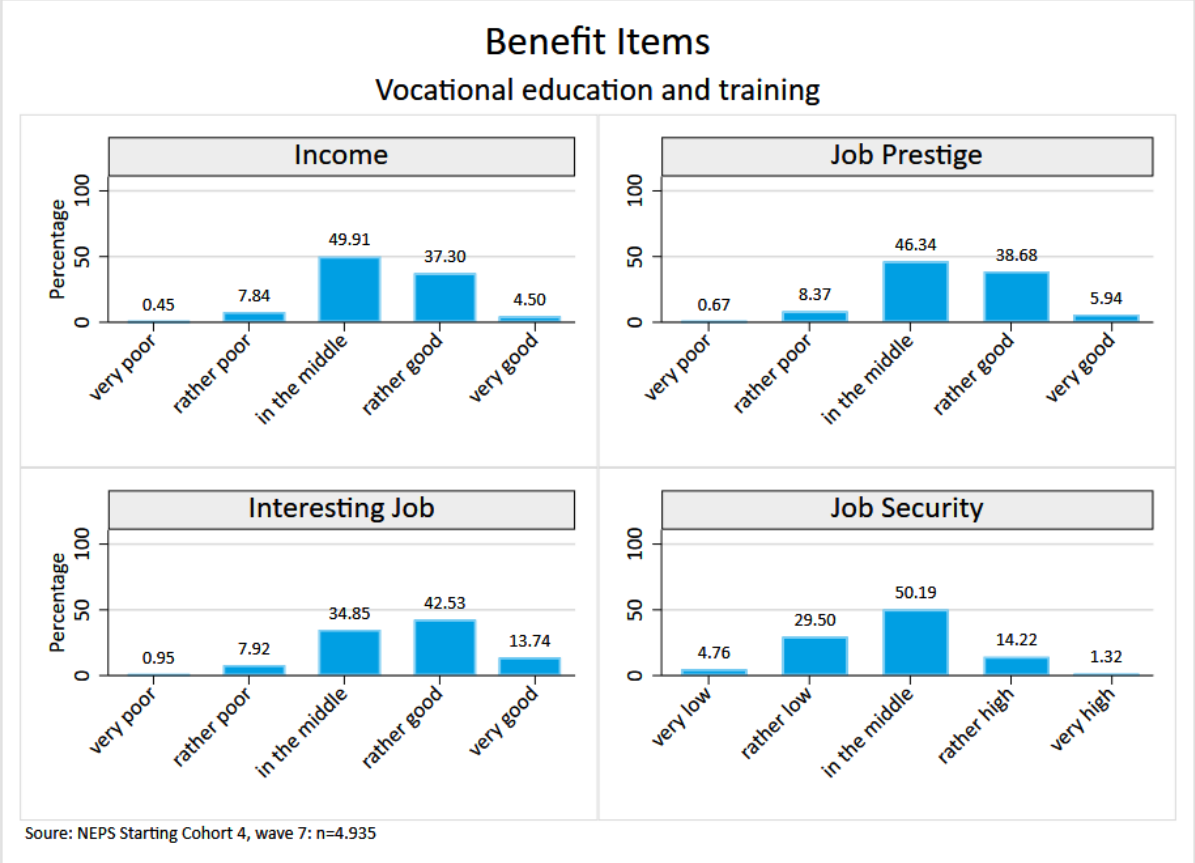

Figure 1: Distribution of the labor market benefit items of VET (SC4).

The pattern that is visible in Figures 1 and 2 can be observed in all Starting Cohorts: Generally, benefits of the highest educational option are rated very favorably, whereas lower options are perceived as more nuanced. Similar patterns emerge for costs. However, financial costs are generally perceived to be very low for all educational options. This result

[3] The current Scientific Use File version is available under: *doi:10.5157/NEPS:SC4:9.1.1*

likely mirrors the fact that schooling, VET and tertiary education are generally free of charge in Germany, and remaining costs for textbooks, transportation, etc., are not perceived as particularly burdensome.

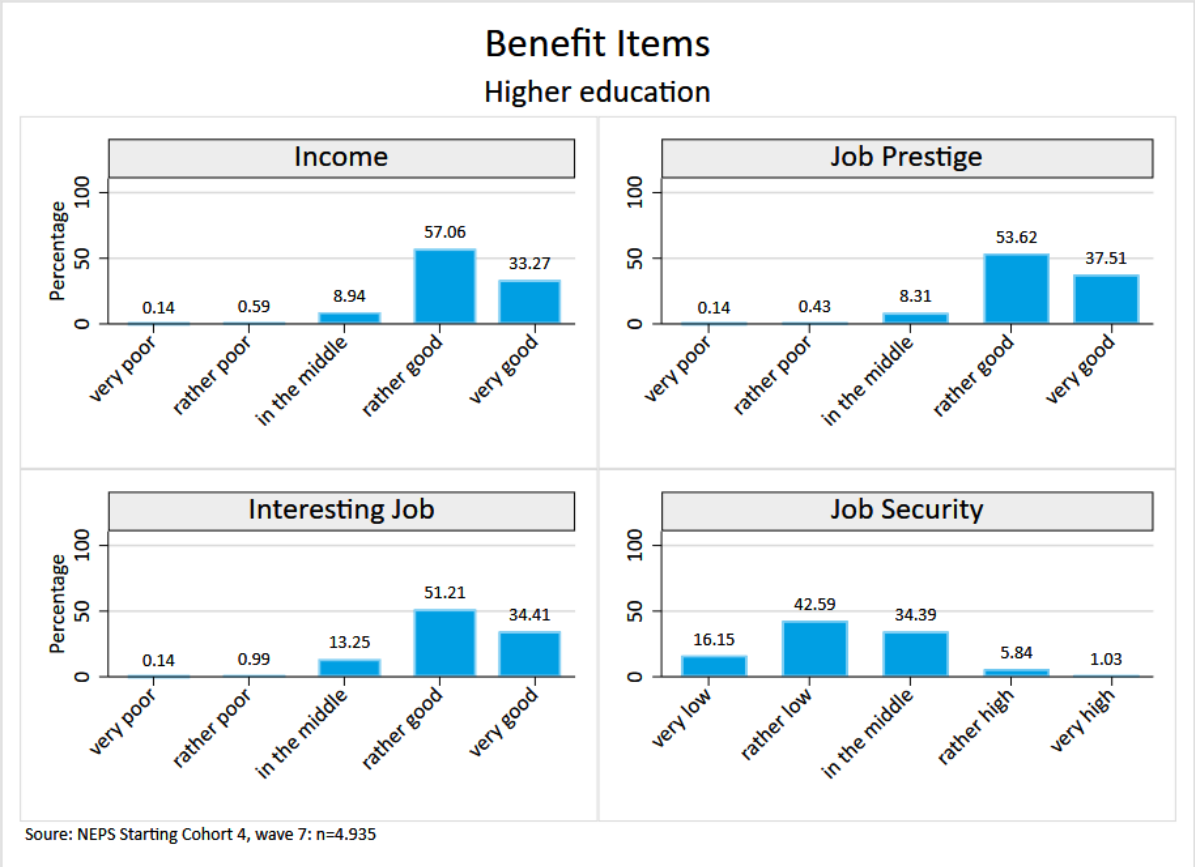

Figure 2: Distribution of the labor market benefit items of higher education (SC4).

Since RCT assumes that social classes differ in the perception of costs for educational investments, the probability of successfully realizing educational credentials, and the suitability of the degrees to ensure intergenerational SM,

Table 3 and Table 4 document the mean of the RC parameters depending on different social classes for the choice of VET and tertiary education, respectively, while table 5 shows the importance of maintaining maternal and paternal social status. In this analysis, parents' social class position is operationalized by using the EGP class scheme (Erikson, Goldthorpe, and Portocarero, 1979). Following Stocké (2007), the different EGP classes were differentiated as follows: I (upper service class), II (lower service class), IIIab, IVabc (routine non-manuals and small proprietors), and V, VI VIIab (supervisors, skilled, and unskilled manual workers). If information about both parents were available, the analyses display the highest value on this dimension as an indicator for the family's class position (dominance model; Korupp et al., 2002).

Table 3: Class Differences in the Rational Choice Parameters of the Educational Decision "Vocational Education and Training" (SC 4)

	upper service class (I)	**lower service class** (II)	**routine non-manuals and small proprietors** (IIIab, IVabc IV)	**supervisors, skilled, and unskilled manual workers** (V, VI, VIIab)
Subjectively expected benefits				
Labor market				
Income	3.30	3.34	3.35	3.43*
	(0.69)	(0.68)	(0.75)	(0.65)
Job prestige	3.34	3.37	3.38	3.42
	(0.75)	(0.73)	(0.76)	(0.69)
Interesting job	3.56	3.36	3.57	3.82*
	(0.85)	(0.85)	(0.86)	(0.77)
Job security	2.80	2.76	2.76	2.82
	(0.76)	(0.75)	(0.84)	(0.86)
Probability of status maintenance				
Mother	2.90	3.13	3.56*	4.03*
	(1.14)	(1.02)	(0.92)	(0.82)
Father	2.39	2.89*	3.35*	3.71*
	(1.12)	(1.09)	(1.05)	(0.92)
Subjectively expected costs				
Direct costs	3.98*	2.76	2.76	2.82
	(0.81)	(0.75)	(0.84)	(0.86)
Opportunity costs	2.43	2.40	2.37	2.68*
	(0.82)	(0.80)	(0.77)	(0.80)
Subjectively expected success probability				
	4.58	4.57	4.54	4.45
	(0.61)	(0.57)	(0.67)	(0.67)

Mean and standard deviation in parentheses;
* value is significantly different (p<.05) from the mean value across the three remaining categories
Source: NEPS Data Starting Cohort 4, wave 7; own calculations, n=2.407

Concerning labor market benefits, we see few differences between the social classes that reach statistical significance. This is in line with the assumption that job benefits to education are independent of social background. However, it should be noted that children of working class parents tend to rate benefits to VET slightly higher than all other social

classes and are more pessimistic when it comes to the risk of job loss for a tertiary degree. In consequence, the difference between the benefits of a tertiary degree and VET are smaller for children with a working class background. It is possible that these children have a different point of reference of what constitutes a good job. We also observe differences in the importance of SM. How important parents regard SM is expected not to differ according to their class position, because "even families form the lowest social class, where inter-generational status demotion is in fact impossible, are in principle assumed to care about SM" (Stocké 2007, p. 511). Contrary to this theoretical assumption

Table 5 shows that the SM for both parents is on average *more* important for respondents with a lower social class background than for respondents with a higher one. These group differences are statistically significant.

Results for the MSM, costs, and success probabilities are all in line with theoretical expectations: All social classes expect that SM is more likely with a tertiary degree, that a tertiary degree is more costly and that its probability of success is lower than for VET. As expected, the probabilities of SM are on average significantly higher the lower respondents' social class background. Difficulties to cover direct costs of either option are significantly lower for respondents with a higher social class status. Opportunity costs are on average at the highest for respondents with a low social class status, and the differences are especially pronounced for the opportunity costs of a tertiary degree. Additionally, success probabilities for both options are higher for respondents with a higher social class origin than for respondents with a lower one, and once again the differences between classes are more pronounced for a tertiary degree. Overall, the contrast between a tertiary degree and VET is more pronounced the higher the social class background.

Table 4: Class Differences in the Rational Choice Parameters of the Educational Decision "Tertiary Education" (SC 4)

	upper service class (I)	**lower service class** (II)	**routine non-manuals and small proprietors** (IIIab, IVabc IV)	**supervisors, skilled, and unskilled manual workers** (V, VI, VIIab)
Subjectively expected benefits				
Labor market				
Income	4.24	4.24	4.20	3.65
	(0.56)	(0.59)	(0.68)	(0.97)
Job prestige	4.32	4.29	4.25	4.31
	(0.58)	(0.61)	(0.64)	(0.67)
Interesting job	4.20	4.20	4.17	4.30
	(0.67)	(0.66)	(0.69)	(0.65)
Job security	2.29	2.33	2.39*	2.48*

	(0.81)	(0.81)	(0.86)	(0.84)
Probability of status maintenance				
Mother	4.27	4.33	4.48*	4.62*
	(0.69)	(0.68)	(0.67)	(0.63)
Father	3.92	4.10	4.26	4.47
	(0.97)	(0.76)	(0.76)	(0.64)
Subjectively expected costs				
Direct costs	3.58*	3.31	2.97	2.87
	(0.95)	(1.01)	(1.01)	(1.07)
Opportunity costs	2.95	3.10	3.18	3.31
	(0.98)	(0.97)	(0.99)	(1.01)
Subjectively expected success probability				
	4.13*	4.03	3.97	3.65
	(0.72)	(0.74)	(0.80)	(0.97)

Mean and standard deviation in parentheses;
* value is significantly different (p<.05) from the mean value across the three remaining categories
Source: NEPS Data Starting Cohort 4, wave 7; own calculations, n=2.407

Table 5: Class Differences of the Importance of Status Maintenance (SC 4)

	upper service class (I)	**lower service class** (II)	**routine non-manuals and small proprietors** (IIIab, IVabc IV)	**supervisors, skilled, and unskilled manual workers** (V, VI, VIIab)
Importance of status maintenance				
Mother	3.34	3.34	3.49*	3.78*
	(1.35)	(1.31)	(1.36)	(1.39)
Father	3.23	3.28	3.42*	3.73*
	(1.33)	(1.29)	(1.33)	(1.35)

Mean and standard deviation in parentheses;
* value is significantly different (p<.05) from the mean value across the three remaining categories
Source: NEPS Data Starting Cohort 4, wave 7; own calculations, n=2.407

4.2 Suggestions for data handling and analysis methods

Due to time restrictions in all NEPS surveys, most RC constructs rely on one-item measurements that are not meant to be integrated into indices. In many cases, it will be possible to use the variables as they are and assume that the underlying response scale is quasi-metric, or to create dummy variables from the existing measures. The latter might also help with the problem of asymmetrical distributions for many variables.

In cases with only two choice alternatives, it is possible to construct differentials by subtracting the values of the respective costs, benefits, and success probabilities for the first option from that of the second.

Calculating different factors of the labor market benefit items might also be a useful tool if the researches is interested in benefit effects as a whole. In our example, reliability analyses of the labor market benefits show a Cronbach's alpha of 0.68 (tertiary education) and 0.71 (VET), respectively. However, not considering the "job security" item would improve Cronbach's alpha for both educational options (0.75 for VET and 0.72 for tertiary education). Again, this finding is a typical feature of the labor market benefit items, which can be found in all Starting Cohorts. Furthermore, an exploratory factor analysis might give useful information about the unidimensionality of the scales. In this context, the principal component analysis shows a unidimensional solution for both scales – VET and tertiary education. However, for the "job security" item factor loadings are low and uniqueness is relatively high at each of the analyzed factor. Since this finding is typical for the labor market benefit items, users have to decide whether to include or to exclude the "job security" item. Testing the explanatory power of both scores – one with and one without the "job security" item – might also be a helpful solution.

Against this background, there are different ways to combine the labor market benefit items into a single index. Combining the items for each scale by calculating the linear combination of the items, either as a sum or on average, is one possibility. Another possibility is to take the different weights (factor loadings) of each item into account. Since a linear combination of the weighted items reflects the unequal association of each item with the factor, this solution might be a better representation of the benefit dimension in particular if the factor loadings are very different.

In those instances where we have included ratings of the importance of certain benefits – for instance in the decision to participate in nonformal education and training (Starting Cohort 6) or in the decision to change school tracks (Starting Cohort 2) – it is possible to construct a weighted index of benefits by multiplying each expected benefit with its subjective importance and then adding up the products. A similar weighted score can be constructed for the MSM, since importance as well as the probability of mother's and father's SM, respectively, are measured. In this case, the importance of SM functions as weight for the possibility of SM of each educational option. Alternatively, multivariate models can include an interaction term of the probability and importance of SM.

Subsequent analyses have to show whether these parameters can explain the effects of social origin on educational decisions. In this context, data users have to take into account that all RC parameters are measured prospectively – factual decisions are therefore only observable in later survey waves. Furthermore, it should be noted that the standard RC model assumes an interaction between the probability of success and the benefits. These interaction terms should be included in multivariate models.

Standard modelling approaches such as binary or multinomial logit models are useful tools to examine the NEPS RC parameters. Besides these approaches, using conditional logit models or similar advanced discrete choice models might be an appropriate method to research choice behavior, too (cf., Hoffmann and Duncan, 1988; McFadden, 1973). As an

extension of the multinomial logit model, conditional logit models take into account that 1) all possible alternatives are presented to each individual but that 2) each alternative has its own characteristics and that 3) individuals can choose only one of these offered options. Conditional logit models include attributes of all choice alternatives as well as characteristics of the individuals making the choice. Since the NEPS measures RC parameters for the relevant educational alternatives at several branching points, modeling the choice behavior by a conditional logit model might be a gainful method. These models are especially useful when there are more than two choice alternatives, which is the case for the decision between the three school leaving certificates of *Hauptschulabschluss*, *Realschulabschluss* and *Abitur*.

5. Summary

The NEPS Starting Cohorts contain explicit measures of respondents' subjective estimations of costs, success probabilities, benefits, and the MSM for educational decisions across the life course, from early education and care to lifelong learning. The NEPS is the first study of its kind to provide this kind of data. It can therefore shed important insight on the standard assumptions of RCT in the field of education.

As was exemplified in this paper using data from Starting Cohort 4, measures of most parameters are in line with theoretical assumptions. However, it has to be noted that some items show asymmetrical distributions. We have provided suggestions for how to deal with these issues and discussed further methods for data handling and analysis strategies.

Finally, it has to be noted that RCT itself has its limits. An ever-expanding literature demonstrates that, while RCT might be an intriguingly parsimonious model of human behavior, actual decision mechanisms often fall short of the assumption of instrumental rationality. Instead, actors engage in satisficing (Simon 1993), use heuristics (Gigerenzer and Todd, 1999), or follow their beliefs, attitudes and aspirations without much reflection. The NEPS additionally surveys theoretical constructs of the Bounded Rationality (cf. Stockè et al., 2019) approach, which address these deficiencies of the RCT approach.

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6. References

Becker, G. (1964). *Human Capital. A Theoretical and Empirical Analysis with Special Reference to Education*. New York, Columbia University Press.

Becker, R. (2003). Educational Expansion and Persistent Inequalities of Education: Utilizing Subjective Expected Utility Theory to Explain Increasing Participation Rates in Upper Secondary School in the Federal Republic of Germany. *European Sociological Review*, *19*(1), 1–24.

Becker, R., & Hecken, A. E. (2009). Higher Education or Vocational Training? An Empirical Test of the Rational Action Model of Educational Choices Suggested by Breen and Goldthorpe and Esser. *Acta Sociologica*, *52*(1), 25–45.

Becker, R., & Lauterbach, W. (2007). Vom Nutzen vorschulischer Erziehung und Elementarbildung: Bessere Bildungschancen für Arbeiterkinder? In R. Becker & W. Lauterbach (Eds.), *Bildung als Privileg* (pp. 125–155). Wiesbaden, Springer VS.

Boudon, R. (1974). Education, opportunity, and social inequality: Changing prospects in Western society. New York, Wiley.

Breen, R., & Jonsson, J. O. (2000). Analyzing Educational Careers: A Multinomial Transition Model. *American Sociological Review*, *65*(5), 754.

Breen, R., & Goldthorpe, J. H. (1997). Explaining educational differentials: Towards a formal rational action theory. Rationality and Society, 9, 275–305.

Büchler, T. (2016). Schulstruktur und Bildungsungleichheit: Die Bedeutung von bundeslandspezifischen Unterschieden beim Übergang in die Sekundarstufe I für den Bildungserfolg. *KZfSS Kölner Zeitschrift für Soziologie und Sozialpsychologie*, *68*(1), 53–87.

Davies, R., Heinesen, E., & Holm, A. (2002). The relative risk aversion hypothesis of educational choice. *Journal of Population Economics*, *15*(4), 683–713.

Dollmann, J. (2011). Verbindliche und unverbindliche Grundschulempfehlungen und soziale Ungleichheiten am ersten Bildungsübergang. *KZfSS Kölner Zeitschrift für Soziologie und Sozialpsychologie*, *63*(4), 595–621.

Hoffmann, S.D., & Duncan, G.T. (1988). Multinomial and conditional logit discrete-choice models in demography. *Demography*, 25(3), 415-427.

Erikson, R., Goldthorpe, J. H., & Portocarero, L. (1979). Intergenerational Class Mobility in Three Western European Societies: England, France and Sweden. *The British Journal of Sociology*, *30*(4), 415–441.

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, Westview Press.

Esser, H. (1996). *Soziologie. Spezielle Grundlagen. Band 1: Situationslogik und Handeln*. Frankfurt a.M., Campus Verlag.

Fuchs-Rechlin, K., & Bergmann, C. (2014). Der Abbau von Bildungsbenachteiligung durch Kindertagesbetreuung für unter 3-Jährige. *Zeitschrift für Erziehungswissenschaft*, *17*(S2), 95–118.

Geier, B., & Riedel, B. (2009). Ungleichheiten der Inanspruchnahme öffentlicher frühpädagogischer Angebote. Einflussfaktoren und Restriktionen elterlicher Betreuungsentscheidungen. In H.-G. Roßbach & H.-P. Blossfeld (Eds.), *Frühpädagogische Förderung in Institutionen* (pp. 11–28). Wiesbaden, Springer VS.

Gigerenzer, G., & Todd, P. M. (1999). Fast and frugal heuristics: The adaptive toolbox. In G. Gigerenzer, P. M. Todd, & The ABC Reserach Group (Eds.), *Simple heuristics that make us smart* (pp. 3–35). Oxford, University Press.

Korupp, S. E., Ganzeboom, H. B. G. and Van Der Lippe, T. (2002). Do Mothers Matter? A Comparison of Models of the influence of Mothers' And Fathers' Educational and Occupational Status on Children's Educational Attainment. *Quality & Quantity*, 36, 17–42.

Kreyenfeld, M., & Krapf, S. (2016). Soziale Ungleichheit und Kinderbetreuung – Eine Analyse der sozialen und ökonomischen Determinanten der Nutzung von Kindertageseinrichtungen. In R. Becker & W. Lauterbach (Eds.), *Bildung als Privileg* (pp. 119–144). Wiesbaden, Spinger VS.

Mayer, K., Müller, W., & Pollak, R. (2007). Germany: Institutional change and inequalities of access in higher education. *Stratification in Higher Education*, 240–265.

McFadden, D. L. (1973). Conditional logit analysis of qualitative choice behaviour. In P. Zarembka (Ed.), *Frontiers in econometrics* (pp. 105-142). New York, Academic Press.

Neugebauer, M. (2010). Bildungsungleichheit und Grundschulempfehlung beim Übergang auf das Gymnasium: Eine Dekomposition primärer und sekundärer Herkunftseffekte. *Zeitschrift für Soziologie*, *39*(3).

Schindler, S., & Lörz, M. (2012). Mechanisms of Social Inequality Development: Primary and Secondary Effects in the Transition to Tertiary Education between 1976 and 2005. *European Sociological Review*, *28*(5), 647–660.

Schindler, S., & Reimer, D. (2008). Primary and Secondary Effects in Class Differentials: The Transition to Tertiary Education in Germany.

Schober, P., & Spieß, K. C. (2012). Frühe Förderung und Betreuung von Kindern: Bedeutende Unterschiede bei der Inanspruchnahme besonders in den ersten Lebensjahren. *DIW Wochenbericht*, *43*, 17–28.

Schömann, K., & Becker, R. (1995). Participation in Further Education over the Life Course: A Longitudinal Study of Three Birth Cohorts in the Federal Republic of Germany. *European Sociological Review*, *11*.

Shavit, Y., & Blossfeld, H.-P. (1993). Chances in Educational Opportunities in the Federal Republic of Germany. A Longitudinal Study of Cohorts Born between 1916 and 1965. In Y. Shavit & H.-P. Blossfeld (Eds.), *Persistent Inequality: Changing Educational Attainment in Thirteen Countries.* (pp. 51–74). Boulder, Westview Press.

Simon, H. A. (1993). *Homo rationalis: Die Vernunft im menschlichen Leben*. Frankfurt a.M., Campus.

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*(4), 505–519.

Stocké, V., Blossfeld, H.-P., Hoenig, K., & Sixt, M. (2019). Social inequality and educational decisions in the life course. In H.-P. Blossfeld & Roßbach, H.-G. (Eds.), *Education as a Lifelong Process*. Wiesbaden, Springer VS.

7. Appendix: RC Modules in the NEPS Starting Cohorts

A note on English translations: Due to the use of different translators, English question wording in official NEPS documents may differ between Starting Cohorts and between waves within a Starting Cohort even though the German question wording is identical. Translation has been harmonized in the following tables and may therefore diverge from official translations in other NEPS documentation. Identical variable names signify identical question wording in German.

Table 6: Operationalization of the Rational Choice Parameters for the Educational Decision About Early Child Care Arrangements [SC1, Wave 1]

Theoretical construct	Measurement Concept	Codification / Variables
Subjectively expected benefits		
Labor market participation (mother)		
Benefit expectation: Occupation	For the following questions, imagine that <target child's name> was attending day care. What would this mean for <target child's name> and yourself? How good are the chances of being employed if <target child's name> attended day care?	p30211a 1 = very poor; 5 = very good
Benefit importance: Occupation	Mothers of toddlers have different desires for their occupation. How important is it for you to be employed?	p30111a 1 = very unimportant; 5 = very important
Child development		
Benefit expectation: Child enrichment	How good are the chances that attending day care would have a positive effect on <target child's name> development?	p30211b 1 = very poor; 5 = very good
Subjectively expected costs		
Financial costs	Attendance of day care incurs a variety of costs, such as fees, money for materials and travel costs. How difficult would you find it to pay the costs incurred as a result of <target child's name> attending day care?	p30311a 1 = very difficult; 5 = very easy
Social costs	To what extent does the following statement apply to you? If I were to send <target child's name> to day care, my friends and relatives would look down on me.	p30311b 1 = Does not apply at all; 5 = Applies completely

Table 7: Operationalization of the Rational Choice Parameters for the Educational Decision About the Timing of Entering Kindergarten [SC1, Wave 2]

Theoretical construct	Measurement Concept	Codification / Variables
Subjectively expected benefits		
Labor market participation (mother)		
Benefit expectation: Employment	How good are the chances that you would be able to work if <target child's name> attended Kindergarten?	p30211b 1 = very poor; 5 = very good
Child development		
Benefit importance: Social competence child	Mothers have different wishes for their child when it comes to getting along with other children. How important is it for you that <target child's name> gets on well with other children of the same age?	p30112c 1 = very unimportant; 5 = very important
Benefit expectation: Social competence	For the following questions, please imagine that <target child's name> is three years old or above and is attending a Kindergarten. How good are the chances that <target child's name> would learn how to get along with children his/her own age in Kindergarten?	p30212c 1 = very poor; 5 = very good
Benefit expectation: Child enrichment	How good are the chances that attending a Kindergarten would have a positive effect on <target child's name> development?	p30212b 1 = very poor; 5 = very good
Subjectively expected costs		
Monetary costs	There are costs involved with attending a Kindergarten, such as fees, money for materials and travel expenses. How hard would it be for you to pay these costs for <target child's name> to attend Kindergarten?	p30312a 1 = very difficult; 5 = very easy

Table 8: Operationalization of the Rational Choice Parameters for the Educational Decision About the Choice of Secondary Degree – Target [SC2, Wave 5; SC3, Waves 2, 4, 6, 7; SC4, Waves 1, 3]

Theoretical construct	Measurement Concept	Codification / Variables
Subjectively expected benefits		
Labor market		
Benefit: Good job	What do you think would be the chances to get a good job later, if you…	1 = very poor; 5 = very good
	… would obtain the leaving certificate of the Hauptschule?	t30235a
	… would obtain the leaving certificate of the Realschule?	t30235b
	… would obtain the Abitur?	t30235c
Status maintenance[4]		
Education: Importance	How important is it for you in future to obtain a school leaving certificate as good as or better than …	1 = very unimportant; 5 = very important
	... your mother?	t30535a
	… your father?	t30535b
Job: Importance	How important is it for you in future to obtain a job as good as or better than …	1 = very unimportant; 5 = very important
	... your mother?	t30560a
	… your father?	t30560b
Job: Probability Mother	What would be the chances of a job as good as or better than that of your mother ...	1 = very poor; 5 = very good
	…if you were to obtain the leaving certificate of the Hauptschule?	t30735a
	……if you were to obtain the leaving certificate of the Realschule?	t30735b
	…if you were to obtain the Abitur?	t30735c
Job: Probability Father	What would be the chances of a job as good as or better than that of your father ...	1 = very poor; 5 = very good
	…if you were to obtain the leaving certificate of the Hauptschule?	t30735d
	……if you were to obtain the leaving certificate of the Realschule?	t30735e
	…if you were to obtain the Abitur?	t30735f

[4] Not assessed in Starting Cohort 2 because cognitive pretesting results show that elementary school students do not have a clear grasp of parental status.

Subjectively expected costs		
Effort costs	For different school-leaving qualifications different amounts of effort are necessary.	1 = very hard; 5 = very easy
	How much effort would the following school-leaving qualifications require for you, if you …	
	… would obtain the leaving certificate of the Hauptschule?	t30335a
	… would obtain the leaving certificate of the Realschule?	t30335b
	… would obtain the leaving certificate of the Abitur?	t30335c
Subjectively expected success probability		
Success probability	Regardless of the school-leaving qualifications that are actually possible at your school: How likely do you think it is that you could …	1 = very unlikely; 5 = very likely
	… obtain the leaving certificate of the Hauptschule?	t30035a
	… obtain the leaving certificate of the Realschule?	t30035b
	… obtain the Abitur?	t30035c

Table 9: Operationalization of the Rational Choice Parameters for the Educational Decision About the Choice of Secondary Degree – Parent [SC2, Wave 5; SC3, Waves 2, 4, 6, 7; SC4, Waves 1, 3]

Theoretical construct	Measurement Concept	Codification / Variables
Subjectively expected benefits		
Labor market		
Benefit: Good job Hauptschule	How good would the chances of a good job be for <target child's name> if he were to complete the leaving certificate of the Hauptschule?	p30235a 1 = very poor; 5 = very good
Benefit: Good job Realschule	And how good would the chances of a good job be for <target child's name> if he were to complete the leaving certificate of the Realschule?	p30235b 1 = very poor; 5 = very good
Benefit: Good job Abitur	And if <target child's name> were to do the Abitur?	p30235c 1 = very poor; 5 = very good
Status maintenance		
Education: Importance	Please tell me how important it is for you that <target child's name> achieves a school-leaving qualification that is as good as or better than your own.	p305350 1 = very unimportant; 5 = very important
Job: Importance	And how important is it for you that <target child's name> will have a profession that is as good as or better than your own later on?	p305600 1 = very unimportant; 5 = very important
Job: Probability Hauptschule	What would the chances of <target child's name> be of having a profession that is as good as or better than your own, if he were to complete the leaving certificate of the Hauptschule?	p30735a 1 = very poor; 5 = very good
Job: Probability Realschule	What would the chances of <target child's name> be of having a profession that is as good as or better than your own, if he were to complete the leaving certificate of the Hauptschule?	p30735b 1 = very poor; 5 = very good
Job: Probability Abitur	What would the chances of <target child's name> be of having a profession that is as good as or better than your own, if he were to complete the leaving certificate of the Hauptschule?	p30735c 1 = very poor; 5 = very good
Subjectively expected costs		
Monetary costs: Hauptschule	As long as children are at school, parents pay the most of the things they need, for example school supplies and clothes. How difficult would it be for you to cover these costs if <target child's name> were to do the leaving certificate of the Hauptschule?	p30335a 1 = very hard; 5 = very easy
Monetary costs: Realschule	And how difficult would it be for you to cover these costs if <target child's name> were to do the leaving certificate of the Realschule?	p30335b 1 = very hard; 5 = very easy
Monetary costs: Abitur	And how difficult would it be for you to cover these costs if <target child's name> were to do the Abitur?	p30335c 1 = very hard; 5 = very easy

Subjectively expected success probability		
Hauptschule	When you think about everything that you currently know: How likely do you think it is that <name of target child> could succeed in obtaining the leaving certificate of the Hauptschule?	p30035a 1 = very unlikely; 5 = very likely
Realschule	And how likely do you think it is that <name of target child> could succeed in obtaining the leaving certificate of the Realschule?	p30035b 1 = very unlikely; 5 = very likely
Abitur	And how likely do you think it is that <target child's name> could complete the Abitur?	p30035c 1 = very unlikely; 5 = very likely

Table 10: Operationalization of the Rational Choice Parameters for the Educational Decision About the Change of School Type – Target [SC2, Waves 7, 8, 9]

Theoretical construct	Measurement Concept	Codification / Variables
Subjectively expected benefits and costs		
Benefit importance [5]		
	How important is it to you …	1 = very unimportant; 5 = very important
	… to get a good school leaving qualification?	t30114a
	… to have good grades?	t30114b
	… to have a lot of spare time?	t30114c
Benefits and costs of current school [5]		
	To what extent do the following statements apply to your current school attendance?	1 = does not apply at all; 5 = applies completely
	a) I am satisfied with my grades.	t30234a
	b) I often have trouble with my classmates.	t30234b
	c) I enjoy attending school here.	t30234c
	d) I have a lot of stress studying.	t30234d
	e) At this school, I can obtain the leaving qualification I desire.	t30234e
	f) At home, we have frequent arguments because of school.	t30234f
	g) I have too much homework.	t30234g
	h) I often have much trouble with my teachers.	t30234h
	i) This school is the best for me.	t30234i
	j) My way to school is very long	t30234j
Subjectively expected success probability		
Current School	In your opinion, how likely is it that you can successfully finish your current school?	t30035e 1 = very unlikely 5 = very likely

[5] Please note a change in variable labels after SUF Release SC2 7.0.0.

Table 11: Operationalization of the Rational Choice Parameters for the Educational Decision About the Change of School Type – Parent [SC2, Waves 7, 8, 9]

Theoretical construct	Measurement Concept	Codification / Variables
Subjectively expected benefits and costs		
Benefit importance		
Grades	Please tell me how important the following things are to you. How important is it to you that <name of target child> has good grades?	p30114a 1 = very unimportant; 5 = very important
Leaving qualification	How important is it to you that <name of target child> obtains a good leaving qualification?	p30114b 1 = very unimportant; 5 = very important
Unable to cope	How important is it to you that <name of target child> is not unable to cope at school?	p30114c 1 = very unimportant; 5 = very important
Good job	How important is it to you that <name of target child> obtains a good job?	t30114d 1 = very unimportant; 5 = very important
Be one of the best	How important is it to you that <name of target child> is one of the best at school?	p30114e 1 = very unimportant; 5 = very important
Benefits and costs of current school[6]		
Grades	To what extent do the following things apply to <name of target child>'s current school attendance? I am satisfied with <name of target child>s grades.	p30234a 1 = does not apply at all; 5 = applies completely
Leaving qualification	At this school <name of target child> can obtain a good leaving qualification.	p30234b 1 = does not apply at all; 5 = applies completely
Unable to cope	<name of target child> cannot keep up at school.	p30234c 1 = does not apply at all; 5 = applies completely
Good job	A leaving qualification from this school will enable <name of target child> to obtain a good job.	p30234d 1 = does not apply at all; 5 = applies completely
Performance	<Name of target child> is one of the best at school.	p30234e 1 = does not apply at all; 5 = applies completely
Family conflict	We often argue at home because of <name of target child>'s school.	p30234f 1 = does not apply at all; 5 = applies completely

[6] Please note a change in variable labels after SUF Release SC2 7.0.0.

Status maintenance		
Probability occupational status maintenance	How likely would it be for <name of target child> to obtain a job that is as good as or better than your own, if he successfully finishes his current school?	p30735d 1 = very poor; 5 = very good
Importance educational status maintenance	How important is it to you that name of target child> obtains a school leaving qualification that is as good as or better than your own?	p305350 1 = very unimportant; 5 = very important
Importance occupational status maintenance	How important is it for you that <target child's name> will have a profession that is as good as or better than your own later on?	p305600 1 = very unimportant; 5 = very important
Subjectively expected success probability		
Current school	If you consider everything you know at the moment, how likely, do you think, is it that <name of target child> can successfully finish his/her current school?	p30035d 1 = very unlikely; 5 = very likely

Table 12: Operationalization of the Rational Choice Parameters for the Educational Decision About Discontinuation or Change of Career Preparation Program [SC4, From Wave 3 Onwards]

Theoretical construct	Measurement Concept	Codification / Variables
Subjectively expected benefits		
Labor market		
Fun	Now, I'm going to ask you about your current career preparation program. To what extent do the following things apply to your apprenticeship/training? My training is fun.	t30152a 1 = does not apply at all; 5 = applies completely
Apprenticeship 1	Now we'd like to know how your career preparation program has shaped your future. If you complete your current program, how good are your chances of getting an apprenticeship/spot in a vocational training program?	t30250e 1 = very poor; 5 = very good
Apprenticeship 2	How good are your chances of getting an apprenticeship/spot in a vocational training program if you drop out of your career preparation program?	t30253a 1 = very poor; 5 = very good
Subjectively expected costs		
Non-monetary costs		
Physically demanding	My career preparation program is very physically demanding.	t30350b 1 = Does not apply at all; 5 = Applies completely
Mentally demanding	My career preparation program is very mentally demanding.	t30350c 1 = Does not apply at all; 5 = Applies completely
Subjectively expected success probability		
Career preparation	How likely is it in your view, that you will successfully complete your career preparation program?	t30050a 1 = very unlikely 5 = very likely

Table 13: Operationalization of the Rational Choice Parameters for the Educational Decision About Discontinuation or Change of Vocational Education and Training [SC4, From Wave 3 Onwards]

Theoretical construct	Measurement Concept	Codification / Variables
Subjectively expected benefits		
Labor market		
Salary	Now we'd like to know how your apprenticeship/vocational training program has shaped your future job. If you complete your current program, how good are you chances of getting a well-paid job?	t30250b 1 = very poor; 5 = very good
Social status	If you complete your current apprenticeship/vocational training program, how good are your chances of getting a job that has high social status?	t30250c 1 = very poor; 5 = very good
Interesting job	How good are the chances of getting an interesting job?	t30250d 1 = very poor; 5 = very good
Job security	How high is the risk of being unemployed if you successfully complete your apprenticeship/vocational training program?	t30250f 1 = very low; 5 = very high
Other benefits		
Enjoyment	Now, I'm going to ask you about your current vocational training program, by that I mean the classes at the vocational school and your work as an apprentice. To what extent do the following things apply to your apprenticeship/training? My training is fun.	t30152a 1 = does not apply at all; 5 = applies completely
Status maintenance		
Probability occupational status maintenance: Mother	What are the chances of getting a job as good as or better than your mother's if you successfully complete your apprenticeship/vocational training program?	t30750a 1 = very poor; 5 = very good
Probability occupational status maintenance: Father	And what are your chances of getting a job as good as or better than your father's?	t30750b 1 = very poor; 5 = very good
Subjectively expected costs		
Financial costs		
Monetary costs	How hard is it for you and your parents to pay for the things you need for your apprenticeship/ vocational training program, for example, work clothes, travel and instructional materials?	t30350a 1 = very hard; 5 = very easy
Opportunity costs	Different training programs offer different levels of pay. For some school-based programs, you even have to pay tuition. How satisfied are you with your current income situation?	t30450a 1 = very dissatisfied; 5 = very satisfied

Non-monetary costs		
Physically demanding	My apprenticeship/training program is very physically demanding.	t30350b 1 = Does not apply at all; 5 = Applies completely
Mentally demanding	My apprenticeship/training program is very mentally demanding.	t30350c 1 = Does not apply at all; 5 = Applies completely
Subjectively expected success probability		
Apprenticeship/vocational training	How likely is it in your view, that you will successfully complete your apprenticeship/vocational training program?	t30050a 1 = very unlikely 5 = very likely

Table 14: Operationalization of the Rational Choice Parameters for the Educational Decision About Discontinuation or Change of Field of Study [SC4, From Wave 9 Onwards]

Theoretical construct	Measurement Concept	Codification / Variables
Subjectively expected benefits		
Labor market		
Salary	Now we'd like to know about the benefits of your current higher education program for your future job. If you complete you higher education program, how good are the chances of getting a well-paid job?	t30240b 1 = very poor; 5 = very good
Job prestige	If you complete your higher education program, how good are your chances of getting a job that has high social status?	t30240c 1 = very poor; 5 = very good
Interesting job	How good are your chances of getting an interesting job?	t30240d 1 = very poor; 5 = very good
Job security	How high is the risk of being unemployed if you successfully complete your higher education program?	t30240e 1 = very low; 5 = very high
Other benefits		
Enjoyment	To what extent do the following things apply to your higher education program? My higher education program is fun.	t30142a 1 = Does not apply at all; 5 = Applies completely
Status maintenance		
Importance occupational status maintenance: Mother	How important is it to you to have a job that is as good as or better than that of your mother?	t30560a 1 = very unimportant; 5 = very important
Probability occupational status maintenance: Mother	And what are your chances of getting a job that is as good as or better than your mother's if you successfully complete your higher education program?	t30740a 1 = very poor; 5 = very good
Importance occupational status maintenance Father	How important is it to you to have a job that is as good as or better than that of your father?	t30560b 1 = very unimportant; 5 = very important
Probability occupational status maintenance: Father	And what are your chances of getting a job that is as good as or better than your father's if you successfully complete your higher education program?	t30740b 1 = very poor; 5 = very good
Subjectively expected costs		
Monetary costs	How difficult is it for you and your parents to pay for the things you need for your degree course, for instance, travel costs, books or tuition fees?	t30340a 1 = very hard; 5 = very easy
Opportunity costs	Up until the end of your degree course, the possibilities of earning your own money and supporting yourself are limited. How satisfied are you with your current income situation?	t30440b 1 = very dissatisfied; 5 = very satisfied

Non-monetary costs	My higher education program is very mentally demanding.	t30340b 1 = does not apply at all; 5 = applies completely
Subjectively expected success probability		
Higher education	How likely is it in your opinion that you could successfully complete a higher education program?	t300400 1 = very unlikely 5 = very likely

Table 15: Operationalization of the Rational Choice Parameters for the Educational Decision About Discontinuation or Change of Field of Study [SC5, Wave 1]

Theoretical construct	Measurement Concept	Codification / Variables
Subjectively expected benefits		
Labor market		
Good Job	And once you do complete the degree course, what are your chances of getting a good job?	t30240a 1 = very poor; 5 = very good
Other benefits		
Enjoyment of degree course	To what do the following statements apply to your degree? I much enjoy my degree course.	t30142a 1 = Does not apply; 5 = Applies completely
Status maintenance		
Importance occupational status maintenance: Mother	How important is it to you to have a job that is as good as or better than that of your mother?	t30560a 1 = unimportant; 5 = very important
Importance occupational status maintenance: Father	How important is it to you to have a job that is as good as or better than that of your father?	t30560b 1 = unimportant; 5 = very important
Probability occupational status maintenance: Mother	What are your chances of getting a job that is as good as or better than your mother's if you successfully complete your degree course?	t30740a 1 = very poor; 5 = very good
Probability occupational status maintenance: Father	What are your chances of getting a job that is as good as or better than your father's if you successfully complete your degree course?	t30740b 1 = very small; 5 = very great
Subjectively expected costs		
Monetary costs	How difficult is it for you and your family to pay for the things you need for your degree course, for instance, travel costs, books or tuition fees?	t30340a 1 = very difficult; 5 = very easy
Opportunity costs	Up until the end of your degree course, the possibilities of earning your own money and supporting yourself are limited. Under how much financial pressure will it put you and your family until the degree course is completed?	t30440a 1 = none; 5 = a lot
Subjectively expected success probability		
Degree course	In your opinion, how likely is it that you will successfully complete your degree course?	t300400 1 = very unlikely; 5 = very likely

Table 16: Operationalization of the Rational Choice Parameters for the Educational Decision About the Choice of Obtaining a Master's Degree [SC5, Wave 5]

Theoretical construct	Measurement Concept	Codification / Variables
Subjectively expected benefits		
Job market		
Income/ Salary Bachelor	How good are the chances of getting a well-paid job if you have a Bachelor's degree?	t30245a 1 = very poor; 5 = very good
Job prestige Bachelor	And how good are the chances of getting a socially prestigious job if you have a Bachelor's degree?	t30245b 1 = very poor; 5 = very good
Interesting job Bachelor	How good are the chances of getting an interesting job if you have a Bachelor's degree?	t30245c 1 = very poor; 5 = very good
Job security Bachelor	How high is the risk of becoming unemployed if you have a Bachelor's degree?	t30245d 1 = very low; 5 = very high
Income/ Salary Master	How good are the chances of getting a well-paid job if you have a Master's degree?	t30246a 1 = very poor; 5 = very good
Job prestige Master	And how good are the chances of getting a socially prestigious job if you have a Master's degree?	t30246b 1 = very poor; 5 = very good
Interesting job Master	How good are the chances of getting an interesting job if you have a Master's degree?	t30246c 1 = very poor; 5 = very good
Job security Master	How high is the risk of becoming unemployed if you have a Master's degree?	t30246d 1 = very low; 5 = very high
Status maintenance		
Importance occupational status maintenance: Mother	How important is it to you to have a job one day that is as good as or better than that of your mother?	t30560a 1 = very unimportant; 5 = very important
Importance occupational status maintenance: Father	How important is it to you to have a job one day that is as good as or better than that of your father?	t30560b 1 = very unimportant; 5 = very important
Probability occupational status maintenance: Mother (Bachelor's degree)	What are your chances of getting a job that is as good as or better than your mother's if you have a Bachelor's degree?	t30745a 1 = very poor; 5 = very good
Probability occupational status maintenance: Father (Bachelor's degree)	What are your chances of getting a job that is as good as or better than your father's if you have a Bachelor's degree?	t30745b 1 = very poor; 5 = very good
Probability occupational status	And what are your chances of getting a job that is as good as	t30746a

maintenance: Mother (Master's degree)	or better than your mother's if you have a Master's degree?	1 = very poor; 5 = very good
Probability occupational status maintenance: Father (Master's degree)	And what are your chances of getting a job that is as good as or better than your father's if you have a Master's degree?	t30746b 1 = very poor; 5 = very good
Subjectively expected costs		
Monetary costs Master	How difficult would it be for you and your family to pay for these things you need for your Master's degree, for instance, travel costs, books or tuition fees?	t30346a 1 = very hard; 5 = very easy
Opportunity costs Master	Until the end of your degree course, the possibilities of earning your own money and supporting yourself are limited. Under how much financial pressure would it put you and your family until the degree course is completed?	t30446a 1 = none; 5 = a lot
Subjectively expected success probability		
Master	How likely is it in your opinion that you successfully complete a Master's degree?	t300460 1 = very unlikely; 5 = very likely

Table 17: Operationalization of the Rational Choice Parameters for the Educational Decision About the Choice of Obtaining a Doctorate [SC5, Wave 10]

Theoretical construct	Measurement Concept	Codification / Variables
Subjectively expected benefits		
Job market		
Wage	How good are the chances to get a well-paid job with a doctoral degree?	t30247a 1 = very poor; 5 = very good
Job prestige/ Respectable Job	And how good are the chances to get a job that is considered to be good by the society?	t30247b 1 = very poor; 5 = very good
Interesting job	How good are the chances to get an interesting job having a doctorate?	t30247c 1 = very poor; 5 = very good
Job security	How high is the risk to become unemployed having a doctorate?	t30247d 1 = very low; 5 = very high
Status maintenance		
Importance occupational status maintenance: Mother	How important is it for you, some day to have a profession that is as good as or better than that of your mother?	t30560a 1 = very unimportant; 5 = very important
Importance occupational status maintenance: Father	How important is it to you to have a profession one day that is as good as or better than that of your father?	t30560b 1 = unimportant; 5 = very important
Probability occupational status maintenance: Mother	And how good are the chances with a completed doctorate to get a profession that is as good as or better than that of your mother?	t30747a 1 = very poor; 5 = very good
Probability occupational status maintenance: Father	And how good are the chances with a completed doctorate to get a profession that is as good as or better than that of your father?	t30747b 1 = very poor; 5 = very good
Subjectively expected costs		
Monetary costs	How difficult would it be for you and your family to pay for the things you need for your doctorate, for instance, travel costs, books or conference fees?	t30313m 1 = very difficult; 5 = very easy
Opportunity costs	It is also possible, that until the finishing your doctorate, you earn only little money to make living. How overburdened is your family financially until the end of the doctorate?	t30447a 1 = Not at all; 5 = a lot
Subjectively expected success probability		
Doctorate	How likely, do you think, is it to successfully complete the doctorate?	t300470 1 = very unlikely; 5 = very likely

Table 18: Operationalization of the Rational Choice Parameters for the Educational Decision About the Choice of Participation in Nonformal Education and Training [SC6, Waves 4, 8, 12]

Theoretical construct	Measurement Concept	Codification / Variables
Benefits		
Benefit importance		
Career advancement	How important is it for you to advance in a career?	t30160a 1 = very important; 5 = very unimportant
Perform tasks better	And how important is it for you to be able to perform tasks better in your job?	t30160b 1 = very important; 5 = very unimportant
Work content	And how important is it for you for the content of your work to be more interesting than it is now?	t30160e 1 = very important; 5 = very unimportant
Job security	And how important is it for you to be better protected from unemployment than you are now?	t30160c 1 = very important; 5 = very unimportant
Getting a job [only unemployed respondents]	How important is it for you to get a job?	t30160f 1 = very important; 5 = very unimportant
Learning new things	And how important is it for you to learn lots of new things in the job area?	t30160g 1 = very important; 5 = very unimportant
Higher income	And finally, how important is it to you to have a higher income than at present?	t30160h 1 = very important; 5 = very unimportant
Benefit of courses and training		
Career advancement	Let us briefly come back again to courses and training: depending on the situation, courses and training can have different effects. How much would courses or training help you personally to advance in your career?	t30261a 1 = very much; 5 = not at all
Perform tasks better	How much would courses and training help you to be able to perform tasks better in your job?	t30261b 1 = very much; 5 = not at all
Interesting work content	And how much would courses and training you to have more interesting content in your work?	t30261e 1 = very much; 5 = not at all
Job security	How much would courses and training help you to be better protected from unemployment than you are now?	t30261c 1 = very much; 5 = not at all
Getting a job [only unemployed respondents]	Let us briefly come back again to courses and training: depending on the situation, courses and training can have different effects. How much would courses or training help you to get a job again?	t30261f 1 = very much; 5 = not at all

Higher income	And how much would courses and training help you to get a higher income?	t30261h 1 = very much; 5 = not at all
Status maintenance		
Importance occupational status maintenance: own status	How important is it to you to continue to have a job which is at least as good as your current one?	t30560a 1 = very important; 5 = very unimportant
Importance occupational status maintenance: status of colleagues	And how important is it for you to keep up with colleagues in your job?	t30560b 1 = very important; 5 = very unimportant
Expectation occupational status maintenance: own status	How much would courses or training help you to continue to have a job which is at least as good as your present job?	t30261i 1 = very much; 5 = not at all
Expectation occupational status maintenance: status of colleagues	How much would courses and training help you to keep up with colleagues in your job?	t30261j 1 = very much; 5 = not at all
Costs of courses, trainings and further qualifications		
Monetary costs	There are sometimes reasons which make it difficult to attend a course or training program on which you would learn more about your job: how much do you agree with the following statements: I can't do it because it's too expensive.	t30361a 1 = completely agree; 5 = don't agree at all
Non-monetary costs	Attending would take too much time.	t30361b 1 = completely agree; 5 = don't agree at all

Table 19: Operationalization of the Rational Choice Parameters for the Educational Decision About the Choice of Obtaining an Additional Educational Degree [SC6, Waves 4, 8, 12]

Theoretical construct	Measurement Concept	Codification / Variables
Benefit importance		
Career advancement	How important is it for you to advance in a career?	t30160a 1 = very important; 5 = very unimportant
Perform tasks better	And how important is it for you to be able to perform tasks better in your job?	t30160b 1 = very important; 5 = very unimportant
Work content	And how important is it for you for the content of your work to be more interesting than it is now?	t30160e 1 = very important; 5 = very unimportant
Job security	And how important is it for you to be better protected from unemployment than you are now?	t30160c 1 = very important; 5 = very unimportant
Getting a job [only unemployed respondents]	How important is it for you to get a job?	t30160f 1 = very important; 5 = very unimportant
Learning new things	And how important is it for you to learn lots of new things in the job area?	t30160g 1 = very important; 5 = very unimportant
Higher income	And finally, how important is it to you to have a higher income than at present?	t30160h 1 = very important; 5 = very unimportant
Benefit of an additional degree		
Career advancement	How much additional qualifications help you personally to advance in your career? Very much, quite a lot, 50-50, not very much or not at all?	t30264a 1 = very much; 5 = not at all
Job security	And how much would such a qualification help you to be protected from unemployment better than you are now? Very much, quite a lot, 50-50, not very much, or not at all?	t30264c 1 = very much; 5 = not at all
Getting a job again	What do you think, how much would additional qualifications help you personally to get a job (again)? Very much, quite a lot, 50-50, not very much or not at all?	t30264f 1 = very much; 5 = not at all
Higher income	And how much would such a qualification help you to obtain a better income than you have now Very much, quite a lot, 50-50, not very much or not at all?	t30264h 1 = very much; 5 = not at all
Status maintenance		
Importance occupational status maintenance: own status	How important is it to you to continue to have a job which is at least as good as your current one?	t30560a 1 = very important; 5 = very unimportant

Importance occupational status maintenance: status of colleagues	And how important is it for you to keep up with colleagues in your job?	t30560b 1 = very important; 5 = very unimportant
Expectation occupational status maintenance: own status	How much would this sort of qualification help you to continue to have a job which is at least as good as your present job? Very much, quite a lot, 50-50, not very much, or not at all?	t30264i 1 = very much; 5 = not at all
Expectation occupational status maintenance: status of colleagues	How much would this sort of qualification help you to keep up with colleagues in your job?	t30264j 1 = very much; 5 = not at all
Costs of further qualifications		
Monetary costs	There are sometimes reasons which make it difficult to take further qualifications: how much do you agree with the following statements: I can't do it because it's too expensive.	t30364a 1 = completely agree; 5 = don't agree at all
Non-monetary costs	Taking further qualifications would take too much time.	t30364b 1 = completely agree; 5 = don't agree at all
Subjectively expected success probability		
Further qualifications	In your opinion, how likely is it that you will manage to take further qualifications?	t30064a 1 = very likely; 5 = very unlikely