

# Parental Risk Attitudes and Children's Secondary School Track Choice

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## Abstract

Although it is well-known that individuals' risk attitudes are related to behavioral outcomes such as smoking, portfolio decisions, and educational attainment, there is virtually no evidence of whether parental risk attitudes affect the educational attainment of their dependent children. We add to this literature and examine children's secondary school track choice in Germany where tracking occurs at age ten and has a strong binding character. Using risk indicators for different domains, we mainly find evidence of an inverse relation between parental risk aversion and children's secondary school track, with some heterogeneity depending on whether parents' risk willingness is modeled separately or jointly, by child gender, or by the risk measure used.

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## 1. Introduction

The decision about which educational path children should take has far-reaching consequences for their future adult life, particularly in countries with early tracking such as Germany (see, for example, Brunello & Checchi, 2007; van Elk et al., 2011).

If later revision of the decision is costly so that upward mobility between tracks is low, early secondary school tracking largely predetermines students' final secondary schooling achievement and their vocational or academic career. A child's future social and economic situation therefore depends strongly on making the correct school track choice.

With respect to the determinants of this choice, there is a vast amount of literature on the transmission of socio-economic status, suggesting high social selectivity in quite a few countries.<sup>1</sup> This means that parental education, as a compound measure for parents' cognitive skills and for investments in their children, remains the most important factor for children's educational attainment in Germany (e.g. Heineck & Riphahn, 2009) and the UK (Ermisch & Francesconi, 2001). Other studies explore the influence of family income (Acemoglu & Pischke, 2001; Blanden & Gregg, 2004; Tamm, 2008) or parental (un)employment (Bratberg et al., 2008; Coelli, 2011; Schildberg-Hoerisch, 2011) on children's education. So far, however, virtually no research has been conducted in the economic literature addressing whether parental attitudes towards education or other possibly non-cognitive skills have an impact on their children's secondary schooling.<sup>2</sup>

Educational decisions might, however, be considered as an investment with uncertain outcomes, and would then be subject to individuals' risk preferences. Everything else being constant, it is therefore plausible to assume that risk preferences will also matter if

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<sup>1</sup>In economics, intergenerational mobility research focuses mainly on income (see the work of Solon (1992) which has initiated a large body of research) whereas social class mobility is of interest in the sociological literature (for example, Erikson & Goldthorpe, 2002)

<sup>2</sup>Yet, there is an interest in this issue in sociology showing that, for example, parents' educational aspirations matter (Henz & Maas, 1995; Paulus & Blossfeld, 2007).

23 individuals have to decide about their children’s educational paths, particularly in countries  
24 with early tracking, arguing that parents, rather than their ten-year-old children take this  
25 decision. The direction of the effect, however, is unclear a priori. If future returns are  
26 uncertain, risk-averse individuals may be more likely to choose a less risky schooling path  
27 either for themselves or for their children, where “less risky” refers not only to a shorter  
28 time spent in education, but also to lower ability requirements. On the other hand, there is  
29 pervasive evidence of the positive effects of education on labor market success, meaning  
30 that education may also be used as a “safe haven”, i.e. it has an insurance character.

31 Given these two underlying contradictory positions, it is no surprise that only few  
32 empirical studies address the relationship between individuals’ risk attitudes and their own  
33 educational outcomes, and that these few studies yield ambiguous findings (Belzil, 2007;  
34 Shaw, 1996; Barsky et al., 1997). In addition, to our knowledge only two prior studies  
35 have in the past examined the relationship between parents’ risk preferences and i) their  
36 children’s secondary schooling track (Leonardi, 2007), and ii) academic test scores and  
37 post high school education (Brown et al., 2012).

38 We add to this scarce literature using data from Germany. Again, this is interesting and  
39 relevant since 1) the German education system streams children into different schooling  
40 tracks at age ten, i.e. very early in their lives and 2) there is little mobility between tracks,  
41 meaning that the initial choice has a strong predetermining character. In addition to previ-  
42 ous research, where risk attitudes are usually derived from hypothetical lottery scenarios,  
43 we mainly rely on individuals’ willingness to take risks in their career, but also employ  
44 further risk attitude indicators to analyze robustness.

45 Using risk indicators for different domains, our results generally indicate an inverse  
46 relation between parental risk aversion and their children’s secondary school track, with  
47 some heterogeneity depending on whether parents’ risk willingness is modeled separately  
48 or jointly, by child gender, or by the risk measure used.

49 The remainder of the paper is organized as follows. Section 2 provides a brief intro-  
50 duction to the German school system. In Section 3, we outline the role of risk preferences  
51 for educational outcomes and give a short overview of earlier research. We introduce data  
52 and methods in Section 4 and provide estimation results in Section 5. Section 6 addresses  
53 the model's robustness and the paper is concluded in Section 7.

## 54 **2. The German school system**

55 The federal government has no major responsibilities for education in Germany; in-  
56 stead, each of the 16 federal states is responsible for its own education system. The main  
57 features of the education system, however, are almost identical: pre-school kindergarten  
58 education is provided for children aged three to six years, but is non-compulsory. Com-  
59 pulsory school attendance begins when children start elementary school at the age of six,  
60 and ends at the age of 16. Between the ages of six and ten, i.e. from grade one to four,<sup>3</sup>  
61 elementary school provides basic training in reading, writing, basic mathematical skills,  
62 as well as in creative and technical subjects such as music, sports, painting and practical  
63 work.

64

[Figure 1 about here]

65

66  
67 After completing primary school, children are streamed into different secondary school-  
68 ing tracks (Figure 1). The three dominant secondary school types are lower secondary  
69 school (*Hauptschule*), intermediate secondary school (*Realschule*), and upper secondary  
70 school (*Gymnasium*). These school types, accounting for about 80 percent of students <sup>4</sup>,

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<sup>3</sup>In two federal states, Berlin and Brandenburg, elementary schooling ends at age twelve, i.e. at the end of grade six.

<sup>4</sup>Other school types include comprehensive schools, special schools and a few other mainly progressive

71 aim at preparing them for a number of further educational and vocational paths with differ-  
72 ent cognitive requirements. Lower secondary schools and intermediate secondary schools  
73 are attended for five to six years, and provide the basis for further (blue and white collar)  
74 vocational apprenticeship training. The upper secondary school track takes nine years<sup>5</sup>  
75 and offers school-leavers who receive their *Abitur*, enabling them to enter university, the  
76 fastest and most direct path to tertiary education at universities and universities of applied  
77 sciences (*Fachhochschulen*).

78 The decision about which of these tracks a pupil will pursue is based on parents' pref-  
79 erences and a recommendation by the pupil's primary school teacher. Ideally, the recom-  
80 mendation should reflect the child's abilities, enabling him or her to meet the cognitive  
81 requirements of the chosen secondary school track. The recommendation is based on the  
82 child's achievements particularly in mathematics, reading and writing, mainly during the  
83 last year at primary school. The recommendation is mandatory in some but not all federal  
84 states: in 2004, the year on which our analysis below is based, it was mandatory in four  
85 (Bavaria, Baden-Württemberg, Saxony, Thuringia) out of sixteen federal states, implying  
86 that children have to meet certain standards. However, parents were able to challenge  
87 the teacher's recommendation, for example by requesting an assessment by specialized  
88 teachers or by having their child take entrance exams for school tracks they preferred. In  
89 all other federal states, teachers' recommendations are also mainly based on the child's  
90 achievements in the year prior to the transition from primary to secondary school. In con-  
91 trast, however, it has no legally binding character here but seeks to give the child's parents  
92 guidance. Ultimately, the parents have the final say in these federal states.

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education alternatives such as Steiner or Montessori schools. Although privately organized, these schools are also subject to the curricula of the respective federal state's Ministry of Education.

<sup>5</sup>A reduction to eight years has been agreed upon, but the adjustment has not yet been realized in all federal states.

93 It is worth noting that there is ambiguous evidence on whether the teacher's recom-  
94 mendation is a good proxy for students' abilities. On the one hand, Lohmann & Groh-  
95 Samberg (2010), for example, show that the recommendation letter predicts differences in  
96 achievements accurately. However, a larger number of studies indicate strong social selec-  
97 tivity patterns: i) conditional on students' skills, the parental socio-economic background  
98 has a major effect on a teacher's propensity to issue a recommendation for the upper sec-  
99 ondary schooling track (Bos et al., 2004; Baumert & Schümer, 2001; Block, 2006). This  
100 is complemented by evidence that children from families with a higher socio-economic  
101 background are more likely to attend upper secondary school despite having been given a  
102 recommendation to pursue a lower achievement track (Cortina, 2003; Neugebauer, 2010).

103 After this first track decision, pupils can generally switch secondary schooling tracks,  
104 although the requirements differ from federal state to federal state. In a couple of federal  
105 states, individuals can, for example, sequentially 'upgrade': after completing lower sec-  
106 ondary school, pupils can obtain the intermediate school leaving certificate (*Mittlere Reife*)  
107 after one more year. In addition, wrong initial decisions can be corrected, for example,  
108 by transferring to the upper secondary schooling track from both lower and intermediate  
109 secondary track. However, such transitions are subject to entrance requirements such as  
110 having achieved a specific grade or having a good command of another foreign language  
111 in addition to English.<sup>6</sup>

112 Although there are options for switching tracks after the initial choice, it is a rare  
113 phenomenon: in the 2004-05 school year, only 2.9 percent of children in the seventh to  
114 ninth grade changed tracks, 60 percent of whom changed to a lower qualifying track, i.e.  
115 from the upper to the intermediate secondary track or from the intermediate to the lower

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<sup>6</sup>In addition, there is also evidence of further social selectivity at later transition stages (compare, for example, Jacob & Tieben, 2009; Glaesser & Cooper, 2011).

116 secondary schooling track. In contrast, a mere 0.6 percent of the pupils in this cohort ac-  
117 complished an upward track change (Konsortium Bildungsberichterstattung, 2006). This  
118 means that, despite the evidence that there is some overlap in students' skills,<sup>7</sup> the ini-  
119 tial choice therefore predetermines students' final educational attainment to a large extent.  
120 This is also why determinants other than students' abilities, such as their parents' educa-  
121 tional background and possibly also their attitudes towards risk, are relevant.

### 122 **3. Risk preferences and educational outcomes**

123 It is widely known that educational attainment correlates strongly with labor market  
124 success: no or low educational attainment is associated with a higher risk of unemploy-  
125 ment and unstable, low-paid jobs; higher education, in contrast, is a good predictor of  
126 access to well-paid, stable jobs with good career prospects. Schmillen & Möller (2012),  
127 for example, show that individuals' lifetime unemployment duration decreases more or  
128 less monotonically with educational attainment. Closely related to this, a myriad of papers  
129 provide evidence of the positive relation between education and earnings (Westergaard-  
130 Nielsen et al., 2001; Psacharopoulos & Patrinos, 2004).<sup>8</sup>

131 Given this almost ubiquitous information, why should individuals be unwilling to in-  
132 vest in education beyond compulsory basic education to minimize negative long-term con-  
133 sequences? In the context of our analysis and Germany's school system, as outlined earlier,  
134 the question is why parents should not want their children to be streamed into at least the  
135 intermediate if not the higher secondary school track?

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<sup>7</sup>Analyses based on PISA data, for example, show that the upper quartile of pupils on the intermediate track perform better than the lowest quartile of pupils on the upper secondary track. The same holds for the top ten percent of pupils on the lower secondary school track compared to the lowest ten percent of the upper secondary track (Naumann et al., 2010)

<sup>8</sup>See also the recent special issue of this journal (Volume 30, Issue 6, 2011) on the economic returns to education.

136 One aspect of a response to this question is that schoolchildren will ideally pursue a  
137 school track that matches their skills with the track's cognitive demands. A recent study  
138 suggests that individuals' risk attitudes are related to their cognitive abilities (Dohmen  
139 et al., 2010). There is also evidence that both risk attitudes and cognitive skills are passed  
140 down from parents to their children (Dohmen et al., 2011a; Anger & Heineck, 2010). A  
141 relation between parents' risk attitudes and children's educational outcomes can therefore  
142 be expected not based on risk alone, but also because of individuals' capabilities. Since we  
143 have insufficient information on children's cognitive abilities, this is hard to differentiate  
144 with the data at hand. To get around this issue to some extent, however, we use a falsifica-  
145 tion test based on whether the recommendation is mandatory or non-mandatory, outlined  
146 in detail below.

147 Conditional on the child's skills, one might either way argue that educational deci-  
148 sions are subject to individuals' risk preferences: in terms of human capital, educational  
149 attainment is an investment in future payoffs and, as such, is a decision under risk. How-  
150 ever, it is impossible to predict a child's future achievements exactly, meaning that it is  
151 unclear whether monetary expenditure and non-monetary opportunity costs will pay off.  
152 Such unknown probabilities of an individual's educational success or failure – including,  
153 for example, the risk of repeating a class or, worse, dropping out of school – can dis-  
154 courage risk-averse individuals from investing in human capital or education beyond the  
155 compulsory level from the very outset.

156 One possible expectation could therefore be that risk-averse parents shy away from  
157 the upper secondary school track and prefer a school track that does not qualify their  
158 children for entrance to university. On the other hand, higher education may be thought  
159 of as a “safe haven”, i.e. as a type of insurance, since the positive correlation between  
160 educational attainment and labor market outcomes is well known. Risk-averse parents  
161 may then be less likely to want their children to pursue the lower secondary school track

162 which, compared to higher qualifying tracks, is related to somewhat greater future risks  
163 in terms of unemployment, preferring them to pursue the intermediate, if not the upper  
164 secondary school track.

165 Since this ambiguity is unsatisfactory from a theoretical point of view, it is therefore an  
166 open empirical question whether one of the effects dominates the other. In addition, given  
167 the evidence that women are more risk-averse than men (Dohmen et al., 2011b) and that  
168 mothers are more involved in their children's education than fathers (Enders-Dragässer  
169 et al., 2004; Oesterbacka et al., 2010; Hallberg & Klevmarcken, 2003; Guryan et al., 2008)  
170 there may also be a gender-specific effect.

#### 171 *Previous research*

172 While there is substantial evidence that risk attitudes affect adults' behavior and outcomes,  
173 including migration (Jaeger et al., 2010), or labor market success (see Hartog et al., 2002;  
174 Bonin et al., 2007; Pfeifer, 2011), we concentrate on studies on the relationship between  
175 individuals' risk attitudes and their own educational attainment. In an early study, Weiss  
176 (1972) used data from the 1966 National Register of Scientific and Technical Personnel  
177 and provided evidence of a negative impact of risk aversion on human capital investments  
178 and on returns to education. The results of Shaw (1996), based on data from the 1983  
179 Survey of Consumer Finances, indicate a positive correlation between risk-taking behavior  
180 and wage growth as well as higher returns to education for less risk-averse persons. In  
181 contrast, Barsky et al. (1997) describe a U-shaped relationship between risk tolerance and  
182 years of education, peaking at 12 years. Belzil & Leonardi (2007) use the Italian Survey of  
183 Household Income and Wealth (SHIW) to explain differences in schooling by individual  
184 risk heterogeneity. Their results indicate only a small negative effect of risk attitudes on  
185 individuals' own schooling attainment.

186 To our knowledge, only two previous studies have addressed the relation between  
187 parents' risk attitudes and their children's educational achievement: Leonardi (2007) ex-

188 amines the effect of parents' risk attitudes on their young adult (19-23 years) children's  
189 schooling track decisions. Using 1995 Italian SHIW data, he concludes that differences in  
190 risk attitudes are not an important determinant of secondary school choice. In contrast, the  
191 study by (Brown et al., 2012), who use data from the 1996 Panel Study of Income Dynam-  
192 ics (PSID) for the US, indicates an inverse relationship between parental risk aversion and  
193 their children's achievement, as measured by scores achieved in standardized academic  
194 tests on mathematics and reading skills as well as by their propensity to attend college  
195 after high school.

#### 196 **4. Data and methods**

197 Our analyses are based on data from the German Socio-economic Panel Study (SOEP).  
198 The SOEP is a representative, annual household panel study implemented in West Ger-  
199 many in 1984. It contained over 12,000 adult respondents from about 5,900 households.  
200 It was extended to the former East Germany in 1990, and additional samples were added  
201 later. It now consists of more than 20,000 adults. The SOEP is a quite rich database includ-  
202 ing a wide range of information on the socio-economic status of both private households  
203 and individuals (see Wagner et al., 2007).

204 Since our interest lies in the risk-education gradient for students' initial secondary  
205 school track choice, we restrict our sample to adult respondents with children between the  
206 ages of 10 and 15.<sup>9</sup> We thus focus on children who have not yet obtained the first possible  
207 school-leaving certificate and who could then, for example, pursue further education to  
208 upgrade. Another reason for the upper age bound is that adolescents are more likely to  
209 start making their own decisions, meaning that we would be unsure whether the track

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<sup>9</sup>We cannot rule out that the observed school track is not the initial choice, but note again that less than one percent of all students changed to a higher qualifying track in the 2004-05 school year.

210 observed at age 16 and above is the one that, we argue, was first dominated by their  
211 parents' expectations and preferences.

212 As for the child's secondary school track choice, we focus on the three major school-  
213 ing tracks as outlined above: lower secondary (*Hauptschule*), intermediate secondary (*Re-  
214 alschule*) and upper secondary (*Gymnasium*). Our dependent variable is therefore a cate-  
215 gorical variable with three outcomes:

$$216 \quad y_i = \begin{cases} 1, & \text{if the child attends the lower secondary schooling track (*Hauptschule*).} \\ 217 \quad 2, & \text{if the child attends the intermediate secondary schooling track (*Realschule*).} \\ 218 \quad 3, & \text{if the child attends the upper secondary schooling track (*Gymnasium*).} \end{cases}$$

219 Information on individuals' risk attitudes was first surveyed in 2004. In addition to a  
220 hypothetical lottery question, the questionnaire includes several items on the respondent's  
221 self-reported general and context-specific, i.e. domain risk attitudes. General risk attitudes  
222 are surveyed asking "*How do you see yourself: Are you generally a person who is fully  
223 prepared to take risks or do you try to avoid taking risks?*", to which answers could be  
224 given on an 11-point Likert-type scale from 0 (*risk-averse*) to 10 (*fully prepared to take  
225 risks*). Context-specific risk attitudes are measured as answers to "*People can behave  
226 differently in different situations. How would you rate your willingness to take risks in  
227 the following areas?*", where areas mentioned are risk-taking while driving, in financial  
228 matters, during leisure and sport, in the respondent's occupational career, with his or her  
229 health, and his or her faith in other people.

230 While previous research on the education-risk gradient is based on risk measures de-  
231 rived from lottery questions, Dohmen et al. (2011b) clearly point out that context-specific  
232 risk attitudes are better predictors of context-specific behavioral outcomes than a lottery-  
233 based measure. Out of all domain-specific risk measures, individuals' risk attitude towards

234 health, for example, is the best risk item to predict their health behavior. The authors  
235 furthermore show that propensity to self-employment is best predicted by career risk atti-  
236 tudes. This is complemented by the findings of Pfeifer (2011) who shows that career risk  
237 attitudes are better predictors of sorting into public sector employment than overall risk  
238 attitudes. We therefore mainly employ individuals' willingness to take risks in their oc-  
239 cupational career as a more appropriate measure with regard to the gradient between risk  
240 and human capital investments. However, we run additional analyses using further related  
241 risk measures (financial matters, general risk taking, lottery) as robustness checks.

242 Considering the ordinal 11-point scale, we would be able to generate up to eleven risk  
243 attitude dummies. For ease of interpretation, however, we calculate mean and standard de-  
244 viation separately by mothers' and fathers' career risk attitudes, and generate the following  
245 three risk categories:<sup>10</sup>

246 A parent is

- 247 • *risk-averse* if their response value  $X$  is smaller than the mean ( $\mu$ ) minus the standard  
248 deviation ( $\sigma$ ):  $X < \mu - \sigma$ ,
- 249 • *risk-neutral*, if  $X$  ranges between the mean plus/minus one standard deviation:  $\mu -$   
250  $\sigma \leq X \leq \mu + \sigma$ ,
- 251 • *risk-loving* if  $X$  is larger than the mean plus the standard deviation:  $X > \mu + \sigma$ .

252 As mentioned above, there is evidence that 1) males and females differ in their will-  
253 ingness to take risks (Dohmen et al., 2011b) and that 2) mothers are much more involved  
254 in their children's schooling activities than fathers (Enders-Drägässer et al., 2004; Oester-  
255 backa et al., 2010; Hallberg & Klevmarcken, 2003; Guryan et al., 2008). Although this

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<sup>10</sup>Compared with other approaches, such as a more or less arbitrary classification into four or five categories, we prefer using information from the observed distributions. See Table A.1 in the Appendix for descriptive statistics of the different risk measures.

256 could lead to a greater influence of mothers' risk attitudes in the tracking decision, it is  
257 unfortunately impossible to further differentiate this intrahousehold decision mechanism  
258 with the data we have at hand. For this reason, we focus mainly on separate analyses for  
259 mothers and fathers in the interpretation of the results, but also estimate further regressions  
260 including both parents' risk attitudes as one of our robustness checks. Our final sample  
261 consists of about 1,200 mother-child observations and some 1000 father-child observa-  
262 tions.

263 The average domain risk attitudes of mothers and fathers, as shown in Table 1, support  
264 earlier findings that females are more risk-averse than males, irrespective of the domains  
265 we consider. We further stratify these first descriptive findings by individuals' employment  
266 status to get an impression of the link between labor market participation and career risk  
267 attitudes. The gender differences hold for all risk domains, irrespective of whether the  
268 individual is employed full-time, part-time or not employed at all. Beyond that, we find  
269 that risk willingness is higher for the employed and, among the employed, higher for  
270 full-time working individuals. In our multiple regressions, we take these differences into  
271 account and control for individuals' labor market status and experience. This is useful due  
272 to the differences in the labor market attachment between men and women, and mothers  
273 in particular.

274 *[Table 1 about here]*

275  
276 A first impression of the relationship between parents' willingness to take risks in their  
277 occupational career and their children's secondary school track choice is given in Figure 2.  
278 The patterns imply that children of risk-loving parents are much more likely to pursue the  
279 upper secondary school track whereas children of risk-averse mothers (fathers) are more  
280 likely to be enrolled in the lower (intermediate) secondary school track.

281

282 *[Figure 2 about here]*

283

284 Since these descriptive findings can be confounded by other factors, we control for a  
285 large range of socio-demographic and -economic characteristics in our regression analy-  
286 ses. Parents' education is clearly a key determinant of their children's secondary school  
287 track choice. In line with the structure of the education system, the regression includes  
288 dummies on whether the parent has acquired a lower, intermediate or upper secondary  
289 schooling-leaving certificate or whether there is no information about the parents' educa-  
290 tion. Parents' current employment status is another relevant covariate since 1) parents' risk  
291 attitudes differ according to employment status, and 2) it relates to the household's budget  
292 constraint and also to the time parents are able to invest in assisting their children, for ex-  
293 ample with their homework. In addition, parents' labor market experience is included by  
294 three variables: full-time, part-time and unemployment experience.<sup>11</sup> The monetary bud-  
295 get constraint is further accounted for by the log of the monthly net equivalence household  
296 income. Further control variables are the child's age, whether the child is a boy, three  
297 dummies on the number of children in the family (one sibling, two siblings, three or more  
298 siblings), the parent's age at the birth of the child, and whether the parent is a citizen of any  
299 other country than Germany.<sup>12</sup> Moreover, the size of the district in which the respondents  
300 live is accounted for to capture possible differences in the availability of intermediate and,  
301 particularly, upper secondary schools between rural and urban areas.

302 Due to the categorical character of our dependent variable, the multinomial logit es-  
303 timator is used, allowing for differences in each covariate's marginal effect across cat-

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<sup>11</sup>Since the different employment experience are highly correlated, we run separate regressions including only one of the three variables at a time without substantial changes of the results.

<sup>12</sup>See Table A.2 for descriptive statistics.

304 egories.<sup>13</sup> Our baseline model describes the correlation between the child's secondary  
305 school track choice and a vector of covariates  $Pr(Y_i = j|X_i)$ , where  $X$  comprises each  
306 parent's risk attitude and the controls noted earlier.

307 We consider a possible relation between the parent's own education and his or her  
308 risk attitude, and extend our baseline specification by including terms interacting the re-  
309 spondent's risk attitude and his or her highest educational achievement. To avoid issues  
310 associated with the calculation of marginal effects in non-linear models that include in-  
311 teraction terms (Ai & Norton, 2003; Greene, 2010), we simulate changes in parents' risk  
312 preferences in order to calculate the corresponding conditional predicted probabilities of  
313 the child's secondary school track choice:  $Pr(Y_i|\text{parent's risk attitude})$ , where the parent's  
314 risk attitude could be averse, neutral or loving.

Since we are mainly interested in the effects of risk aversion vs. the willingness to take risks, we calculate the following differences:

$$\Delta_L = Pr(\text{lower track} | \text{parent is risk-averse}) - Pr(\text{lower track} | \text{parent is risk-loving})$$

$$\Delta_I = Pr(\text{intermediate track} | \text{parent is risk-averse}) - Pr(\text{intermediate track} | \text{parent is risk-loving})$$

$$\Delta_U = Pr(\text{upper track} | \text{parent is risk-averse}) - Pr(\text{upper track} | \text{parent is risk-loving})$$

315 As outlined above, the role played by teachers' track recommendations after primary  
316 school differs from federal state to federal state. Our baseline model includes a dummy  
317 for the four federal states (Bavaria, Baden-Württemberg, Saxony, and Thuringia) where  
318 recommendations are more or less final and the costs to circumvent recommendations are  
319 high.<sup>14</sup>

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<sup>13</sup>Both the Hausman-McFadden test and the Small-Hsiao test were applied to test the independence of irrelevant alternatives (IIA) assumption underlying the multinomial logit model; we found no evidence to the contrary (see also Long & Freese, 2006, p. 243ff.).

<sup>14</sup>We also used a different specification using only Bavaria and Baden-Württemberg as the two states

320 We furthermore use this restriction as a kind of falsification test: ideally, teachers'  
321 recommendation match the children's skills, enabling us to ignore for the moment that  
322 we have insufficient information on academic abilities.<sup>15</sup> Moreover, if we assume that  
323 parental preferences are distributed equally across the country, the underlying correlation  
324 between parents' risk willingness and their preferences for their children's school track  
325 choice should be just as strong in federal states with mandatory teacher recommendations  
326 as in all other federal states.

327 Parents' preferences are not taken into account in the states where recommendations  
328 are mandatory, and the child's tracking decision is based solely on the teacher's evaluation  
329 of the child's skills. As a consequence, any observable association between parents' risk  
330 attitudes and school track choice in federal states where recommendations are mandatory  
331 must be due to omitted variables. We may therefore expect that if there were no association  
332 in these four states but a strong association in the remaining states, the results would  
333 be more likely to point to causal effects rather than mere correlations. Hence, as a key  
334 competitor to our baseline model, we split our sample into two subsamples. One sample  
335 includes observations from the four federal states where recommendations are binding;  
336 the second sample contains observations from the federal states without legally binding  
337 recommendations.

338 In addition to our baseline specifications we run the following robustness tests: 1) we  
339 account for both parents' risk willingness in the estimations by jointly including items

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where the education system has the highest restrictions for track selections and very strict segregation between tracks (compare Lohmann & Groh-Samberg, 2010, p. 478). The results remained the same and are available upon request.

<sup>15</sup>A shortcoming in our analysis is that we do not have any direct information on children's academic achievements or cognitive abilities. We tried to circumvent this problem by matching information from then 17-year-olds who were asked for retrospective information on their primary school teachers' recommendation. This resulted in quite substantial problems due to missing values, which is why we refrain from reporting the findings in this paper. Where available, the recommendation coefficient correlates with the observed secondary school track, but does not substantially change the results for the parents' risk attitudes.

340 for mothers' and fathers' risk willingness, and by using averaged parental risk, 2) we  
341 employ the individual's score on the risk willingness scale, i.e. we use a quasi-metric  
342 measure, 3) we employ further domain risk indicators – the individual's general risk will-  
343 ingness attitude and risk attitude in financial matters and the lottery item – to check the  
344 sensitivity of the risk measure used. As a further extension, we run separate analyses for  
345 mother/father–son/daughter subsamples to examine whether there are differences due to  
346 the child's gender.

## 347 **5. Results**

348 Tables 2 and 3 report average marginal effects for the baseline model, for mothers  
349 and fathers, respectively. First, unsurprisingly, the most influential control variables are  
350 parents' education and household income. Having a parent with an upper secondary  
351 schooling-leaving certificate increases the probability of the child pursuing the upper sec-  
352 ondary schooling track by about 20 percentage points (Table 2 for mothers) or almost 16  
353 percentage points (Table 3 for fathers) compared to the child of a parent with intermediate  
354 secondary schooling. A complementary picture is found for parents with lower secondary  
355 schooling, whose children are more likely to pursue the lower secondary school track. We  
356 find evidence of a strong education transmission from parents to their children, which is  
357 in line with previous research on intergenerational education mobility in Germany (Hei-  
358 neck & Riphahn, 2009). Children in higher income households also have greater chances  
359 of pursuing the upper secondary school track. Moreover, living in a federal state where  
360 teachers' recommendations are strongly binding is associated with higher probabilities of  
361 enrollment in the lower secondary track and with lower probabilities of pursuing the upper  
362 secondary track.

363 Regarding our central interest, the estimates suggest that high parental willingness to  
364 take risks has no impact on children's secondary school track choice, compared to an

365 average risk-taking attitude. Having a risk-averse mother, however, is correlated with a  
366 9 percentage point decrease in the probability of the child being enrolled in the upper  
367 secondary school track and a roughly 5 percentage point increase in pursuing the lower  
368 secondary school track (Table 2). This effect seems to be modest, but comes close to the  
369 association between living in a federal state with binding teachers' recommendations and  
370 children's secondary school enrollment. The overall pattern also indicates a substantial  
371 gradient: conditional on mothers' risk attitudes, the predicted probabilities imply that the  
372 greater a mother's risk willingness, the more likely her child is to attend upper secondary  
373 school and the less likely he or she is to pursue the lower secondary school track (cf. the  
374 lower panel in Table 2).

375

376

*[Table 2 about here]*

377

378 While this finding is in line with the previously mentioned notion that education is a  
379 risky investment from which risk-averse individuals shy away, we find a somewhat differ-  
380 ent pattern for fathers. In particular, the estimates indicate a small negative and weakly  
381 statistically significant association between fathers' risk aversion and children's enrollment  
382 in the lower secondary school track (Table 3, column 1), again compared to counterparts  
383 with risk-neutral attitudes. This is at odds with the first expectation, but is in line with  
384 the "safe haven" notion. Yet, the negative sign of the average marginal effect of fathers'  
385 risk aversion on the children's enrollment in the upper schooling track may indicate that  
386 fathers opt for a middle path. In addition, calculating predicted probabilities conditional  
387 on fathers' risk willingness (cf. the lower panel in Table 3), we find only minor differences  
388 in children's secondary school track choice as their fathers' career risk attitudes vary.

389

390

*[Table 3 about here]*

391

392 Looking at both parents together, the results differ for mothers inasmuch as their risk  
393 attitudes are no longer related to their children's school track. It is, however, hard to  
394 tell whether this loss in statistical significance is due to assortative mating in partners'  
395 risk willingness or whether it is the male who dominates the decision on the preferred  
396 school track, or both of these reasons. Irrespective of the underlying mechanism, the  
397 result for fathers holds as there is a statistically weak, negative association between their  
398 risk attitudes and their children's enrollment in the lower secondary school track (Table 4,  
399 upper panel). We find a similar picture for risk aversion if we average parents' risk attitudes  
400 (Table 4, lower panel). We now also find that risk willingness is positively related to the  
401 child pursuing the upper secondary school track. The predicted probability increases by  
402 about 6 percentage points.

403 *Results from the falsification test*

404 Until now, we have used a dummy variable to allow for differences between states in the  
405 impact of teachers' recommendations. However, as argued earlier, maybe there are factors  
406 other than parental risk attitudes that drive the association with children's school track en-  
407 rollment. As outlined above, we split our sample in order to run a falsification test: if there  
408 were a gradient between parental risk attitudes and school track choice in federal states  
409 where recommendations are final, we would have reason to distrust our results since such  
410 a gradient might more probably be caused by omitted confounding variables. However, the  
411 estimates do not raise any concern. Without showing the results in detail, the simulations  
412 initially indicate no statistical correlation between fathers' risk attitudes and their chil-  
413 dren's school track for either the full sample or both subsamples. The findings for mothers  
414 are then convincing inasmuch as the risk attitude differences in conditional predicted prob-  
415 abilities are zero in the subsample of the federal states where teachers' recommendations  
416 are binding (Table 5, Panel B). In contrast, the findings for either the full sample that in-

417 cludes the binding recommendation state dummy or the subsample of observations from  
418 the states without binding teachers' recommendations indicate substantial differences in  
419 both lower and upper secondary school enrollment probabilities, once mothers' risk atti-  
420 tudes are varied from averse to loving (Table 5, Panels A and C). Having a risk-loving  
421 rather than a risk-averse mother significantly increases (decreases) her child's probability  
422 of pursuing the upper (lower) secondary school track by roughly ten percentage points.<sup>16</sup>

423

424 *[Table 5 about here]*

#### 425 *Interacting risk and education*

426 We extend our baseline model and include interaction terms of parental risk attitudes and  
427 education to control for the relation between a parent's own education and her or his risk  
428 attitude.<sup>17</sup> Similar to the conditional predicted probabilities, we calculate differences in  
429 the predicted school enrollment outcomes after varying parental risk attitudes, while all  
430 other covariates are kept at the observed values (see Table 6).

431

432 *[Table 6 about here]*

433

434 The results of these simulation exercises reinforce the findings of the baseline models  
435 inasmuch as there is no convincing evidence of fathers' risk attitudes, but a striking gra-  
436 dient between mothers' risk attitudes and their children's secondary school track enroll-  
437 ment. The difference in predicted probabilities of enrollment in the lower track amounts

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<sup>16</sup>We run additional estimations, classified according to federal states with or without mandatory teachers' recommendations, and including averaged parents' risk willingness, and come to a similar conclusion inasmuch as there is no statistical relation between parents' risk attitudes and their children's secondary school track, but a decrease of about 12 percentage points in intermediate secondary school enrollment and an increase of about 10 percentage points in upper secondary school enrollment if parents are, on average, willing to take risks rather than being risk-neutral.

<sup>17</sup>In contrast to the baseline model, we do not run a similar analysis for a joint parental risk indicator since we would also have to average mothers' and fathers' educational attainment, which is not a useful approach.

438 to almost 7 percentage points conditional on the mother being either risk-averse or risk-  
439 loving. The impact of maternal risk attitudes is even stronger when examining the upper  
440 secondary school track: there is a difference of 10 percentage points in predicted proba-  
441 bilities, meaning that the child of a risk-loving mother is much more likely to pursue the  
442 directly university-qualifying schooling track.

## 443 **6. Robustness**

### 444 *Using the quasi-metric scale*

445 In our baseline models, we use categorical risk variables as derived from the underlying  
446 risk attitude distributions. To examine the stability of these first findings, we now employ  
447 the scores of the scale itself. The results in Table 7 mainly show similar patterns. An in-  
448 crease in fathers' risk willingness by one unit is not statistically related to their children's  
449 secondary school track, but the average marginal effects suggest a kind of U-shaped gradi-  
450 ent. Moreover, there is again evidence of a monotonic relation between a mother's attitude  
451 to occupational career risk and her child's secondary school track: a one-unit increase in  
452 risk willingness decreases the predicted probabilities of enrollment in the lower track and  
453 increases enrollment in the upper track by one percentage point respectively.

454

455

*[Table 7 about here]*

456

457 Figure 3 depicts this result, showing that irrespective of whether the mother has a lower  
458 or upper secondary school-leaving certificate, the child's probability of pursuing the up-  
459 per secondary schooling track increases by roughly ten percentage points with changes in  
460 maternal willingness to take risks from 0 to 10. Complementing this, an increase in risk-  
461 taking willingness over the whole range also reduces lower secondary school enrollment

462 by about ten percentage points.

463

464

*[Figure 3 about here]*

465

466 *Further domain risk attitudes*

467 As outlined, our analysis differs from existing studies (e.g. Belzil & Leonardi, 2007;  
468 Leonardi, 2007; Brown et al., 2012) inasmuch as we mainly employ individuals' risk aver-  
469 sion derived from their attitudes towards taking risks in their career rather than relying  
470 on hypothetical lottery questions only. To allow for comparison, however, we run further  
471 robustness checks to accommodate prior research by using 1) individuals' general risk-  
472 taking attitudes, which is still a better overall risk behavior predictor than a lottery measure  
473 (Dohmen et al., 2011b), 2) individuals' willingness to take risks in financial matters, and  
474 3) the lottery question as implemented in the SOEP.<sup>18</sup>

475 Compared to the findings from the baseline model, the results for the other risk-taking  
476 indicators imply somewhat more heterogenous patterns: first, there is a 6.4 percentage  
477 point decrease for risk-loving mothers in the probability of their children's enrollment in  
478 the lower secondary school track (Table 8, Panel A). This again suggests the "safe haven"  
479 hypothesis, even more so since we further find a 7.5 percentage point increase in the pre-  
480 dicted probability that the child will be streamed into the intermediate secondary schooling  
481 track. The negative sign of the average marginal effect on pursuing the upper secondary  
482 track would again suggest shying away from this option, yet this is not statistically signif-  
483 icant. This pattern holds if we look at mothers' risk-taking in financial matters (Table 8,  
484 Panel B): again we find a decrease (increase) of almost 8 (more than 6) percentage points

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<sup>18</sup>Note, however, that the resulting distribution is highly skewed so that our categorization in "averse-neutral-loving" yields a very different pattern for individuals' risk willingness compared to the other risk indicators, cf. Appendix Table A.1.

485 for risk-loving mothers and the predicted probability of enrollment in the lower (interme-  
486 diate) track. In addition, there is a decrease of almost 5 percentage points in pursuing  
487 the upper secondary school track if the mother is riskaverse. For the lottery measure, the  
488 evidence is less convincing, even though there is a increase of almost 6 percentage points  
489 in the probability of a child pursuing the intermediate school track.

490

491

*[Table 8 about here]*

492

493 The results for fathers complement the picture for mothers inasmuch as, where sta-  
494 tistically different from zero, the results suggest a tendency in favor of the “safe haven”  
495 notion. In particular, there is a negative association between (generally) risk-averse fa-  
496 thers and their children’s pursuit of the lower secondary school track, but a positive link  
497 to enrollment in the intermediate track, with a decrease (an increase) of 6 (9) percentage  
498 points. Similar to mothers, there is a decrease in their children’s enrollment in the upper  
499 secondary school track if fathers are risk-averse in financial matters, with the effect being  
500 slightly greater, i.e. pointing to a decrease of almost 8 percentage points. Finally, and  
501 again similarly to the results for mothers, there is an increase of about 5 percentage points  
502 in the predicted probability that the child will pursue the intermediate school track.

503 We repeated these analyses with i) the joint and ii) the averaged parental risk indica-  
504 tors, but refrain from showing the results in further detail, since the patterns are roughly  
505 the same as in the separate analyses. That is, where statistically significant, the overall pic-  
506 ture supports a tendency towards enrollment in the intermediate secondary school track.  
507 Full results are available on request.

508

509 We also carried out simulation exercises, i.e. we calculated children’s predicted sec-  
510 ondary school track probabilities, conditional on varied parental risk willingness. We

511 refrain from presenting these findings since the differences in the predicted probabilities  
512 do not usually differ statistically from zero. There is one exception: similar to the findings  
513 for mothers, there is a 10.5 percentage point difference in lower track enrollment probabil-  
514 ity for a mother being either risk-averse or risk-loving in financial matters, with a higher  
515 probability found for risk-averse mothers. Additionally, we repeated the simulations for  
516 the two subsamples that differ in terms of the binding character of teachers' recommenda-  
517 tions and find similar patterns for mothers' risk attitudes towards financial matters: there  
518 are no significant effects in federal states where recommendations are final but, again, an  
519 11 percentage point probability of higher lower track enrollment for a child of a risk-averse  
520 mother compared to one of a risk-loving mother in all other federal states.

521

#### 522 *Differences by child's gender?*

523 Recent research further suggests gender-specific intergenerational education transmission,  
524 i.e. that fathers' education is more important for the educational achievement of their sons  
525 and that, similarly, mothers' education is more relevant for their daughters' educational  
526 outcomes (e.g. Dearden et al., 1997; Heineck & Riphahn, 2009; Kleinjans, 2010).

527 Given this evidence and the observation that risk-taking willingness differs between  
528 males and females, we extend our analysis and separate the samples by the child's sex to  
529 examine whether parents' risk attitudes affect boys' or girls' secondary school enrollment  
530 differently (Table 9). Our results highlight two findings: first, parental risk attitudes play  
531 a larger role for daughters than for sons, inasmuch as none of the average marginal ef-  
532 fects on the outcomes of boys differs statistically from zero. Second, however, we find  
533 suggestions of different underlying mechanisms for fathers and mothers. In line with the  
534 findings of our baseline model, a daughter's probability of pursuing the lower secondary  
535 track is associated with an increase of about 10 percentage points when having a risk-  
536 averse mother but, in contrast, decreases her probability of pursuing the upper secondary

537 track by 8 percentage points. For fathers, we again find that risk aversion is negatively  
538 associated with enrollment in the lower secondary track, but that risk-loving substantially  
539 decreases the daughter's chances of being enrolled in the intermediate secondary track and  
540 substantially increases her probability of being enrolled in the upper track, with changes of  
541 almost 10 and 14 percentage points respectively. Without showing it in detail, the results  
542 for fathers hold if we use parental risk indicators jointly. The maternal impact loses its sta-  
543 tistical significance, as in our basic model. Nevertheless, this finding raises the issue that  
544 aspects such as social conservatism or social reproduction may also be of importance for  
545 the underlying mechanism, and not just the anticipated value of human capital investment  
546 alone.<sup>19</sup>

547 *[Table 9 about here]*

## 548 **7. Summary and conclusions**

549 Growing research addresses the effects of individuals' cognitive and non-cognitive  
550 skills on different labor market outcomes (for an overview, see Borghans et al., 2008). The  
551 role of individuals' risk attitudes has also attracted scholarly attention within this strand  
552 of research (ibid., p. 1002 f.), but has largely concentrated on issues such as portfolio  
553 choice, occupational choice, or earnings. Yet, as future outcomes of individuals' educa-  
554 tional choices are uncertain and may thus represent risky investments, it is plausible to  
555 assume that an individual's willingness to take risks may have an impact on his or her won  
556 educational choices as well as on the educational path of his or her children.

557 Theoretically, however, it is not that clear a priori whether risk-averse individuals  
558 would attempt to avoid educational investments as education may also serve as a "safe  
559 haven", i.e. would have an insurance type character. Our analysis provides further evi-

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<sup>19</sup>We are grateful to one of the referees for pointing this out to us.

560 dence of this issue, and we examine whether parental risk attitudes are linked to the sec-  
561 ondary school track choice of their children. We therefore add to an almost non-existent  
562 literature, where the studies of Leonardi (2007) and Brown et al. (2012) are the only pre-  
563 vious studies on the parent–children gradient. We explore the German case which is as in-  
564 teresting and possibly even more relevant because of the institutional setting that streams  
565 children at age ten, i.e. very early, into different secondary school tracks. Upward mo-  
566 bility between tracks is low, meaning that the initial choice has a strong predetermining  
567 character.

568 Our results imply the following: 1) with everything else being constant and compared  
569 to their risk-neutral counterparts, risk-averse mothers are more likely to have their child  
570 enrolled in the lower secondary schooling track, particularly if the child is a girl, and less  
571 probably in the upper secondary track. With substantial changes in the predicted proba-  
572 bilities (6 and 10 percentage points respectively), this supports the notion that education  
573 is considered as a risky investment. 2) In contrast, the findings for fathers are not as con-  
574 vincing and consistent as for mothers and are more in line with a “safe haven” argument  
575 inasmuch as the children of risk-averse fathers are less likely to pursue the lower secondary  
576 school track. This is reinforced in analyses that jointly model both parents’ risk attitudes,  
577 for which we find a tendency towards the intermediate secondary school track.

578 In further analyses by child gender, the results suggest aspects beyond and other than  
579 just the anticipated value of a human capital investment inasmuch as we find a stronger  
580 effect for girls. This is further complemented by evidence that daughters of risk-loving  
581 rather than risk-neutral fathers are much more likely to pursue the upper secondary track  
582 which directly qualifies schoolchildren for entrance to university.

583 Given that our analysis is only one of yet very few attempts to explore this specific  
584 question, it may be too early to deduce policy implications. To widen the scope for social  
585 mobility, it might either way be useful to consider relaxing the requirements for upward

586 track mobility in particular so that a possibly wrong initial choice based on, amongst other  
587 things, parental-risk taking attitudes can be reversed more easily.

**Table 1:** Descriptive summary of mothers' and fathers' risk measures, in general and by employment status

	<b>Full sample</b>		<b>Full-time</b>		<b>Part-time</b>		<b>Not employed</b>	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
<i>Mothers</i>								
Career	3.38	2.41	4.06	2.47	3.29	2.30	3.02	2.46
General	4.07	2.23	4.55	2.20	3.98	2.20	3.88	2.25
Financial matters	1.97	1.83	2.32	1.79	1.98	1.82	1.71	1.82
Lottery	5.41	0.92	5.36	0.90	5.39	0.93	5.48	0.89
<i>Fathers</i>								
Career	4.40	2.48	4.47	2.45	3.92	2.50	3.88	2.72
General	5.04	2.20	5.10	2.17	4.96	2.36	4.51	2.36
Financial matters	3.24	2.36	3.32	2.36	3.22	2.34	2.49	2.27
Lottery	5.02	1.24	4.98	1.24	5.52	0.75	5.24	1.29

**Notes:** Risk willingness towards *career*, *general* and *financial matters* is measured on an 11-point Likert-type scale, where "0" indicates no willingness to take risks and "10" indicates full willingness to take risks. Risk willingness in the *lottery* is measured on a 6-point Likert-type scale, where "1" indicates full willingness to take risks and "6" indicates no willingness.

**Source:** SOEP, 2004. Authors' own calculations.

**Table 2:** Baseline specification - children's educational attainment: multinomial logit estimation.

	Pr(y=lower sec)	Pr(y=secondary)	Pr(y=upper sec)
<b>Average marginal effects</b>			
Mother: risk-averse (career)	0.076** (0.031)	0.004 (0.036)	-0.079** (0.034)
Mother: risk-loving (career)	-0.021 (0.031)	0.015 (0.036)	0.006 (0.033)
Mother's education: lower sec.	0.233*** (0.033)	-0.100*** (0.037)	-0.132*** (0.035)
Mother's education: upper sec.	-0.055* (0.031)	-0.139*** (0.041)	0.194*** (0.041)
Mother's education: missing	0.156*** (0.050)	-0.106* (0.056)	-0.050 (0.058)
Mother's age (at birth of child)	-0.008** (0.003)	-0.007* (0.004)	0.015*** (0.003)
Mother: migrant	-0.010 (0.034)	0.029 (0.048)	-0.019 (0.046)
Male	0.063*** (0.022)	-0.011 (0.026)	-0.051** (0.024)
Child's age	-0.036*** (0.008)	0.015 (0.010)	0.021** (0.009)
One sibling	-0.017 (0.033)	0.005 (0.037)	0.012 (0.036)
Two siblings	-0.016 (0.038)	0.065 (0.045)	-0.049 (0.042)
Three or more siblings	0.048 (0.050)	0.057 (0.058)	-0.105** (0.053)
Net equiv-income (log)	-0.160*** (0.030)	-0.072** (0.035)	0.232*** (0.032)
Federal state with binding recommendations	0.085*** (0.023)	-0.011 (0.027)	-0.074*** (0.025)
Regional fixed effects	Yes	Yes	Yes
Mother's employment history	Yes	Yes	Yes
<b>Predicted probabilities</b>			
Pr(.../ Mother's risk attitude = averse)	0.314*** (0.029)	0.330*** (0.031)	0.356*** (0.031)
Pr(.../ Mother's risk attitude = neutral)	0.238*** (0.015)	0.326*** (0.017)	0.436*** (0.018)
Pr(.../ Mother's risk attitude = loving)	0.217*** (0.029)	0.342*** (0.035)	0.441*** (0.034)

**Note:** Multinomial logit estimation, average marginal effects. N=1,204 mother-child observations. Log-likelihood = -1042.559. Predictions are generated as the average of all individual predicted probabilities (calculated with the individually observed values of the covariates), after modification of mothers' risk attitudes. Standard errors in parentheses. \*\*\*, \*\*, \* significant at 1%, 5%, 10%.

**Source:** SOEP, 2004. Authors' own calculations.

**Table 3:** Baseline specification - children's educational attainment: multinomial logit estimation.

	Pr(y=lower sec)	Pr(y=secondary)	Pr(y=upper sec)
<b>Average marginal effects</b>			
Father: risk-averse (career)	-0.058* (0.032)	0.033 (0.041)	0.025 (0.040)
Father: risk-loving (career)	-0.037 (0.031)	-0.006 (0.036)	0.043 (0.033)
Father's education: lower sec.	0.168*** (0.035)	-0.045 (0.040)	-0.123*** (0.038)
Father's education: upper sec.	-0.048 (0.035)	-0.112** (0.048)	0.159*** (0.047)
Father's education: missing	0.099* (0.052)	-0.182*** (0.055)	0.083 (0.065)
Father's age (at birth of child)	-0.006 (0.004)	-0.011** (0.005)	0.017*** (0.005)
Father: migrant	0.062 (0.040)	0.063 (0.051)	-0.126*** (0.048)
Male	0.047** (0.024)	-0.047 (0.029)	-0.001 (0.027)
Child's age	-0.038*** (0.009)	0.014 (0.011)	0.024** (0.011)
One sibling	0.023 (0.036)	0.022 (0.042)	-0.045 (0.041)
Two siblings	0.030 (0.040)	0.069 (0.048)	-0.100** (0.046)
Three or more siblings	0.084* (0.051)	0.081 (0.060)	-0.164*** (0.056)
Net equiv-income (log)	-0.063* (0.037)	-0.082* (0.043)	0.144*** (0.038)
Federal state with binding recommendations	0.080*** (0.026)	-0.027 (0.030)	-0.054* (0.028)
Regional fixed effects	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Father's employment history	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
<b>Predicted probabilities</b>			
Pr(.../ Father's risk attitude = averse)	0.185*** (0.027)	0.352*** (0.037)	0.463*** (0.036)
Pr(.../ Father's risk attitude = neutral)	0.243*** (0.017)	0.319*** (0.019)	0.438*** (0.018)
Pr(.../ Father's risk attitude = loving)	0.206*** (0.029)	0.313*** (0.032)	0.481*** (0.030)

**Note:** Multinomial logit estimation, average marginal effects. N=997 father-child observations. Log-likelihood = -839.633. Predictions are generated as the average of all individual predicted probabilities (calculated with the individually observed values of the covariates), after modification of fathers' risk attitudes. Standard errors in parentheses. \*\*\*, \*\*, \* significant at 1%, 5%, 10%.

**Source:** SOEP, 2004. Authors' own calculations.

**Table 4:** Baseline specification - children's educational attainment: multinomial logit estimation.

	Pr(y=lower sec)	Pr(y=secondary)	Pr(y=upper sec)
<b>Average marginal effects</b>			
Mother: risk-averse (career)	0.041 (0.033)	-0.026 (0.040)	-0.014 (0.039)
Mother: risk-loving (career)	-0.013 (0.037)	-0.021 (0.043)	0.034 (0.038)
Father: risk-averse (career)	-0.063* (0.032)	0.013 (0.044)	0.050 (0.042)
Father: risk-loving (career)	-0.046 (0.031)	-0.008 (0.037)	0.054 (0.034)
Parents: risk-averse (career)	-0.053* (0.030)	0.034 (0.041)	0.019 (0.038)
Parents: risk-loving (career)	-0.032 (0.035)	-0.033 (0.040)	0.065* (0.037)

**Notes:** Multinomial logit estimation. N = 926 parent-child observations. Additional control variables included. Standard errors in parentheses. \*\*\*, \*\*, \* significant at 1%, 5%, 10%.

**Source:** SOEP, 2004. Authors' own calculations.

**Table 5:** Predicted probabilities, simulation results for different samples: baseline specification using career risk attitudes

<b>(A) OBSERVATIONS FROM ALL FEDERAL STATES (N=1204)</b>			
	Pr(y=lower sec)	Pr(y=secondary)	Pr(y=upper sec)
<b>Predicted school track</b>			
P(...  mother = risk-averse)	0.3138	0.3298	0.3564
P(...  mother = risk-neutral)	0.2382	0.3262	0.4356
P(...  mother = risk-loving)	0.2170	0.3415	0.4414
Diff. averse-loving	0.0967**	-0.0117	-0.0850**
	(0.0405)	(0.0495)	(0.0425)
	0.0168	0.8126	0.0453
<b>(B) OBSERVATIONS FROM FEDERAL STATES WITH BINDING RECOMMENDATIONS (N=528)</b>			
	Pr(y=lower sec)	Pr(y=secondary)	Pr(y=upper sec)
<b>Predicted school track</b>			
P(...  mother = risk-averse)	0.3368	0.3535	0.3097
P(...  mother = risk-neutral)	0.2944	0.3230	0.3826
P(...  mother = risk-loving)	0.2809	0.3525	0.3666
$\Delta$ averse-loving	0.0559	0.0010	-0.0569
	(0.0708)	(0.0762)	(0.0650)
	0.4296	0.9892	0.3809
<b>(C) OBSERVATIONS FROM FEDERAL STATES WITHOUT BINDING RECOMMENDATIONS (N=676)</b>			
	Pr(y=lower sec)	Pr(y=secondary)	Pr(y=upper sec)
<b>Predicted school track</b>			
P(...  mother = risk-averse)	0.2808	0.3269	0.3923
P(...  mother = risk-neutral)	0.1928	0.3304	0.4768
P(...  mother = risk-loving)	0.1802	0.3171	0.5027
$\Delta$ averse-loving	0.1006**	0.0098	-0.1104**
	(0.0503)	(0.0576)	(0.0562)
	0.0457	0.8648	0.0494

**Notes:** Standard errors (in parentheses) are obtained via bootstrap with 200 repeated draws. \*\*\*, \*\*, \* significant at 1%, 5%, 10%.

**Source:** SOEP, 2004. Authors' own calculations.

**Table 6:** Predicted probabilities, simulation results: extended specification using career risk attitudes, interacted with parental education

(A) MOTHER-CHILD OBSERVATIONS (N=1204)

Mothers' risk attitude	Predicted school track		
	Lower secondary	Secondary	Upper secondary
P(...  mother = risk-averse)	0.2764	0.3554	0.3682
P(...  mother = risk-neutral)	0.2364	0.3286	0.4350
P(...  mother = risk-loving)	0.2099	0.3230	0.4672
$\Delta$ Diff. averse-loving	0.0665* (0.0398)	0.0324 (0.0478)	-0.0990** (0.0434)

(B) FATHER-CHILD OBSERVATIONS (N=997)

Fathers' risk attitude	Predicted school track		
	Lower secondary	Secondary	Upper secondary
P(...  father = risk-averse)	0.1824	0.3609	0.4567
P(...  father = risk-neutral)	0.2425	0.3192	0.4383
P(...  father = risk-loving)	0.2112	0.3145	0.4743
$\Delta$ Diff. averse-loving	-0.0288 (0.0403)	0.0464 (0.0505)	-0.0176 (0.0468)

**Notes:** Standard errors (in parentheses) are obtained via bootstrap with 500 repeated draws. \*\*\*, \*\*, \* significant at 1%, 5%, 10%.

**Source:** SOEP, 2004. Authors' own calculations.

**Table 7:** Children’s secondary school track choice: estimates using career risk attitudes as metric variable.

	Pr(y=lower sec.)	Pr(y=secondary)	Pr(y=upper sec.)
<b>Average marginal effects</b>			
Mother: risk willingness	−0.010** (0.005)	0.000 (0.006)	0.009* (0.005)
Father: risk willingness	0.002 (0.005)	−0.008 (0.006)	0.006 (0.006)

**Notes:** Multinomial logit estimation, average marginal effects. N=1204 (997) mother–(father–)child observations. The estimates are estimated separately for the mother–child and father–child sample and are based on the baseline specification including the same set of control variables. Risk willingness is used as a metric variable, where "0" indicates no willingness to take risk and "10" full willingness to take risks. Standard errors in parentheses. \*\*\*, \*\*, \* significant at 1%, 5%, 10%.

**Source:** SOEP, 2004. Authors’ own calculations.

**Table 8:** Children's secondary school track choice: estimates using different risk attitudes

<b>(A) GENERAL RISK-TAKING ATTITUDES</b>			
	Pr(y=lower sec.)	Pr(y=secondary)	Pr(y=upper sec.)
Mother: risk-averse	-0.009 (0.031)	0.014 (0.038)	-0.005 (0.036)
Mother: risk-loving	-0.064* (0.033)	0.075* (0.040)	-0.011 (0.035)
Father: risk-averse	-0.061* (0.032)	0.095** (0.044)	-0.035 (0.041)
Father: risk-loving	-0.049 (0.036)	0.046 (0.045)	0.003 (0.042)
<b>(B) RISK ATTITUDES IN FINANCIAL MATTERS</b>			
	Pr(y=lower sec.)	Pr(y=secondary)	Pr(y=upper sec.)
Mother: risk-averse	0.027 (0.026)	0.021 (0.030)	-0.048* (0.028)
Mother: risk-loving	-0.078*** (0.029)	0.065* (0.037)	0.012 (0.033)
Father: risk-averse	0.018 (0.033)	0.060 (0.041)	-0.078** (0.039)
Father: risk-loving	-0.018 (0.032)	-0.000 (0.038)	0.018 (0.035)
<b>(C) LOTTERY MEASURE</b>			
	Pr(y=lower sec.)	Pr(y=secondary)	Pr(y=upper sec.)
Mother: risk-averse	-0.023 (0.024)	0.056** (0.028)	-0.033 (0.026)
Mother: risk-loving	-0.035 (0.062)	0.120 (0.078)	-0.085 (0.067)
Father: risk-averse	-0.006 (0.026)	0.051* (0.031)	-0.046 (0.029)
Father: risk-loving	-0.020 (0.041)	0.032 (0.050)	-0.011 (0.046)

**Notes:** Multinomial Logit estimation, average marginal effects. N=1246 (1005) mother-(father-)child observations. The estimates are estimated separately for the mother-child and father-child sample and are based on the baseline specification including the same set of control variables. Standard errors in parentheses. \*\*\*, \*\*, \* significant at 1%, 5%, 10%.

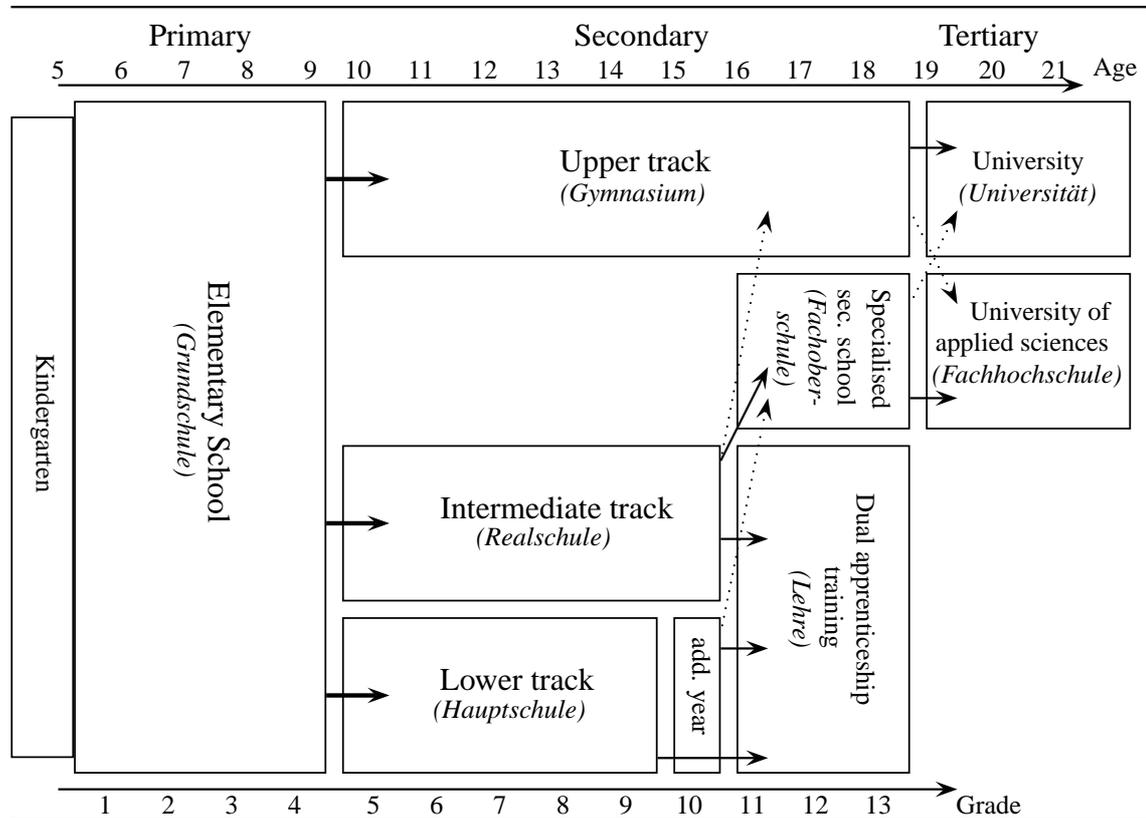
**Source:** SOEP, 2004. Authors' own calculations.

**Table 9:** Child's secondary school track: estimates using career risk attitudes by child's gender

Average marginal effects			
Mother-daughter (N=567)	Pr(y=lower sec.)	Pr(y=secondary)	Pr(y=upper sec.)
Risk-averse	0.097** (0.041)	-0.019 (0.049)	-0.078* (0.046)
Risk-loving	0.017 (0.044)	-0.025 (0.052)	0.007 (0.050)
Mother-son (N=637)	Pr(y=lower sec.)	Pr(y=secondary)	Pr(y=upper sec.)
Risk-averse	0.059 (0.046)	0.020 (0.053)	-0.079 (0.049)
Risk-loving	-0.049 (0.045)	0.044 (0.052)	0.005 (0.046)
Father-daughter (N=475)	Pr(y=lower sec.)	Pr(y=secondary)	Pr(y=upper sec.)
Risk-averse	-0.086** (0.040)	0.042 (0.059)	0.044 (0.056)
Risk-loving	-0.034 (0.044)	-0.101** (0.051)	0.135*** (0.049)
Father-son (N=522)	Pr(y=lower sec.)	Pr(y=secondary)	Pr(y=upper sec.)
Risk-averse	-0.012 (0.050)	-0.012 (0.056)	0.024 (0.056)
Risk-loving	-0.033 (0.043)	0.068 (0.050)	-0.034 (0.046)

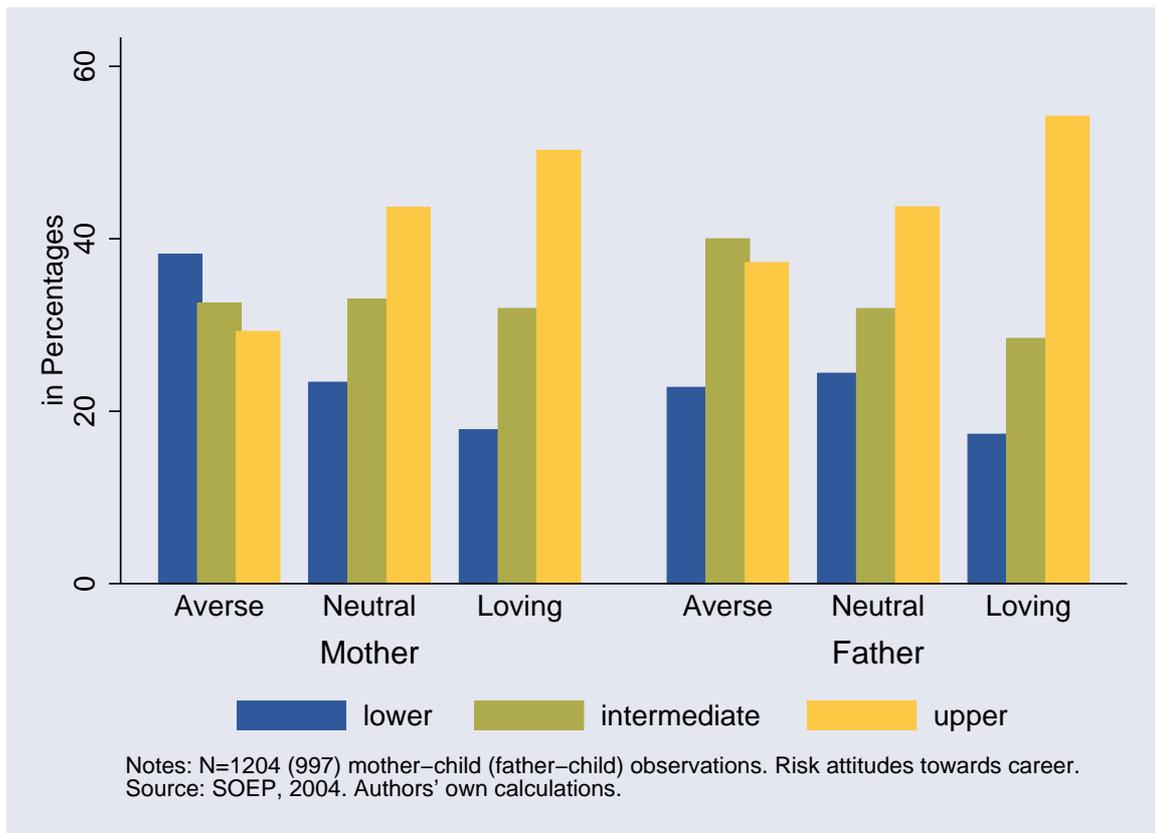
**Notes:** Multinomial logit estimation, average marginal effects. The estimates are estimated separately for the four samples and are based on the baseline specification including the same set of control variables. Standard errors in parentheses. \*\*\*, \*\*, \* significant at 1%, 5%, 10%.

**Source:** SOEP, 2004. Authors' own calculations.

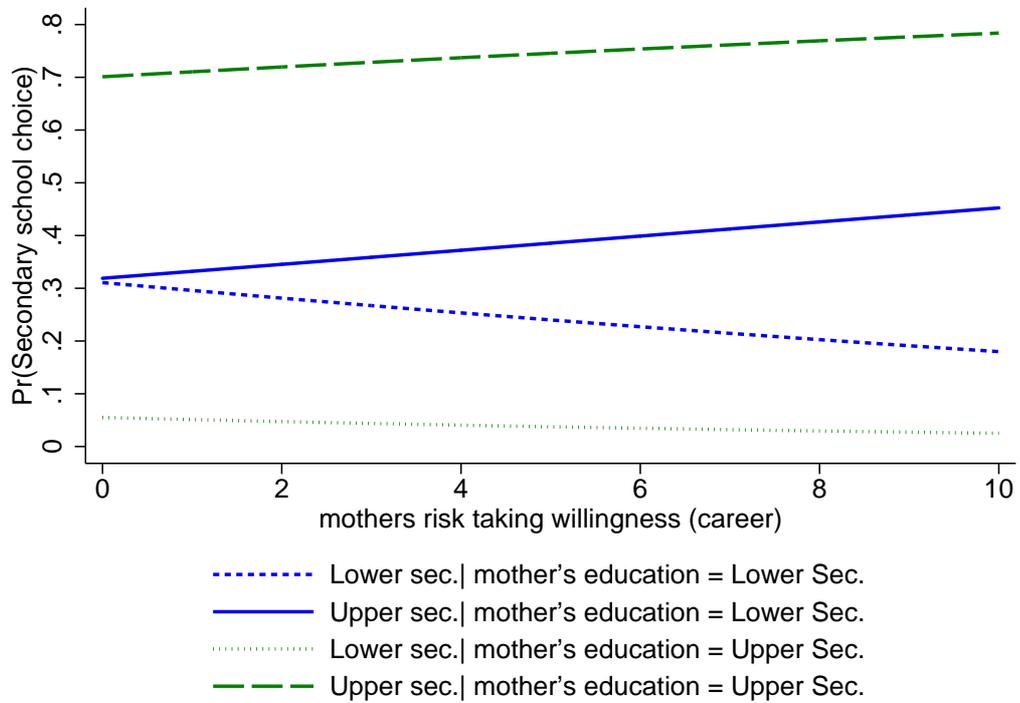


**Figure 1:** Simplified illustration of the German school system

**Note:** The German education system is structured into three levels (primary, secondary and tertiary). The bold arrows specify the typical paths. The dashed arrows represent less common transitions. Other school types (not shown) include comprehensive schools, special schools and a few other mainly private progressive education alternatives such as Steiner schools or Montessori schools. In some federal states, students with a lower secondary school leaving certificate can obtain the intermediate school leaving certificate (*Mittlere Reife*) after one more year. Specialised secondary schools (*Fachoberschule*) offer an upper school leaving certificate that generally entitles the holder to gain entry to universities of applied sciences.



**Figure 2:** Children's school attendance by parental risk attitudes



**Figure 3:** Predicted conditional school track choice probabilities

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**Table A.1:** Descriptive summary of risk measures

	Mother				Father			
	<i>Career</i>	<i>Finance</i>	<i>General</i>	<i>Lottery</i>	<i>Career</i>	<i>Finance</i>	<i>General</i>	<i>Lottery</i>
N	1,204	1,246	1,246	1,238	997	1,007	1,005	1,006
<i>Quasi-continuous</i>								
0	17.61	28.01	7.95		8.22	16.19	3.08	
1	8.06	17.09	5.38	.40	6.32	10.43	2.39	1.79
2	12.87	21.75	12.52	.57	10.33	16.09	7.66	2.78
3	14.45	15.09	14.45	2.67	12.44	15.89	13.53	7.65
4	10.30	5.78	12.28	14.38	9.33	9.04	10.35	17.99
5	19.02	8.27	23.52	18.17	19.96	12.51	20.50	18.99
6	6.40	2.17	9.87	63.81	10.83	9.33	14.53	50.80
7	6.40	1.12	7.62		12.14	6.36	15.52	
8	3.57	.48	4.82		7.12	3.48	8.06	
9	.66	.24	.96		1.60	.60	2.59	
10	.66		.64		1.71	.10	1.69	
Mean	3.38	1.97	4.07	5.41	4.40	3.24	5.04	5.02
Standard deviation	2.41	1.83	2.27	.92	2.48	2.36	2.20	1.24
<i>Dummies</i>								
Risk-averse	17.61	28.01	13.32	63.81	14.54	16.19	13.13	50.80
Risk-neutral	64.70	53.93	72.63	32.55	62.89	63.95	74.43	36.98
Risk-loving	17.69	18.06	14.04	3.63	22.57	19.86	12.44	12.23

**Notes:** Risk willingness towards *career*, *finance* and *general* is measured on an 11-point Likert-type scale, where "0" indicates no willingness to take risks and "10" indicates full willingness to take risks. Risk willingness in the *lottery* is measured on a 6-point Likert-type scale, where "1" indicates full willingness to take risks and "6" indicates no willingness. A parent is *risk-averse*, if his or her response value  $X$  is smaller than the mean ( $\mu$ ) minus the standard deviation ( $\sigma$ ):  $X < \mu - \sigma$ ; *risk-neutral*, if  $X$  ranges between the mean plus/minus one standard deviation:  $\mu - \sigma \leq X \leq \mu + \sigma$  and *risk-loving*, if  $X$  is larger than the mean plus the standard deviation:  $X > \mu + \sigma$ . Using the *lottery* measure a person is *risk-averse*, if his or her response value  $X$  is "6"; *risk-neutral* if  $X$  is "4" or "5" and *risk-loving* if  $X$  is less than "4".

**Source:** SOEP, 2004. Authors' own calculations.

**Table A.2:** Descriptive summary

Variable	Mother-child (N=1,204)	Father-child (N=997)
	Mean (Sda)	Mean (Sda)
<b>Child's age</b>	13.26 (1.40)	13.22 (1.42)
<b>Parent's age at birth of child</b>	27.90 (4.97)	31.08 (5.69)
<b>Number of siblings</b>	1.27 (0.84)	1.33 (0.85)
<b>Equiv. net household income (in €)</b>	3173 (1830)	3378 (1896)
<b>Male child</b>	52.91	52.36
<b>Child's secondary school track</b>		
Lower track	25.00	22.57
Intermediate track	32.72	32.30
Upper track	42.28	45.14
<b>Child's school recommendation</b>		
None particular	6.73	6.92
Lower sec. school	8.72	7.82
Intermediate sec. school	18.52	17.75
Upper sec. school	28.41	29.79
Unknown/no answer	37.62	37.71
<b>Parent's risk attitude (towards career)</b>		
Risk-averse	17.61	14.54
Risk-neutral	64.70	62.89
Risk-loving	17.69	22.57
<b>Parent's school leaving certificate</b>		
Lower track	25.25	30.99
Intermediate track	39.20	27.48
Upper track	24.42	28.59
Other	11.13	12.94
<b>Parent's current employment status</b>		
Full-time	21.51	88.10
Part-time	49.83	2.70
Not employed	28.65	9.20
<b>Parent's employment experience (in years)</b>		
Full-time	8.00 (6.35)	20.68 (6.67)
Part-time	4.75 (4.78)	0.46 (1.75)
Not employed	0.93 (1.90)	0.68 (1.75)
<b>Migration background</b>	16.03	19.36
<b>Federal state with binding recommendations</b>	43.85	42.93
<b>Size of resident's community</b>		
less than 2,000	14.12	13.94
2,000-5,000 (East:2,000-20,000)	12.96	12.14
5,000-20,000	25.25	27.98
20,000-50,000 (East:-100,000)	17.36	17.45
50,000-100,000	6.15	5.82
100,000-500,000	14.87	14.04
500,000 or more	9.30	8.63

Source: SOEP, 2004. Authors' own calculations.