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Parents' Ambitions and Children's Competitiveness[*]

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Abstract

Individual willingness to compete is a personality trait of high importance. While substantial differences between individuals are documented in the literature, the sources of this heterogeneity are still not well understood. To contribute to this issue we conduct an incentivized field study with pre-school children. We assess the children's willingness to compete and relate those inclinations to ambitions and preferences of their parents. The ambition levels of parents concerning their children's success in the later professional life seems predictive for their children's competitiveness. In particular, children of highly ambitious parents tend to enter competition even if their chances to win are low. Moreover, the link between parents' ambitions and children's competitiveness is related to the socio-economic background of the parents.

Keywords: *Children, Competition, Field Experiment, Parents, Socialization, Intergenerational Transmission*
JEL-Classification: C91, C93, D01

1 Introduction

A key characteristic of most modern societies is their emphasis on competition. Firms compete for customers, employees compete for promotions and bonuses, and politicians compete for voters. Indeed competition increases welfare and productivity in many settings, for instance labor contracts (Lazear and Rosen, 1981), and can result in joy of winning (Dohmen et al., 2011). The ubiquitous emphasis of competition may however also be a burden for those individuals who experience losing frequently, resulting in stress, depression and connected health costs (e.g., Dohmen et al., 2011; Gilbert et al., 2009). Several studies show that competition for school placement and competition in classrooms negatively affects the quality of learning and other social aspects of students (e.g., Belfield and Levin, 2002; Ladd and Fiske, 2003). Consequently, it is crucial to choose one's competitions wisely.

Little is known about the origins of immanent preferences for competition. Our study provides evidence on factors that shape preferences for competition already in their early childhood. Our data suggests that an important factor triggering children's competitiveness are parents' ambitions for their child's later success in professional life. That is, parents' ambitions drive some of the children to enter competition regardless of their chances to win.

A number of studies analyze whether gender causes differences in the competitiveness of children: Gneezy and Rustichini (2004) as well as Sutter and Rützler (2010) find greater competitiveness among boys in a running task, particularly for older children. The authors relate this finding to the tremendous degree of overconfidence concerning the rank of their performance of – especially older – boys. Other authors cannot confirm this result for other tasks (Khachatryan, 2012; Dreber et al., 2011; Samak, 2013), or present mixed evidence regarding decisions to compete and the improvement of performance (Cárdenas et al. (2012)). One potential reason for this mixed picture may be different cultures in the countries where the children grew up.

Psychologists, and very recently also economists, test another potential origin of preferences for competition: they link different degrees of competitiveness to family factors (e.g. Hupp et al., 2010; McKee and Leader, 1955; Poulin-Dubois et al., 2002; Van Lange et al., 1997).[1] For instance, McKee and Leader (1955) analyze behavior of 112 three-to-four-year

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[1]Recent studies by Bauer et al. (2011), Dohmen et al. (2012) and Kosse and Pfeiffer (2012) have taken the same avenue linking other-regarding preferences, risk preferences and patience to their parents' attitudes. All three works find correlations between parents' and children's preferences suggesting that the transmission of preferences from parents to their children is a key driver for these personality traits. Likewise, Deckers et al. (2013) show that parental socioeconomic status significantly influences patience and risk attitude: children from families with higher socioeconomic status are more patient and are less risk seeking.

old children in child-care institutions in the Bay Area. They report that children in child-care institutions in low-class residential areas were more inclined towards competition compared to children from middle-class areas. Van Lange et al. (1997) measure competitiveness of 631 Dutch adults with the social value orientation method and relate their data to background information. Notably, they find that subjects with more siblings are more pro-socially oriented, but less competition-oriented compared to those with fewer siblings. Almås et al. (2012) explore the relation between children's willingness to compete and the socio-economic background of their families among Norwegian adolescents, 14 to 15 years old. One of their key findings is that children from families with low income and low education are less willing to compete (even when controlling for performance). Leibbrandt et al. (2013) provide evidence that part of an individual's competitiveness stems from norms and customs in her society. Bartling et al. (2012) analyzes whether child health can explain differences in their willingness to compete with others. Findings suggest that childrens willingness to compete is negatively related to health problems. More specifically, health has a strongly negative effect for children with low socio-economic background, whereas this connection cannot be found for children with high socio-economic background.

In our study, we provide an investigation on another source of intergenerational socialization: we test whether parents' preferences and ambitions with respect to their children's success influence children's competitiveness. In order to allow for maximal relevance of the family background on children's decision, we analyze the behavior of very young children. Our investigation comprises an experimental task with 84 pre-school children in Northern Germany. Like other recent studies, we borrow a running task from Gneezy and Rustichini (2004). The design allows us to measure children's willingness to compete in a familiar task which appears to be easily comprehensible for three to six year-old children, and where competing is 'natural'. Prior to the experiment, we sent out consent forms including a short survey to the parents. Importantly, neither the parents nor the kindergarten teachers knew the task and research question. The survey included questions concerning topics which are related and unrelated to competitiveness. We collected information on parents' values and ambitions concerning their children.

Our results indicate hardly any gender differences in competitiveness at this very young age. Likewise, parents' preferences do not appear to matter directly for children's decision making. Rather, one of the most important factors influencing children's competitiveness is parents' ambitions for their child's later success in professional life. That is, children of parents stressing the importance of their offspring's job success are significantly more likely to compete than

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children of less ambitious parents: we find a (mean) marginal increase of about 14 percent in the likelihood to compete for a one point increase on the seven-point ambitions scale. Interestingly, when controlling for the individual likelihood of winning a competition, children of highly ambitious parents decide to enter competition even when the prospects of winning are unfavorable. Consequently, relatively slow children with very ambitious parents enter competitions and, on average, earn fewer rewards than relatively slow children whose parents are less ambitious. Hence, parents' ambitions drive some of the children to 'overinvest' into competition. On average, we find parents with lower income and lower education to be more ambitious than families with high relative income. This effect could strengthen the already existing status and income disadvantages of children from low income and low education households.

The remainder of the article is organized as follows: Section 2 presents the method we use to obtain data on children's willingness to compete as well as parents' characteristics and ambitions. Here we also formulate the hypotheses we want to test. In Section 3 we lay out the results of our study with regard to the different possible sources of competitiveness and test our hypotheses. Finally, Section 4 provides a concluding discussion of our results.

2 Method

In total, our study includes data from 84 children of ages between almost three and six years. [2] The settings of our study are two kindergartens in Northern Germany. The first kindergarten is located in Hamburg, in the suburb of Heimfeld. 52 children from Hamburg participated in our study, 23 boys and 29 girls. This data was collected in March 2012. The second kindergarten is located in Lower Saxony, in Essenrode. Here we were able to collect the data for 32 children, 20 boys and 12 girls in May 2012. Notice that both kindergartens are located in German middle class neighborhoods. Children in both kindergartens come from approximately the same family structure (83% married parents in Heimfeld, 88% in Essenrode), the same number of siblings (mean is 0.78 in Heimfeld, 0.97 in Essenrode), parents' age (median is 34 in Heimfeld, 37 in Essenrode) and parents' education level (27% of the mothers have a university degree in Heimfeld, 23% in Essenrode).

The primary aim of our study is to analyze jointly the effects of a child's characteristics and her parents' characteristics and ambitions for her decision concerning competition. First, we

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[2]Overall, 100 children participated in the experiment. However, we had to exclude 16 observations due to some missing data in the parents' survey.

describe the elicitation of the competition decision. Then we report the data on parents' and children's characteristics.

2.1 Eliciting Children's Willingness to Compete

We elicit children's willingness to compete by offering competitive and non-competitive reward schemes in a running task. We borrow the idea of a running task from Gneezy and Rustichini (2004) who use it to study competition effects among 9-10 years old children in Israel.[3] We employ the specific running task in our design to allow for easy comparison of our data with earlier findings. Moreover, running is one of the few tasks that presumably all children are familiar with already at a very young age. It therefore seems natural to consider competition in a running task for kindergarten children.

The running task was conducted in the respective playgrounds of the two kindergartens in six separate sessions.[4] The kindergarten teachers allocated children into these sessions according to organizational criteria of the kindergartens. In each session, one group of children participated in our study, while all others were looked after by teachers. On average a group consisted of 16 children, while group sizes varied between 12 and 23 children.

The children were asked to run as fast as possible from one pair of cones to another pair of cones which were placed at a distance of 30 meters. Each child ran twice and we recorded the time with a stop watch. Prior to the first recording, each child was informed that she would receive the reward if she completed the task faster than half of the other children. If she was not faster than half of the other children, then she received no reward for this recording. Notice that we did not elicit the child's subjective expectation concerning the rank or being in the faster half of the group. Sutter and Rützler (2010) report an overwhelming degree of overconfidence among children of that age, so that statement seems to provide little information (they report that on average 91 percent of the children expect to be in the faster group). Nonetheless, we assume that children could assess intuitively their performance within the group based on every-day experience, since they were able to observe each other while running. Information on performance and on earned rewards was not disclosed until the end of the experiment.[5]

After the first recording each child was interviewed in private (a teacher was always present

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[3]Recent studies by Cárdenas et al. (2012), Dreber et al. (2011) and Sutter and Rützler (2010) also make use of the task for research with 9-12 years old children in Colombia and Sweden, 7-10 years old children in Sweden, and 3-8 years old children in Austria, respectively.

[4]All sessions were conducted in comparable, sunny weather conditions.

[5]All children finally received at least one reward as a 'show-up fee'.

in the background to ensure comfort for the child). We informed each child that there would be a second recording and that this time the reward depends on her decision. Again, we told each child that we would record the time. Each child had to decide whether to run against another child (i.e., to compete against another child), or to run in order to improve her own time. If she wins against another child, she receives a large reward plus a small reward. If she loses against another child, she receives no reward. Conversely, if she decides to improve her own time, she receives a large reward if she runs faster than before and a small reward if she does not improve her own time. The two options were illustrated by two large cards showing large and small wrapped rewards for the corresponding case (see Figure A.1 in Appendix A); children had to point to one of the two options and to declare explicitly their choices in order to make clear decisions.

The interview with each child was always conducted by the same experimenter and followed, as closely as possible, a protocol of how to phrase the instructions and questions. [6] The second recording of the running time was also conducted without another child running at the same time (see Figure A.2 in Appendix A).[7] The matching of competing children was set up by ranking first recording times and ensuring close ranks; no information concerning the matching was provided to the children. Again, this procedure follows Gneezy and Rustichini (2004) and Sutter and Rützler (2010).

Formally, a child i needs to decide on her binary competition choice $c_i \in \{0, 1\}$. Given that children do not know the form of the rewards until the end of the study, it is fair to assume that $0 = v_i^{none} < v_i^{small} < v_i^{large} < v_i^{both}$ for all children.[8] Then the expected utility of child i is

$$EU_i(c_i) = \begin{cases} p_i v_i^{both} + 0 & \text{if } c_i = 1 \\ q_i v_i^{large} + (1 - q_i)v_i^{small} & \text{if } c_i = 0, \end{cases} \tag{1}$$

where p_i is child $i's$ probability of winning in competition and q_i is her probability of running faster than her first record. The decision to compete ($c_i = 1$) maximizes expected utility if and only if

$$p_i \geq \frac{q_i v_i^{large} + (1 - q_i)v_i^{small}}{v_i^{both}} \in (0, 1). \tag{2}$$

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[6] See Appendix B for the protocol.

[7] We decided to have children run without their competitors aside them in order to disentangle the two effects of pressure from having another child next to oneself and being in a competition per se. Otherwise, we would have had the children running next to each other for the first recording as well, which may result in issues of feeling in a competition without being in one.

[8] It is possible that $v_i^{both} = v_i^{small} + v_i^{large}$, which has the standard interpretation of risk neutrality. Smaller v_i^{both} reflects risk aversion since it is the discrete counterpart to a concave utility function.

Note that this is always the case if p_i close enough to 1 and never satisfied if p_i close enough to 0 such that children who are very confident about winning should always enter competition, while children very sure not to win potential competition should not enter.[9] For less extreme values of p_i the utility maximizing decision depends on the trade-off between probabilities and valuation of the rewards. Thereby, the competitive choice becomes more attractive the larger the value of *both* rewards, v_i^{both}, is compared to the case of *either* reward, v_i^{large} or v_i^{small} and the smaller the probability q_i is of running faster in the second round than in the first round.

The probability of winning a competition, p_i, depends on the own ability to run fast in comparison to the abilities of the others in the own group who also enter the competition.[10] Ex post, we can observe those who opted for competition and how they performed in the second round. Ex ante, the estimation of p_i depends on the beliefs about who enters the competition. Still, it is reasonable to assume that the probability to win a competition, p_i, is increasing in the performance in round one compared with the other children from the own group such that children who are faster than others have better prospects in competition. Therefore, we consider being faster than others in the first round as an indicator for a high p_i.[11]

The above expected utility function serves as a summary of the incentive and decision structure; naturally, one may wonder whether kindergarten children are able to process all the trade-offs involved. Nevertheless, we employ the rewards in order to ensure an adequate incentive structure. While all children are informed about this incentive structure, we deliberately focus the attention of the children on the decision of whether to run *against another child* or to run to improve *one's own* time. Thus, when confronted with the choice situation not only considerations of expected rewards, but also spontaneous inclinations to avoid or enter competition are likely to be present. In the latter case, we are not measuring risk preferences and beliefs about own and others' performance, but rather a preference for or against competition per se. In either case, it is important to understand which factors shape the decision. Let us now turn to the characteristics and ambitions of the parents.

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[9]Similarly, highly risk averse children (v_i^{both} close to v_i^{large}) should not enter competition, while risk seeking children (v_i^{both} sufficiently large) should enter.

[10]The assumption $v_i^{both} = v_i^{small} + v_i^{large}$ simplifies the condition such that competition maximizes expected utility if $v_i^{small}(p_i + q_i - 1) \geq v_i^{large}(q_i - p_i)$. For instance, one should reject competition if $p_i < \min\{q_i, \frac{1}{2}\}$.

[11]Moreover, we will show later on that children who do not belong to this category of 'fast' children, maximize expected utility by *not* entering competition, if they are risk averse or risk neutral.

2.2 Parents' Preferences and Ambitions

In addition to children's decisions for or against entering into a competition, we collected data on parents' preferences and ambitions which may allow us to identify parents' influences on a child's willingness to compete. In order to collect our data, we approached the parents by mail (sent via the kindergarten) to ask for their consent (with the permissions of the kindergartens' directions and their administrative institutions). We combined the consent form with a survey part, so that we had the possibility to collect data on children's and parents' characteristics beyond the age and gender of the child. Note that neither parents nor kindergarten teachers were aware of our research question. To rule out obvious clues about our research question, the survey was a mixture of related and unrelated questions. Both kindergartens offered activities for those children without parents' consent or those who opted out during the sessions.[12]

The main reason for us to study kindergarten children is that they are at the very beginning of their encounter of social norms. Therefore, we expect that parents' influence is fairly undiluted compared to later stages in life. Amongst others, we collected data on parents' age, number and ages of siblings, duration of breast feeding, marital status of the parents, the language that is spoken at home, and the education of the parents. Further, we asked parents to answer questions with regard to trust, competition, risk, importance of athletic and professional success of their child, perceived relative household income and the mother's share of household work on a seven-point scale. [13]

The survey items are guided by a list of hypotheses derived from multiple strands of the literature: Approaches suggesting the transmission of cultural traits argue that children adopt preferences similar to their parents' (e.g., Bisin and Verdier, 2001, or see Bisin and Verdier, 2010 for a survey). In that light, competitive parents are expected to have competitive children.[14]In our data set we measure to which extent parents like competition on a seven-point scale. The corresponding hypothesis is that highly competitive parents tend to have competitive children. If this hypothesis is confirmed, then it is still an open question which mechanism causes the correlation. Parents not only share genes with their children but also serve as role models in their socialization process. Moreover, socialization is dependent on the (social) envi-

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[12]Despite the consent of her parents, a child was free to choose not to participate in the study at any point in time. This option was not used apart from a few exceptions of very young children.

[13]See Appendix C for an English translation of the survey sheet.

[14]Similar correlations between children's and parents' preferences are found recently for risk preferences and trust (Dohmen et al., 2012), for time preferences such as impatience (Kosse and Pfeiffer, 2012), and for attitudes concerning female labor force participation (Fernandez et al., 2004).

ronment which could be different for different family dynasties.

Doepke and Zilibotti (2008) analyze how the industrial revolution could be driven by a generation of industrialists who are socialized to be patient and hardworking. This model exemplifies Max Weber's classic argument that Protestant work ethic is instrumental in the emergence of capitalism. If competitiveness is considered as "capitalistic" or typical to industrialists, then the hypothesis follows that the more parents value hard work, the more their children should be inclined to compete. To approach this question empirically, we asked parents to state their agreement with the statement that "success is based on hard work" in the questionnaire. Moreover, the analysis of Almås et al. (2012) shows that the economic underpinning of the preference formation process is the socio-economic standing of the parents. Therefore, we will relate the parents' values that turn out to be crucial for a child's formation of competition preferences to socio-economic background variables such as parent's age, marital status, education, relative income, and division of homework among parents.

The next type of hypothesis relates children's competitiveness to their parents' educational goals. It seems problematic to ask someone directly for her desire to have competitive children because competitiveness is not a typical dimension of educational goals. Moreover, we would reveal too much about the purpose of this study if we ask this question directly. Therefore, we ask the following questions: "As how important do you regard your child's future professional success?" In a market economy, job success seems strongly related to competitive behavior. Moreover, we include a highly similar variable where professional success is replaced by athletic success to control for level effects in the sense that the interpretation of 'very important' might be quite different across respondents. Thus, we can use the difference of the answers to job success and sports success to construct a relative measure of job success.

On the level of the child we consider these characteristics: gender, age, and number of siblings. One reason to include age is the amount of experience with competition while the psychological work by Van Lange et al. (1997) suggests that the number of siblings might matter. Of course, age is also a control for several other aspects of a child's development. Similarly, for the number of siblings there might be mechanisms beyond experience with competition which shape the socialization process. For example, it could be the case that a singleton is raised differently by the parents than a child with (many) siblings, since, for instance, parents have more attention for their only child. Empirical evidence on the impact of age on competitiveness is unclear. In the study of Sutter and Rützler (2010), age is used as a control in several models where the probability to choose competition is estimated. In some of them it appears to have a

significant positive effect, in some it is insignificant. To avoid potential age effects, we always control for age in our estimations such as Sutter and Rützler (2010) do.

Concerning gender differences among very young children, Sutter and Rützler (2010) provide evidence for a gender gap in the sense that boys are more likely to enter competition than girls. However, this result is not confirmed in other studies (Dreber et al., 2011; Samak, 2013; Andersen et al., 2010). Although this question is not the main focus of our paper, the literature suggests that we should control for gender and we are able to straightforwardly report test statistics.[15]

Finally, theory suggests that risk preferences play a significant role. The analysis in Section 2.1 shows that the decision to compete is less attractive the more risk averse a person is. However, since competition mostly involves the risk of losing and the probability of winning, risk is an essential element of competition, and could be reflected in the preference for or against competition. Cárdenas et al. (2012) employ six lottery choices between a coin-flip lottery and a safe option to measure risk preferences of 9-12 years old children. While Cárdenas et al. (2012) are able to provide interesting insights into gender differences with regard to risk taking, in our study with 3 to 6 years old children, we doubt the applicability of these measures. For this reason, we abstain from investigating the children's risk preferences. Nevertheless, we are able to include an item on risk preferences into the parents' survey. Thus, in our analysis, we will employ parents' risk preferences as an additional variable of parents' preferences to potentially explain children's competitiveness. Following the literature on the cultural transmission of risk, stating that risk averse parents have risk averse children (see Dohmen et al., 2012), we hypothesize that children of risk averse parents are reluctant to enter competition. Table 1 provides a summary of these control variables.

3   Results

Our data analysis consists of three parts: in part one, we analyze children's performance and the decision to compete in the running task solely on the basis of children's data. Part two combines children's behavior with parents' preferences and ambitions, while part three addresses the sources and consequences of parent's ambitions.

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[15]To our knowledge our study is also the first to report data on this matter from Germany.

	variables	mean	std. dev.	min.	median	max.
child's char.	age	4.30	0.94	2.90	4.05	6.52
	male	51%				
	number of siblings	0.89	0.70	0	1	2
parents' pref.	like competition	4.84	1.45	1	5	7
	risk	3.98	1.55	1	4	7
	hard work	5.60	1.03	3	6	7
parents' ambitions	job success	5.66	1.27	1	6	7
	sports success	4.45	1.41	1	4	7

Table 1: Most important control variables: children's and parents' characteristics.

3.1 Children's Performance and Competition Decisions

In the following we present the results of children's performance in the running task and the frequencies of decision for and against competition. Table 2 reports means and standard deviations of children's performance in the running task in seconds, where time 1 (time 2) stands for the recording in the first (second) round. In addition, we report the differences time 1−time 2 (Δ time). We thereby distinguish between children opting for or against competition.

	children	time 1	time 2	Δ time
no competition	46	11.71 (2.95)	11.12 (2.29)	0.59 (1.68)
competition	38	11.38 (4.07)	10.70 (3.20)	0.67 (1.56)
total	84	11.56 (3.48)	10.93 (2.73)	0.63 (1.62)

Table 2: Mean performance in the running task in seconds (standard deviations in parentheses).

The reported numbers show that children (on average) have significantly improved by approximately half a second from the first to the second round (testing Δ time to be different from zero yields $p = 0.001$ for all children, $p = 0.006$ for children deciding against and $p = 0.08$ for children deciding for competition, using a Wilcoxon Mann-Whitney Rank Sum Test, two-sided; we use this test for all other pairwise comparisons throughout this section). About fifty percent of the children opted for competition. The differences between mean times of competitive and non-competitive children are not significant, neither in time 1 ($p = 0.27$), nor in time 2 ($p = 0.17$). This is also true for the comparison of the median times which are 11.4 and 11.3 for the non-competitive children and 9.75 and 9.7 for the competitive children in the

two recordings. This is a puzzling observation since theory suggests that the faster a child can run, the higher the expected utility from competition and thus the more likely she should be to compete.

To elaborate further on the puzzling relation between performance and competitive choice, let us examine how three basic demographic characteristics (age, gender and number of siblings) influence these two variables. Overall, age and time are very related: time 1 (time 2) and age – measured exactly in days – are significantly correlated at -0.60 (-0.61; $p < 0.001$ in both cases, Pearson's product-moment correlation test, two-sided). Interestingly, this observation holds true for both genders: the correlation between time 1 and age for girls (boys) is -0.66 (-0.64), while the correlation between time 2 and age for girls (boys) is -0.63 (-0.66; $p < 0.001$ in all cases, Pearson's product-moment correlation test, two-sided). In addition to age and gender, we also consider the number of siblings as a potential determinant of fast running times and decisions to compete. For this purpose, we compute the correlation between the running times and the number of siblings. The pairwise correlation of -0.24 and -0.26 for time 1 and time 2 is significant ($p = 0.028$ and $p = 0.016$, Pearson's product-moment correlation test, two-sided) such that indeed children with more siblings were faster.

To have the exact partial effects we regress the running time in the first round as model (o) on the variables age, boy, and number of siblings, where we cluster the error term at the level of groups. The results, which are reported in Table 3, suggesting that performance in the running task is increasing in age and in the number of siblings, and it is higher for boys than for girls.

dependent variable: time 1		
variables	(o)	
age	-2.395**	(0.589)
male	-1.801***	$(.357)$
number of siblings	$-.797$**	$(.253)$
r-square	.461	

Note: standard errors in parentheses; significance at the 10, 5 and 1 percent level is denoted by *, ** and ***, respectively.

Table 3: Linear regression results: children's running time in first round on children's variables.

Let us now proceed by analyzing how the three demographic factors that determine performance are related to competitive choices. Again, we differentiate between girls' and boys' decisions on competition. It turns out that 19 out of 41 girls compete, while 19 out of 43 boys

compete. Thus, confirming Samak (2013) study with US-American pre-schoolers, we do not find any significant difference between girls' and boys' choice for competition ($p = 0.920$). This holds despite the fact that boys ran faster on average than girls. Next, as we have seen that running times decrease substantially with age, we examine the influence of age on the tendency to compete. There is an insignificant, though positive correlation between the two variables of 0.17 ($p = 0.12$, Pearson's product-moment correlation test, two-sided).

Finally, we explore the number of siblings. Since it affects performance, it should also affect decisions for or against competition. Yet, a correlation test shows only an insignificant negative correlation of -0.10 between the choice in favor of competition and the number of siblings ($p = 0.36$, Pearson's product-moment correlation test, two-sided). Therefore, there is no straightforward way in which age, gender, and number of siblings influence the decision to compete, although these characteristics shape performance.

To examine the interference between these factors in further detail, we analyze the decision for or against competition in the probit regression (i) in Table 4. The dependent variable is one if the child opts for competition and zero otherwise. We test the independent variables 'age', 'male', 'number of siblings', and the dummy variable 'fast', which is one if the child performs better than the median child in its group with respect to time 1, and zero otherwise. We opted for this binary way to control for relative performance as we can employ it for interaction terms in our analysis later on. We cluster the error term at the level of groups and report mean marginal effects along robust standard errors in parentheses as well as the pseudo r-square as a measure for the goodness of the regression's fit.

The results of our probit estimation confirm that neither 'fast' nor 'male' nor 'number of siblings' significantly influence children's choice for competition. Rather, 'age' affects whether children opt for or against competition: the likelihood that they compete within their group increases on average by about 11 percent per year. This is still true when using different controls for performance (e.g., continuous measures of relative performance). In the next subsection, we will see how parents' preferences and ambitions influence these results.

3.2 Parents' Preferences and Ambitions

We now introduce parents' characteristics as determining variables for a child's willingness to compete. We divide our analysis along two blocks of questions from the survey, one concerning preferences and one concerning ambitions. As discussed in subsection 2.2, we focus in our analysis of parents' preferences on inclination towards competition, risk preferences, and

appreciation of hard work. For this purpose, we extend our previous probit model (i) on the children's decision for or against competition by our three measures 'like competition', 'risk loving', and 'hard work' (model (ii)). As explained earlier, we expect all three variables to be positively correlated with the children's choice for competition.

Turning to parents' ambitions for their children, we test the ambitions concerning their child's success in professional life, called 'job success'. Along our earlier argument, we expect that this variable contributes positively to the probability that children opt in favor of competition. In addition, we control for the parental ambition concerning 'sports success'. Therefore, we extend our previous probit model (i) on the children's decision for or against competition by our two measures 'sports success', and 'job success' (model (iii)). For both models, Table 4 reports mean marginal effects along robust standard errors, clustered by groups, in parentheses. In addition, model (iv) is included which tests both blocks of questions jointly.

The results show that the positive effect of age carries over from model (i) to these richer models. In model (ii) we find a significant effect of 'number of siblings' on competitiveness, which does not seem to be robust as it disappears in the other specifications. We will return to this point below.

The results of model (ii) and (iv) do not indicate any significant influence of parents' preferences on the likelihood that children compete. In other words, neither parents' own preferences for competitive tasks, nor their willingness to take risks, nor their appreciation of 'hard work' appear to spill over to children's decision for or against competition. Thus, we cannot confirm the hypotheses that were derived from the literature on cultural transmission of preferences with our data.

	dependent variable: likelihood to compete									
variable	(i)		(ii)		(iii)		(iv)		(v)	
age	.1119*	(.0647)	.145**	(.064)	.1355**	(.0646)	.14*	(.0721)	.1342**	(.0595)
male	.0282	(.1008)	.0404	(.1214)	.0891	(.0884)	.0982	(.1136)	.0391	(.0846)
number of siblings	−.0978	(.0654)	−.1036*	(.0567)	−.0575	(.0649)	−.0755	(.0718)	−.0705	(.0611)
fast	−.0656	(.214)	−.1016	(.2318)	−.0395	(.2418)	−.0505	(.2579)	.8892***	(.1359)
like competition			.0059	(.065)			.0026	(.0555)		
risk loving			−.0072	(.0384)			−.0205	(.0437)		
hard work			.0164	(.0884)			−.016	(.0658)		
sports success					−.0823	(.0537)	−.0748	(.0544)		
job success					.1427*	(.0786)	.1463**	(.0602)	.2295***	(.0684)
job success × fast									−.2252**	(.0985)
pseudo r-square	.04		.05		.09		.09		.10	

Note: standard errors in parentheses; significance at the 10, 5 and 1 percent level is denoted by *, **, and ***, respectively.

Table 4: Probit mean marginal effects: children's decision to compete.

In contrast, the estimated mean marginal effects for 'job success' in models (iii) and (iv) indicate a significant influence of parents' ambitions on the likelihood that children opt in favor of competition. In other words, the more parents stress the importance of professional success for their children, the more likely these children are to opt for competition. Interestingly, we find the relation for 'job success', but not for 'sports success'. We would like to interpret this in the way that parents who strongly emphasize the future socio-economic success of their children educate them along this fashion, and, hence, strengthen their children's willingness to compete.[16] That is, higher ambitions of parents concerning the job success of their offspring leads to higher degrees of children's competitiveness; the degree increases by about 14 percent for each point on a 7-point scale, so that children of parents with maximum ambitions almost certainly compete.

Finally, we want to investigate whether this influence of parents ambition on children's competitiveness is moderated by performance. For this purpose, we estimate the model (v) which extends model (i) by adding the variable 'job success' and interaction term 'job success $\times$ fast'. Doing so, we address the question whether fast running children really opt against competition when parents' ambitions are low (in this case, 'fast' and the interaction term are insignificant), or whether the specific interaction between 'fast' and 'job success' influences the choice for competition (in this case, all three terms are significant). Table 4 reports mean marginal effects for model (v) along robust standard errors, clustered by groups, in parentheses.

Indeed, all three mean marginal effects are significant. This means that 'fast' and 'job success' interfere in a way that (beyond the effect of 'age') they both influence children's decisions for or against competition. We now observe a significant positive effect of relative performance, i.e., of being faster than the median child of the own group, on the likelihood to compete. Notice that the sum of the coefficients of 'job success' and 'job success $\times$ fast' is zero (a χ^2 test yields $p = 0.97$ that the sum is zero) such that this effect cancels out for fast running children. Thus, one can interpret the estimation results as evidence that fast running children opt for competition irrespectively whether parents are ambitious or not. For slow running children, however, the likelihood to compete increases with the degree of parents' ambitions. In other words, parents' ambitions drive slow running children into competition.

To summarize, our analysis of children's choices for or against competition yields the effect that older children are more likely to compete (as also partially found by Sutter and Rützler,

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[16]Because parents might give a different interpretation to the items of the scale concerning importance of success, we reran model (iii) with 'relative importance of job success' (which is defined as 'job success' minus 'sports success') as a robustness test. Again, the mean marginal effect is significant ($p = 0.060$).

2010, and as already found in the classic study of McKee and Leader, 1955), but does not confirm that gender of the child determines competitiveness, which adds to the ongoing quest in the socio-economic literature (e.g. Andersen et al., 2010; Sutter and Rützler, 2010; Samak, 2013). Neither is there evidence that the parents' preferences with respect to competition, risk, or hard work influence the child's choice significantly. Most importantly, we find a significant positive effect of parents' ambitions (concerning professional success of their child) on their child's willingness to compete, which is only mitigated for children with a high relative performance. In the next subsection, we will address the potential origins and consequences of this finding.

3.3 Sources and Consequences of Parents' Ambitions

In this paragraph, we want to address two things: first, can we identify social characteristics of parents that promote their ambitions concerning children's job success? Second, what are the consequences of parents' ambitions for children's winning chances? For the first question, we will make use of parents' background variables which we collected in the questionnaire. Specifically, we estimate a linear regression model (vi) with 'job success' as dependent variable, which, as we recall, measures the parents' ambitions concerning the professional success of their child on a seven-point scale. As independent variables we use income relative to other families (which is a subjective report on a seven-point scale), 'parents' age' (of the parent who filled out the questionnaire), a dummy variable 'married' (which is one if parents are married and zero otherwise), the 'number of children', a dummy variable 'college' (which is one if one of the parents has a college degree and zero otherwise), as well as 'housework mother' (measuring the percentage of housework handled by the mother). With these independent variables we try to characterize the parents with respect to their personal background ('income', 'parents' age', 'college') and their family organization ('married', 'housework mother').[17] Table 5 reports marginal effects for model (vi) along robust standard errors, clustered by groups, in parenthesis.

The estimated marginal effects for parents' social characteristics reveal a significant negative influence of 'income' and 'number of children' on the parents' ambitions and a positive effect of being married, while there is no significant marginal effect for 'parents' age', education and 'housework mother'.[18] Recall that we found a weakly significant negative effect of the

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[17]In this regression, as well as in all estimations, there is no significant effect of which parent, i.e., mother or father, have answered the questionnaire. Most of the respondents were mothers.

[18]In an additional model (not reported here), we included also 'male' and an interaction term 'male× housework

dependent variable: 'job success'		
variables	(vi)	
relative income	−.283**	(.0444)
parents' age	−.000	(.029)
married	1.232***	(.424)
number of children	−.622***	(.214)
college	−.336	(.286)
housework mother	.041	(.137)
adj. r-square	.17	

Note: standard errors in parentheses; significance at the 10, 5 and 1 percent level is denoted by *, ** and ***, respectively.

Table 5: Linear regression results: parents' ambitions on social characteristics.

'number of siblings' on the child's decision to compete in model (ii), which disappears once we control for job success. In fact, it seems that parents of singletons hold stronger ambitions concerning the job success of their children than parents having more than one child. And, similarly, children whose parents are married face stronger parental ambitions.

Interestingly, the results of model (vi) show another important factor leading to strong ambitions of parents, their perceived income relative to other families. That is, the more parents perceive that they earn higher incomes than other families, the less ambitious they are with respect to their offspring. This is in line with the argument made by Doepke and Zilibotti (2008) that wealthy families need not emphasize the traits of becoming wealthy when socializing their children. Indeed, relative income is negatively related to the emphasis on hard work. Moreover, perceived income is highly positively related to education such that we can interpret the effect of 'relative income' as an effect of socio-economic status.[19] Our results fit the classic psychological study by McKee and Leader (1955) who find clear evidence that lower class children at the age of 3-4 compete more than higher class children.[20] One of the mechanisms causing this rela-

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mother' to see whether role perception affects parents' ambitions concerning boys and girls differently. However, estimated marginal effects are insignificant.

[19]Notice that we also tested the effect of 'income' in model (iv) testing whether the mere attraction of having two presents potentially "lured" children from low income households into competition. Since the corresponding mean marginal effect is insignificant (while the effect of 'job success' remained significant), we conclude that there is a mediated effect: low relative income increases the likelihood for ambitious parents, whereas ambitious parents increase the likelihood for the child to opt for competition.

[20]Our as well as results by McKee and Leader (1955) contradict the findings of Almås et al. (2012) on Norwegian adolescents. Whether this is due to the difference in the age of the population or other factors needs to be clarified by future research.

tion is expected to be the getting-ahead orientation or in words of the authors, competitiveness of lower class children might be "a compensatory device" (McKee and Leader, 1955, p. 141). Thus, we can interpret the finding that higher relative income leads to lower ambitions such that parents with higher education are more confident regarding the success of their children, and, therefore, do not stress the importance of their success as much.

The final question that we examine is whether children forgo rewards in our study due to their parents' strong ambitions. That is, how is the children's likelihood to win competition influenced by parents' ambitions? Certainly, 'job success' is a crude predictor for children's performance in the second running task.[21] In other words, relating the decision to compete to parents' ambitions, but not to (relative) performance leads to questionable decisions. Consequently strong ambitions might result in unwise inclinations in favor of competition.

To investigate this question we assess the quality of decisions from two angles, ex ante and ex post. For the ex ante assessment, let us reconsider expected utility and identify one type of suboptimal decision. Recall Eq. 2 which provides the necessary and sufficient condition for competition to maximize expected utility. We assume that the probability to run faster in the second round than in the first is larger than one half, due to learning effects (indeed, two thirds of the children improved their running time). Thus, $q_i > \frac{1}{2}$. Moreover, let us assume that the participants are risk averse or risk neutral, that is, $v_i^{small} + v_i^{large} \leq v_i^{both}$.[22] With these two basic assumptions, the right-hand side of Eq. 2 is strictly larger than one half. The probability to win in competition, p_i on the left-hand side, is difficult to estimate ex ante, because it depends on who enters competition. However, there is no reason to expect a selection bias in competition towards slow running children. Thus, it seems save to assume that $p_i \leq \frac{1}{2}$ for those children who are not faster than the median of their group in the first round, that is, the children who were not classified as 'fast'. As we have just shown, slow children would maximize their expected utility by abstaining from competition, given that they are not risk seeking. We now restrict attention to these slow children and assess how many of them made the suboptimal decision to enter competition. Figure 1 depicts the fraction of children who opted for competition although they belong to the category of slow children depending on parents' ambitions.

Among the children who are slower than the median child in their group, the fraction of

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[21]A linear regression with 'job success' as the only independent and time 2 as the dependent variable has an r-square of 0.03 (robust standard errors, clustered at the group level). For comparison, including 'time 1' as the only independent variable in this regression leads to an r-square of 0.80 (again, robust standard errors, clustered at the group level).

[22]Sufficiently risk seeking children should always enter competition, independently of the winning probability.
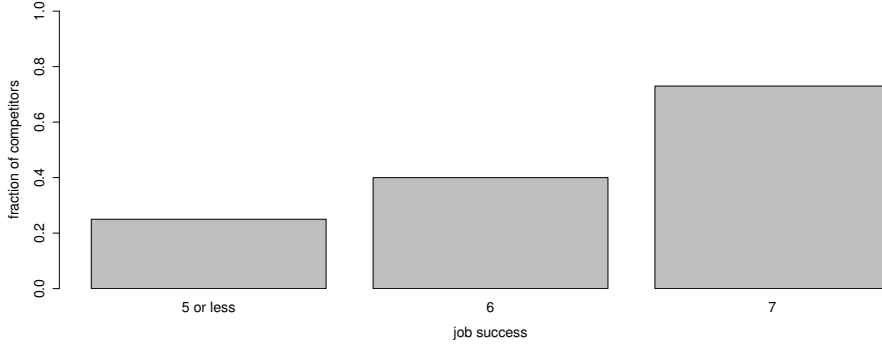
Figure 1: Suboptimal decisions among slow children, by parents' ambitions.

those who still enter competition is increasing in parents' ambitions – from one out of four to three out of four. The results clearly indicate that the more ambitious the parents, the more likely that a child enters competition although this choice is suboptimal. Thus, children of highly ambitious parents decide poorly from an ex ante perspective.

Ex post, we know who entered competition and how they performed in competition, which makes it easier to assess the quality of decisions. Recall that children winning in competition received both rewards, while their opponents did not receive any reward. Since $v_i^{none} < v_i^{small} < v_i^{large} < v_i^{both}$, entering competition is always optimal ex post when a competition is won and never optimal ex post when a competition is lost.

Table 6 presents the fraction of actual winners in competition separated again by parents' ambitions. It must be noted, however, that the actual outcome depends on the applied matching procedure, and, as such, also on luck. To more robustly assess the quality of decisions ex post, we additionally compare a child's running time in competition with the running time of an average child in the set of children who entered competition within their group. Table 6 thus also reports the fraction of children who would have won in competition (i.e. being strictly faster) when meeting a median competitor of their group.

winners	job success < 6	job success $= 6$	job success > 6
actual matching	63%	41%	38%
median matching	50%	47%	31%

Table 6: Fraction of children winning competition, by parents' ambitions.

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Among the children whose parents stated 5 or less 63% (5 out of 8) won in competition, among the children whose parents stated 6 only 41% (7 out of 17) won in competition and among the children whose parents stated 7 as few as 38% (5 out of 13) won in competition.[23] The hypothetical median matching confirms the qualitative observation of the actual matching. Although the numbers of observations for these subgroups are small, there is a clear indication that most of the children of parents with strong ambitions would have been better off, if they had not entered competition. In fact, if they would have opted against competition then 63% of them would have earned the large reward and 36% would have earned the small reward, both of which is better than no reward.

Overall, this imbalance of self-assessment for slow children of ambitious and not so ambitious parents results in a two-folded result. On the one hand, slow children are "lured " into competition by their parents' job ambitions, on the other hand fast children – who are "correctly" attracted by competition – meet one of the former children. Our results therefore suggest that parents' excessive job ambitions for their children create a substantial disadvantage for their children as they overrule the ecological wisdom to compete only if there is prospect of winning the competition.

4   Conclusion

We started our article with some reflections on the positive and negative effects of competition. Being competitive offers the chance for substantial success, particularly in modern societies. However, competitions has also important down-sides (e.g., Dohmen et al. (2011)). Therefore, it is not wise to compete in every contest, but it requires the careful evaluation of the task including the trade-off of potential costs and benefits.

This article shows how this rationale is overruled: parents' ambitions may misguide children's assessment of the situation and lead them to compete regardless of the individual chances in the competition. More specifically, even slow children opt for competition in our running task if parents' are highly ambitious concerning the professional success of their offspring. A one point increase on the job ambitions scale corresponds to a (mean) marginal increase of about 14 percent in the likelihood to compete. This effect substantially reduces the chance for a slow child with ambitious parents to receive any reward, although there was an alternative option

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[23]Since some groups have an odd number of participants, the number of winners and losers in competition need not exactly coincide.

where a reward is guaranteed and a large reward is likely.

Moreover, our data indicates a strong influence of the socio-economic background on parents' ambitions. On the one hand, parents of singletons hold stronger ambitions concerning the job success of their children, so that the 'number of children' in a family is negatively related to those ambitions. On the other hand, the data reveal strong ambitions for parents with lower perceived income along married couples. This result suggests a mechanism for the classic psychological finding (e.g., McKee and Leader, 1955) that children with lower socio-economic status are more competitive. That is, parents of lower socio-economic status put particular stress on the job success of their offspring. In turn, their children are very competitive.[24] If competitiveness per se is valuable for individual success, then children from lower status families can get ahead by this behavior. Our study, however, provides many examples for unpromising competition. In turn, the competitiveness of slow children with a lower socio-economic background increases the winning chances for young children with a higher socio-economic background, who compete predominantly in their favorable tasks. This does not reduce but rather strengthen the existing status and income structure. Of course, further research is needed to establish (or refute) such strong claims. Therefore, we consider this study as a promising invitation for future research to shed light in this exciting aspect of human life.

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[24]Of course, our experimental results indicate correlations, but no causal effects. Therefore, we cannot rule out the claim that children's high level of competitiveness increases parents' ambitious concerning the job success of their offspring. Further research is needed to establish (or refute) this claim.

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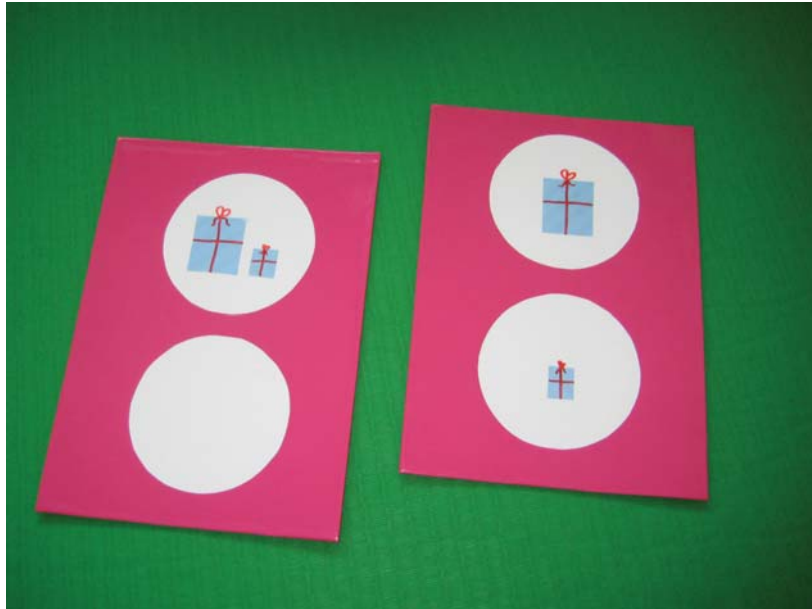
A   Appendix: Illustrations

Figure A.1: Illustration of reward scheme

Figure A.2: Children during the task

B Appendix: Experimental protocol

- Kindergarten teachers take care of the children who are playing in the yard of the kindergarten.

- The team of researchers measures the running distance (30 meters) with a measuring tape and marks the beginning and the end of the track with orange cones.

- The children receive their gift packages after lunch.

Part 1

- All children are instructed by one of the kindergarten teachers and two members of the research team. They receive the following information:
  Please run as fast as you can from here, these two cones, to the other two cones over there. We will stop your time. In case you are faster than a certain time, you will receive a gift for your running.

- Other kindergarten teachers watch any remaining (mostly very young) children inside the building or in the yard.

- One of the kindergarten teachers begins recruiting individual children for the task. The other children are free to watch and play off the running track. One of the researchers and of the kindergarten teachers helps the children to get ready at the beginning of the track. Another researcher waits at the end of the running track. He measures the time with a stop watch and notes it down. Children do not get to know their times.

- Children were ask individually, with a kindergarten teacher being present in the background:
  Now you have two possibilities (showing the two decision boards and explaining them). You may run against another child. In this case you can receive a big and a small gift, if you run faster and win against the other child. If you run slower and lose against the other child, you will receive no additional gifts. Or you decide to run by yourself and try to improve your first time. If you run faster than the first time, you will receive a big gift. If you run slower than the first time, you will receive a small gift. What do you prefer? (Child answers and points towards one of the decision boards, we ask the child to repeat her choice.)

Part 2

- The children run individually for the second time alike the protocol of the Part 1.

- The research team calculates the resulting amount of gifts for all parts and a 'show-up gift'. It prepares gift packages.

C   Appendix: Survey sheet

Please fill in the form completely and return it to Mrs. ------.

I agree that my child _____ (please fill in the first and last name) participates in the study of the University of Hamburg.

Date   Signature

General Information

Age of the child: _____

Age of the siblings. Brothers:_____ Sisters:_____

Your relationship to the child (for instance mother, father, …): _____

Your year of birth:_____

Did you breast feed your child? Until what month? _____

Status of the parents (for instance married, separated, divorced): _____

The language most spoken at home: _____

Highest edu. degree …of the mother: _____ …of the father:_____

Please assess the following statements.

Statement	Your Assessment (please mark with a cross)	
"In general one can trust other people."	I fully disagree	I fully agree
	O------O------O------O------O------O------O	
"Games without identifiable winners are…"	"boring"	"exciting"
	O-------O-------O-------O-------O-------O-------O	
"Competitive environments are…"	"unpleasant"	"appealing"
	O-------O-------O-------O-------O-------O-------O	
"I am a person who is willing to take risks."	I fully disagree	I fully agree
	O-------O-------O-------O-------O-------O-------O	
"I am a sore loser."	I fully disagree	I fully agree
	O-------O-------O-------O-------O-------O-------O	
"One needs to work hard to be successful."	I fully disagree	I fully agree
	O-------O-------O-------O-------O-------O-------O	

Figure C.3: The survey sheet (English translation); side one

Questions concerning your child

Question	Your Assessment (please mark with a cross)	
My child is rather	shy O-------O-------O-------O-------O-------O-------O	outgoing
As how important do you regard your child's future athletic success?	completely irrelevant O-------O-------O-------O-------O-------O-------O	very important
As how important do you regard your child's future professional success?	completely irrelevant O-------O-------O-------O-------O-------O-------O	very important
As how important do you regard it that your child is careful with weaker children?	completely irrelevant O-------O-------O-------O-------O-------O-------O	very important
How much does your child like to go to the kindergarten?	very little O-------O-------O-------O-------O-------O-------O	very much

General questions

Question	Your Assessment (please mark with a cross)		
How would you assess your household income relative to incomes of other families?	very low O-------O-------O	average -------O-------	very high O-------O-------O
What share of time for household care does the mother of the child handle?	0 % O-------O-------O-------O-------O-------O-------O		100%
As how important do you regard feedback about the general behavior of children in this study?	completely irrelevant O-------O-------O-------O-------O-------O-------O		very important
As how important do you regard feedback about your child's behavior in this study??	completely irrelevant O-------O-------O-------O-------O-------O-------O		very important

Thank you for your help and for making this study of the University of Hamburg possible.

Figure C.4: The survey sheet (English translation); side two