

# Willingness to Compete: Family Matters\*

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## Abstract

This paper studies the results from a lab experiment with a representative sample of adolescents in Norway, where we link behavioral data from the experiment to official register data about family background. We show that family background is fundamental in two important ways. First, children from families where parents have low income and education are less willing to compete, even when controlling for confidence, performance, risk- and time preferences, social preferences, and psychological traits. Second, family background is crucial for understanding the observed large gender difference in willingness to compete. Girls from well-off families are much less willing to compete than boys, whereas we do not find any gender difference among children with low socioeconomic background.

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# 1 Introduction

A growing experimental literature has identified important gender differences in the willingness to compete, where typically females are more competitive averse than males. This may potentially explain a wide range of real world economic phenomena, including observed gender differences in labor markets (Flory, Leibbrandt, and List, 2010; Gneezy, Niederle, and Rustichini, 2003; Gneezy and Rustichini, 2004; Niederle and Vesterlund, 2007, 2010, 2011). But why do boys and girls differ in their willingness to compete? Recent important studies show that culture and institutions play an important role in shaping people's willingness to compete (Booth and Nolen, 2009; Cárdenas, Dreber, von Essen, and Ranehill, 2011; Gneezy, Leonard, and List, 2009; Niederle and Vesterlund, 2011; Schmitt, Realo, Voracek, and Allik, 2008), suggesting that females' competition aversion reflects the prevalence of male-dominated social norms.

The novel contribution of this paper is that we add to this literature by providing, to our knowledge, the first study of how the level of competitiveness and notably the gender difference in willingness to compete relates to family background. We conducted a lab experiment with a representative sample of adolescents (14-15 years old) in Norway, who all have been exposed to the same culture and political institutions at the national level, and we link behavioral data from the experiment to administrative register data about family background. We show that family background is fundamental in two important ways. First, children from families where parents have low income and education are less willing to compete, even when controlling for confidence, performance, risk- and time preferences, social preferences, and psychological traits. Second, family background is crucial for understanding the observed large gender difference in willingness to compete. Girls from well-off families are much less willing to compete than boys, whereas we do not find any gender difference among children with low socioeconomic background.

An interesting aspect of our study is the fact that we use data from a Scandinavian country. Norway ranks highest on the UN gender equality index comprising measures of educational attainment, labor market participation and health.<sup>1</sup> Still, we find that females are substantially less willing to compete than males, which maps to the fact that the Scandinavian countries have very gender segregated labor markets, both horizontally and vertically (Birkelund and Sandnes, 2003). The link between the gender difference in competitiveness aversion and the segregated labor markets is furthered strengthened by our study not finding any evidence of a gender difference in confidence, risk preferences, time preferences, and social preferences. It is also consistent with another recent experimental study, comparing the gender difference in competitiveness among Swedish and Columbian children, showing that the gender difference in competitiveness is larger in a highly gender equal Scandinavian country than in a much less gender equal Latin American country (Cárdenas et al., 2011).

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<sup>1</sup><http://hdr.undp.org/en/statistics>

Finally, our analysis also speaks directly to the literature on the importance of parental background in the formation of cognitive and non-cognitive skills and the persistence of these skills (Cunha and Heckman, 2007, and Cunha, Heckman, Lochner and Masterov, 2006 and Heckman, 2006). We contribute to this literature by studying the importance of family socio-economic background on both preferences and traits.

The paper unfolds as follows: Section 2 and Section 3 describes the sample and the experimental design respectively. Section 4 presents the data, Section 5 analyzes how competitiveness depends on personality and family background, while Section 6 concludes.

## 2 Sample

Our participants were recruited among Norwegian adolescents, 14 to 15 years old. To obtain a representative sample of the Norwegian population in the selected age group, we randomly selected 11 middle schools in a municipality which is representative for Norway, Bergen municipality. The schools were selected using probabilities proportional to the number of student at the relevant grade. All the invited schools accepted the invitation and all the 9th graders in the selected classes were sent a personal invitation to participate in the experiment. Two schools later withdrew due to practical circumstances with teaching. Participation was voluntary and both the pupils and their parents had to consent to the participation in the experiment. Within each school, we randomly selected two classes. The participation rate was high, out of 603 invited pupils from 9 schools, 524 took part in the experiment, giving us a mean participation rate of 87% male.

In collaboration with Statistics Norway, we matched the behavioral data from the experiment to the official register data on parental education and income. For this we needed additional consent from parents. In total, out of 524 participants, we have detailed education outcomes for both parents for 505 participants. We also have access to official register data for the whole population of people in Norway and this enables us to test how representative our sample is in terms for family background. This test confirms that our sample is representative with respect to parents' education, see Table 1.

[ Table 1 about here. ]

To ensure control over the experimental situation, all participants were transported with busses from their schools to a lab at NHH Norwegian School of Economics. On average 50 pupils participated in each session and the sessions lasted for approximately two hours.

### 3 Experimental design

In order to measure preferences for competitiveness, we used a set-up similar to Niederle and Vesterlund (2007). Participants were asked to add sets of four two-digit numbers over a three minute period and they earned one point for each correct answer. They did this first under a competitive tournament scheme, where they earned 50 NOK (approximately 8.5 USD) if they got at least as many point as the average number of points in the same session, nothing otherwise. A timer on their computer screen informed the participant of how much time that was left and the number of correct answers was updated each time the participant moved to a new set of four two-digit numbers.

Without getting any feedback on their own productivity relative to the other participants, they were then told to do the same task again for another 3 minutes. This time they were asked to choose whether they wanted be compensated with a fixed piece rate of 1 NOK per correct answer or with 3 NOK per correct answer if they got at least as many points as the average in the first round and nothing otherwise.

After getting the instructions about the real effort task, but before they worked in the first round, the participants were asked how they believed they would perform on the task relative to the other participants in that session. Specifically, they were asked to state what fraction of the other participants they believed would do better than them on the task. Comparing the participants' answers to this question with their actual performance provides us with a measure of overconfidence.

In addition to the experiment designed to measure competitiveness we also conducted experiments that measured the participants' risk preferences, social preferences and time preferences. To get a measure of the participants' risk preferences we asked the participants to choose between a safe alternative and a risky alternative in a structured sequence of situations. The safe alternative always gave 75 NOK and the lottery either gave 150 NOK or 0 NOK. The only difference between the 11 choice situations was the probability of the high outcome in the lottery which varied with equal increments from 25 percent to 75 percent (Holt and Laury, 2002). One of the situations was randomly selected to determine the payment from this part of the experiment.

To get a measure of time preferences we first asked the participants to choose between receiving 50 NOK after three weeks and a larger sum of money after six weeks. They made this choice in eight situations where sum of money received at the later date varied (51 NOK, 53 NOK, 57 NOK, 63 NOK, 70 NOK, 80 NOK, 90 NOK and 100 NOK respectively). After making these decisions, the participants were asked to choose between 50 NOK the same day or a larger sum of money three weeks later. Again they made this choice in eight situations where the larger sum of money was the same as in the first sequence of choices. For each of the two sets of situations, one situation was randomly drawn to determine the payment.

To measure social preferences we first asked all participants to work on a real effort task for five minutes. The task was to count the number of black squares in a sequence of boards. The participants received 1 point for each correct answer. Payment consisted of two parts. First, all participants received a fixed payment of 50 NOK

independently of how many points they got. Second, the participants earned an additional 25 NOK if they got less than the average number of points in their session and an additional 75 NOK if they got at least as many points as the average in the sessions. To get a measure of how the participants made a trade-off between self-interest and fairness we matched the participants in pairs and asked them to decide how they would distribute the sum of the fixed payments (100 NOK) between themselves and the other participant in the pair. Both participants in the pair made this choice and one of the two choices was randomly drawn and implemented. To measure whether the participants had an egalitarian or a meritocratic view of fairness we asked all participants to decide how the additional money earned by two participants in another pair should be distributed between them. These pairs always had one participant who earned the low additional payment and one participant who earned the high additional payment. The decision makers had to choose between distributing the additional earning equally or according to their earnings.

After all the incentivized parts of the experiment were completed, all participants answered the 44-item Big Five Inventory (John, Donahue, and Kentle, 1991; Benet-Martínez and John, 1998).<sup>2</sup> Self-reported ratings are made on a Likert scale each of the 44 items. This test provides a quick and efficient assessment of five personality dimensions: Neuroticism, Extraversion, Openness to Experience, Agreeableness, and Conscientiousness; and it allows us to study the extent to which the gender difference in competitiveness is mediated by differences in personality. For scoring, we pre-processed the item responses using the “ipsatizing” procedure developed to control for individual differences in acquiescent response style (John, Naumann, and Soto, 2008; Soto, John, Gosling, and Potter, 2008).

Participants were not given any feedback on the outcome of the different incentivized parts of the experiment before at the end of the experiment. They were then given an overview of the outcomes and paid the sum of what they earned in all parts. The average total payment from the experiment was 361 NOK (approximately 60 USD). All payments, except payments from the time preference decisions, were made in cash immediately after the experiment. Special care was taken so that the payment procedure ensured anonymity. The computer assigned a payment code to each of the participants and a group of assistants, who were not present in the lab during the experiment, prepared envelopes containing the payments corresponding to each payment code. After bringing the envelopes to the lab, the assistants immediately left and the envelopes were handed out in accordance with the payment codes. This procedure was explained to all participants at the start the experiment. Participants could also receive money at to later dates and at these days assistants visited each school and handed out envelopes according to the payments codes to everyone who had participated.

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<sup>2</sup>Hallvard Føllesdal kindly made available a Norwegian translation of the Big Five Inventory made by Harald Engevik.

## 4 Descriptives: experimental data

From Table 2, we observe that 42 percent of the participants choose to compete and that boys are considerably more likely to choose competition than the girls: 52.2 percent of the boys, but only 31.2 percent of the girls choose to compete. This result corroborate the results from earlier experiments that find a large gender difference in the willingness to choose competition in this type of situation (Niederle and Vesterlund, 2007).

[ Table 2 about here. ]

The gender difference is not the result of differences in the ability to solve the task. There is a significant difference in the average number of correct answers among boys and girls (11.0 versus 9.7), but this difference is not the main explanation of the difference in competitiveness. This is easily seen from the upper panel in Figure 1 which presents, for both boys and girls, the average share who choose to compete for each decile of actual productivity in the task. We observe that boys are more competitive than girls for all deciles of actual performance except the lowest.

[ Figure 1 about here. ]

The gender difference is furthermore not a result of a gender difference in self-confidence. The lower panel in Figure 1 presents the willingness to compete for a given self-reported decile of ability. We observe that the picture is very much the same, with boys being more willing to compete than the girls. In contrast to the result in Niederle and Vesterlund (2007) we do not find a large gender difference in overconfidence, i.e. the average difference between their actual performance and their own expected performance. From Table 2 we see that the boys are not, on average, more overconfident than the girls.

The difference in preferences for competitiveness is particularly striking when we compare with gender differences in social preferences, time preferences and risk preferences reported in Table 2. Women are often found to be more risk averse than men (Croson and Gneezy, 2009), but we find that risk preferences, measured by the number of times the risky alternative is chosen, are the same for both boys and girls in our sample. There is furthermore no significant difference in time preferences, measured as the average number of times the “late” alternative is chosen in the experiment. Finally, we find, in contrast to some other studies (Engel, 2011), no significant gender difference in our two measures of social preferences. Girls give somewhat more to the other participant in the dictator game, but this difference is not significant and the share who choose the egalitarian distribution when they make decisions as impartial spectator is almost identical for boys and girls.<sup>3</sup>

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<sup>3</sup>This confirms results reported in Almås, Cappelen, Sørensen, and Tungodden (2010).

Looking at the measures of personality from the Big Five Inventory, we observe that the only significant gender difference is with respect to neuroticism. This is in line with what is found in most other countries, women are more neurotic than the men in developed countries (Schmitt et al., 2008).<sup>4</sup> Girls also scored higher on openness, agreeableness, extroversion and conscientiousness, but none of these differences are significant at the 5 percent level.

From Table 2 we also observe, as we should expect, that there is no difference in parental income and education between boys and girls. Furthermore, from the lowest panel we notice that the sample is representative in the sense that the mean years of education and earnings for fathers and mothers with at least one child at the same age, is very similar to the mean values in our sample.

## 5 Explaining willingness to compete

What explains the participants' willingness to compete in the experiment? Table 3 shows that gender is a powerful explanatory factor, where the gender differences in competitiveness is robust to conditioning on performance and confidence, other experimental variables, and psychological variables. It is also robust to the inclusion of parental background variables, which is as expected in a representative sample where there should not be any correlation between gender and family background. In sum, our experiment clearly demonstrates that even in a highly egalitarian and gender equal society, females are more competition averse than males.

Table 4 shows that family is another crucial factor in explaining competition aversion, where children with lower socioeconomic background are much less willing to compete. By comparing columns (1)-(3), we observe that this partly works through these children being less confident and performing worse on the task, and also to some extent having a different mind-set than children from more well-off families (as measured by our experimental families). However, the striking finding is that even when we control for all these factors, family still matters substantially. This suggests that parents are crucial in transmitting values of importance for children's willingness to compete.

In light of these two findings, it is natural to ask whether family matters in explaining why females are less willing to compete than males.

### 5.1 Competitiveness and family background

To test whether family background matters in explaining the gender difference in willingness to compete, we estimate the following difference-in-difference specification:

$$y_i = \beta_1 \text{sex}_i + \beta_2 (\text{lowSES})_i + \beta_3 (\text{lowSES} \times \text{female})_i + \delta Z_i + \varepsilon_i \quad (1)$$

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<sup>4</sup>If we were to compare the overall gender differences to those in Schmitt et al. (2008), we would place our sample at about average gender difference. However, Soto, John, Gosling, and Potter (2011) have shown that adolescence is not a representative age for measuring personality traits.

where  $y_i$  is willingness to compete, and the equation includes a dummy for gender and socioeconomic background (SES), as well as the interaction between the two. The gender dummy is 1 for girls, and SES is 1 for low SES. In order to capture the most important aspects of family background, we have constructed a composite measure of SES that includes parental education and income. Our main specification defines low SES as: Father has finished no more than mandatory schooling and is in the lowest 20 percentiles of the income distribution.

[ Table 5 about here. ]

Table 5 presents four version of (1) from column 1 without controls and to column 4 with both controls for experimental data from Big Five Inventory. The first line shows the gender difference in willingness to compete and the second the effect of family background in willingness to compete, which confirm the findings presented in the previous section. The third line shows our second main finding, namely a strong SES gradient in the difference for boys and girls in willingness to compete. In fact, we find no gender difference in willingness to compete among children from low SES families, whereas it is substantial in the rest of the sample. In Figure 2, we show that this finding is robust to alternative specifications of the a low socioeconomic background.

[ Figure 2 about here. ]

## 6 Conclusion

Our study has shown that family matters in explaining children's willingness to compete. Children with a high SES parental background are much less competition averse, but for this group we observe large gender differences, where boys are much more likely to compete than girls. In contrast, among children with low SES, we do not find any gender differences in the willingness to compete.

Our results have implications for the policy debate about gender equality in educational and labor market choices. The fact that we find a large gender difference in competitiveness among adolescents in a country that has fully embraced policies aimed at gender equalization suggests that such policies might not contribute to eliminating gender differences in competitiveness. Our results may thus shed some light on the paradox that the world most gender equal country also has one of the most gender segregated labor markets.

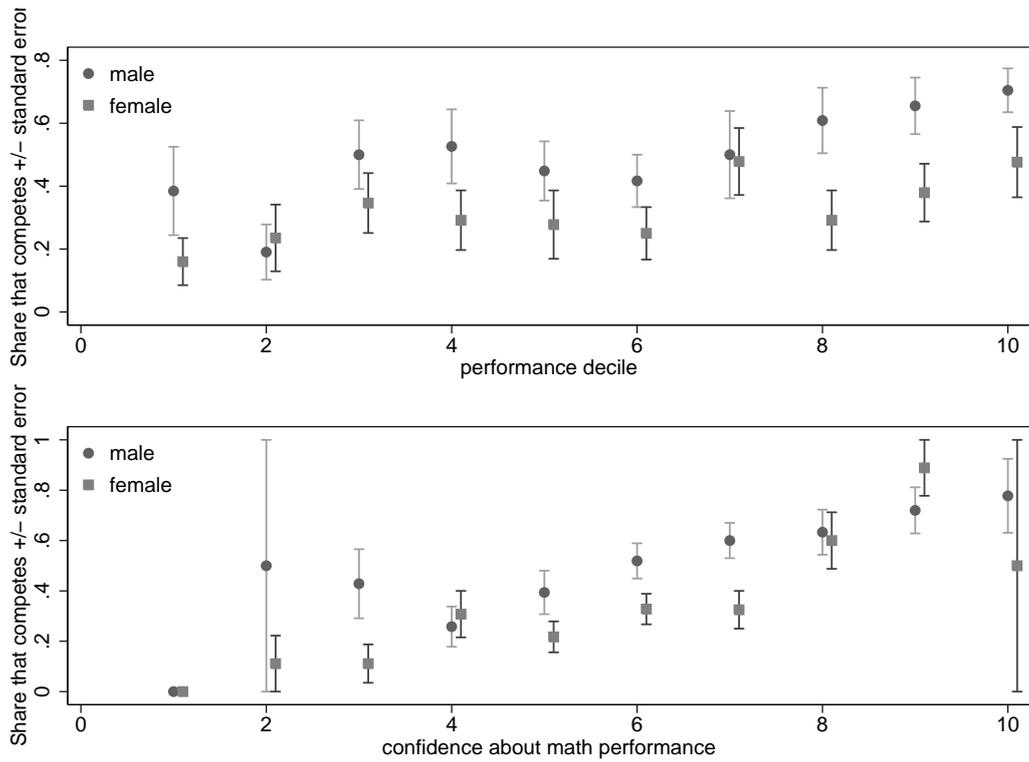
A potential explanation for this segregation could be that girls with well-educated parents shy away from competition and therefore are unwillingness to compete for promotions and top jobs. In this respect our result corresponds to the finding in social psychology that "sex differences in personality traits are often larger in prosperous, healthy, and egalitarian cultures in which women have more opportunities equal with men" (Schmitt et al., 2008, p. 169).

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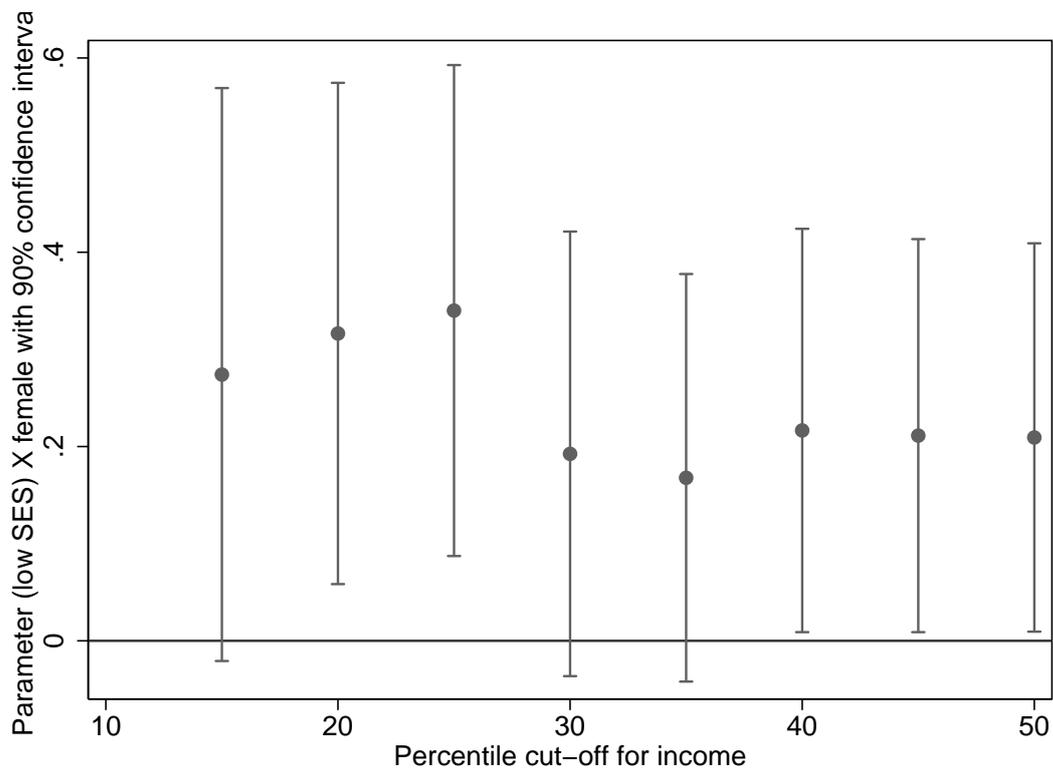
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Figure 1: Share that competes



*Note:* The upper panel show the share of boys and girls who compete against actual performance (reported as the deciles they are in). The lower panel show the share who compete against the participants' belief about their own performance relative to the other participants (reported in deciles they believe they are in).

Figure 2: Interaction effect between low SES and female for different definitions of low SES



*Note:* The graph shows confidence intervals for different cut-offs of income in the definition of low SES. Along the first axis cut-off is drawn at different percentiles of the (male) income distribution. The specification estimated corresponds to (4) in Table 5 (with the full set of controls).

Table 1: Comparison of parental background between participants and population

	Father		Mother	
	register	sample	register	sample
Only compulsory education	0.195	0.151 (0.016)	0.196	0.169 (0.017)
Some secondary education	0.427	0.408 (0.022)	0.370	0.345 (0.021)
At least some college	0.379	0.441 (0.022)	0.435	0.486 (0.022)

*Note:* Education of parents. “Register” refers to the full population having children in the 1996 cohort, weighted by the number of such children. Standard error in parentheses (for the experimental sample only).

Table 2: Overview of gender differences

	means		std.dev.		<i>p</i> -value (equal means)	<i>N</i>
	Boys	Girls	Boys	Girls		
<i>Variables pertaining to the competition experiment</i>						
Compete	0.516	0.319	0.501	0.467	< 0.001	485
Performance	10.98	9.78	4.97	4.37	0.005	485
Overconfidence	0.060	0.009	2.71	2.97	0.842	485
<i>Other experimental measures</i>						
Risk	3.64	3.63	2.27	2.14	0.975	485
Egalitarian	0.268	0.272	0.443	0.446	0.914	485
Share given	0.306	0.310	0.243	0.230	0.877	479
Patient 0	4.27	4.02	2.12	1.90	0.171	485
Patient 3	4.30	4.34	2.11	2.04	0.830	485
<i>Personality</i>						
Openness	0.307	0.356	0.435	0.402	0.207	485
Conscientiousness	0.428	0.479	0.485	0.451	0.223	485
Extraversion	0.379	0.448	0.374	0.411	0.053	485
Agreeableness	0.711	0.758	0.349	0.406	0.171	485
Neuroticism	-0.572	-0.361	0.426	0.465	< 0.001	485
<i>Background</i>						
Father education (yrs)	14.01	14.26	2.84	2.82	0.326	485
Mother education (yrs)	14.25	14.09	2.66	2.28	0.502	485
Father average income (1000s)	550	542	313	373	0.808	485
Mother average income	322	320	158	145	0.839	485

*Note:* “Compete” is an indicator variable (1: participant chose to compete, 0: participant did not compete), “Performance” indicates how many correct answers the participant had in the addition task, “Overconfidence” indicates the difference between what the participant believe about own performance and actual performance (reported in deciles) “Risk” indicates how many times gamble was chosen over the certain alternative, “Egalitarian” is an indicator variable (1: participant as spectator shared equally between two players with different production in a dictator game, 0: participant did not share equally), “Share given” gives share given to other participant when dictator and equal production, “Patient 0” indicates how many times the participant chose to wait when choosing between money ‘today’ and in three weeks, “Patient 3” indicates how many times the participant chose to wait when choosing between money in three weeks and in six weeks, the personality measures are from the standard Big Five Inventory, parental background measures are taken from administrative data, income is averaged over the past 10 years, in 2009 prices, and includes transfers and capital incomes.

Table 3: Effect of gender on willingness to compete.

	(1)	(2)	(3)	(4)	(5)
female	-0.197*** (0.044)	-0.141*** (0.043)	-0.135*** (0.043)	-0.132*** (0.044)	-0.136*** (0.044)
performance		0.045*** (0.006)	0.041*** (0.006)	0.038*** (0.006)	0.037*** (0.006)
overconfidence		0.051*** (0.010)	0.046*** (0.010)	0.043*** (0.010)	0.041*** (0.010)
<i>Included controls:</i>					
Experimental variables	no	no	yes	yes	yes
Big-5 personality	no	no	no	yes	yes
Low SES	no	no	no	no	yes
Observations	485	485	485	485	485
$R^2$	0.040	0.130	0.184	0.195	0.200

*Note:* Standard errors in parentheses ( \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ ). The controls referred to are those in Table 2. The observations without “share given” in the dictator game has a separate dummy variable included.

Table 4: Effect of low SES on willingness to compete.

	(1)	(2)	(3)	(4)	(5)
low SES (parents)	-0.208*** (0.079)	-0.144* (0.078)	-0.109 (0.074)	-0.131* (0.077)	-0.145* (0.078)
performance		0.047*** (0.005)	0.044*** (0.005)	0.041*** (0.006)	0.037*** (0.006)
overconfidence		0.054*** (0.010)	0.050*** (0.010)	0.046*** (0.010)	0.041*** (0.010)
<i>Included controls:</i>					
Experimental variables	no	no	yes	yes	yes
Big-5 personality	no	no	no	yes	yes
Gender	no	no	no	no	yes
Observations	485	485	485	485	485
$R^2$	0.011	0.115	0.169	0.183	0.200

*Note:* Standard errors in parentheses ( \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ ). Low SES is defined as father having finished no more than mandatory schooling and being in the lowest 20 percentiles of the income distribution.

Table 5: Willingness to compete on low SES, gender, and interactions

	(1)	(2)	(3)	(4)
female	-0.164*** (0.045)	-0.160*** (0.044)	-0.155*** (0.046)	-0.153*** (0.045)
low SES (parents)	-0.275*** (0.097)	-0.263*** (0.082)	-0.282*** (0.096)	-0.268*** (0.083)
low SES X female	0.281* (0.159)	0.343** (0.154)	0.259 (0.160)	0.316** (0.157)
<i>Included controls:</i>				
Performance and overconfidence	yes	yes	yes	yes
Experimental variables	no	yes	no	yes
Big-5 personality	no	no	yes	yes
Observations	485	485	485	485
$R^2$	0.141	0.195	0.151	0.205

*Note:* Standard errors in parentheses ( \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ ). Low SES is defined as father having finished no more than mandatory schooling and being in the lowest 20 percentiles of the income distribution.