Culture and Gender Differences in Willingness to Compete*

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Abstract

We test whether culture affects willingness to compete by combining the epidemiological approach with a pre-registered online experiment. In a sample of 1,943 Norwegians with parents born in 59 different countries, we find a smaller gender gap in willingness to compete for individuals with parents born in more gender equal countries. The difference is driven both by men with parents from more gender equal countries wanting to compete less, and by women with the same ancestry wanting to compete more. The results are robust to controlling for a large set of factors at the individual, parental, and ancestry country level.

Keywords: Culture; Gender; Competition

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I Introduction

Women are less willing to enter into competitions than men. This classic finding of Niederle and Vesterlund (2007) has survived countless replications (see e.g., Niederle (2015); Niederle and Vesterlund (2011) for reviews). The magnitude of the gender difference is also considerable, for example, a recent review of competition experiments including findings from 53 published papers shows 52 percent of the men and 34 percent of the women choose to compete (Dariel et al., 2017). Competitiveness is consequential and has been shown to explain part of the gender differences in educational choices and labor market outcomes (Flory et al., 2015; Reuben et al., 2019; Buser et al., 2014). We study the effect of culture on gender differences in competitiveness using the epidemiological approach (see Fernández (2011) for a review of the approach in the economics literature).

Men and women differ in economic preferences and psychological attitudes (see Croson and Gneezy (2009) for a review), but gender differences also vary by context. Falk and Hermle (2018) describe two opposing theories with respect to individual gender differences in preferences and personality and macro level gender equality. On the one hand, the social role hypothesis predicts that gender differences diminish in more gender equal places as the views of women's and men's roles and positions in society become more equal. On the other hand, the resource hypothesis suggests that more resources reduce barriers for gender-specific ambitions and goals, which in turn increases gender differences. In their recent study of gender differences in preferences across the world, Falk and Hermle (2018) find larger differences in preferences between men and women in more gender equal countries, supporting the resource hypothesis.[1]

[1]There is also a literature in psychology arguing that there is a gender paradox in personality whereby gender differences are larger in more egalitarian countries (e.g., Kaiser, 2018; Schwartz and Rubel-Lifschitz, 2009; Stoet and Geary, 2018). The sociological literature highlights that the gender egalitarianism that has evolved in many western countries is one compatible with individualism, and hence, differences may increase in areas of social life where inherent gender differences are believed to be strong (England 2010; Charles 2011).

Previous research suggests that cultural factors may be important for competitiveness as there are large variations in the gender differences found across space. The best-known examples are from a series of seminal papers comparing selection into competition in a Masai society in Tanzania to the ones in a Khasi society in India (Andersen et al., 2013; Gneezy et al., 2009). The two societies are described as being on the opposite poles of the gender spectrum with the Masai as particularly patriarchal and the Khasi are matrilineal with respect to inheritance and Khasi women are usually heads of the households. In these diverse settings, men compete more than women in the patriarchal Masai community and women compete more than men in the matrilineal Khasi community. While the result is generally interpreted as cultural differences affecting the gendered willingness to compete, it is likely that there are other differences across these settingsas well, such as institutional differences.[2] Several recent papers have shown that institutions matter for competitiveness as well, for instance that women growing up under communism (Booth et al., 2018), before and after reforms (Zhang, 2019), or in single-sex schools (Booth and Nolen, 2012), have different competitive behavior than other women (but see Lee et al. (2014) for a null finding of single-sex schools).

The gender difference in competitiveness does not always point in the direction of more gender equal settings producing smaller differences in competitiveness, however. Cárdenas et al. (2012) compare Sweden, which is ranked as country number 4 in the Global Gender Gap Index in 2016 (GGI), and Colombia, ranked as country number 39 in the GGI. They find that boys in Sweden are more willing to compete than girls but find no gender difference in Colombia. Likewise, other single-country studies in gender equal countries such as Sweden and Norway, have found gender differences in competitiveness: A study among adults in

[2]We follow the convention in economics and define institutions as societal level rules that affects payoffs for different actions (Lowes et al., 2017; North and Thomas, 1973) whereas culture refers to beliefs, norms and preferences that individuals hold and which are transmitted within families (Alesina and Giuliano, 2015; Fernández, 2011; Guiso et al., 2006). Hence, a setting consists of both institutions and culture.

Sweden (Boschini et al., 2019) and one among children and their parents in Norway (Tungodden, 2018) find that males are more competitive than females. Further, studies in less gender equal societies such as China (Zhang, 2019), Armenia (Khachatryan et al., 2015) and the United Arab Emirates (Dariel et al., 2017), ranked as country number 99, 102 and 124 respectively on gender equality in the GGI, find no gender differences in competitiveness. Furthermore, not even the relationship between gender differences in competitiveness and matrilineality is universal, as shown by Lowes (2018), who finds no differences across matrilineal and patrilineal groups in the Democratic Republic of Congo. Hence, the direction of the relationship between gender differences in competitive appetite and macro level gender equality is unclear, as is to what extent such differences reflect effects of culture.

The epidemiological approach identifies the effect of culture by comparing outcomes of individuals living in the same economic and institutional environment, but whose cultural beliefs, norms, and preferences are potentially different due to different migration histories (Fernández, 2011). By comparing Norwegians whose parents were born in different countries, we investigate cultural influences on gender differences in willingness to compete. In particular, we follow for example, Fernández and Fogli (2009) and use female labor force participation in the parents' country of birth as a proxy for ancestry culture. Ancestry culture thereby originates in the parental country of ancestry, is transported to Norway with migration, and is reproduced within families via childhood socialization. As all individuals in our sample face the same formal institutions, schools, and labor market, while differing in their cultural heritage from their parents, ancestry culture is separated from the institutions that caused it. Furthermore, by comparing women and men from the same countries and investigating the differences in gender gaps, we control for other factors that parents pass on to their children, such as human and economic capital. Comparing men and women of the same ancestry also controls for differential selection of immigrant groups such as groups from certain countries immigrating for specific reasons or during specific time periods. Finally, the

approach controls for non-gendered differences in ancestry characteristics such as levels of economic development and general attitudes and beliefs about for example, the importance of work (Finseraas and Kotsadam, 2017).

We find that women are on average 34 percent less likely to choose to compete than men. Large gender differences remain after controlling for confidence and risk preferences, implying that the gender difference seems to be driven by preferences for competition. We also find a smaller gender difference in competitiveness among people whose parents are from more gender equal countries than among people whose parents are from less gender equal countries. This difference is driven both by men with parents from more gender equal countries wanting to compete less, and by women with the same ancestry wanting to compete more. The fact that ancestry culture plays a different role across gender strongly suggests that the pattern is driven by gender culture. The results do not seem to be driven by differential selection into the study and we find no indications of differences in response rates across country backgrounds. In addition, we find positive correlations between gender attitudes reported in our survey and answers reported in the World Value Survey of the parents' home country, supporting that children have internalized attitudes from their parents ancestry country through upbringing.

We contribute to previous literature on culture and gender differences in several ways. First of all, by using the epidemiological approach we are more likely to identify the effects of culture as individuals face the same institutions. Compared to lessons learned from cross-country comparisons, a within country study of culture also ensures that all participants face the same decision environment, the same level of payoffs, the same currency (which means that no adjustments for purchasing power is necessary), read instructions in the same language (no translations are necessary), the timing of the study is the same and the background variables such as educational attainment are comparable because they are

from the same society (see Zhang (2019) for similar arguments). Second, our analysis is pre-registered and well powered.[3] While many lab experiments can be easily replicated, our experiment is harder to replicate, which increases the importance of pre-registration (Coffman and Niederle, 2015). Third, we use excellent quality data from administrative registers with minimal attrition and reporting problems which enables us to investigate issues of selection into the experiment to a much larger extent than previous studies.

The remainder of the paper proceeds as follows: Section II presents the experimental design, data, hypotheses and empirical strategy. Section III presents the main experimental results. Possible alternative explanations are discussed in Section IV before we conclude in Section V.

II Experimental design and data

A) The experiment

We follow the classical design of the competition experiment by Niederle and Vesterlund (2007), including several measures designed to parse out other differences between men and women, such as risk preferences, altruism, feedback aversion, and confidence. Our experiment consists of 3 parts where the participants solve as many tasks as possible for 90 seconds, in addition to answering a survey. All subjects receive a show-up fee of 50 NOK, and in addition one part of the experiment is randomly chosen for payment.

The task in our experiment is a counting task, counting the number of 1's in 5x5 matrixes consisting of zeroes and ones, as in Figure 1. This task has two advantages: First, it reduces the possibilities of cheating in an online setting which would be easier with other commonly used tasks such as adding and subtracting numbers. Secondly, men and women have been

[3]The American Economic Association's registry for randomized controlled trials. Number AEARCTR-0004153. The plan is linked to on the first page and will be added as an Appendix when submitting the paper.

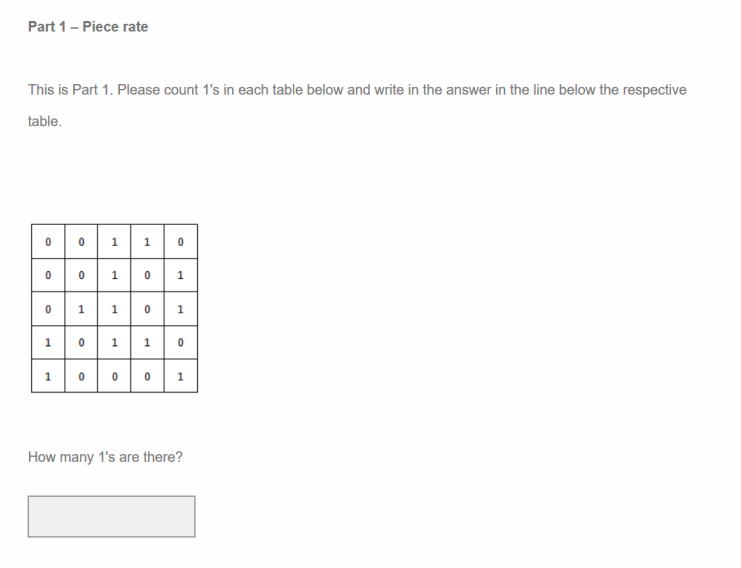

Figure 1: Example of a task.

found to perform equally well at this task in previous online experiments (Lezzi et al., 2015).

In Part 1 of the experiment, participants earn 5 NOK (0.55 USD) for every task solved. In Part 2, payment is based on performance so that the best player in a group of 4 receives payment (if several people have equally high scores all of them win). The payment to the winner in Part 2 is 20 NOK per task. The groups are composed by randomly drawing three additional individuals from a pilot sample, which participants were informed of prior to starting the experiment.[4]

After Part 2 is played, the respondents are asked to self-asses their relative position in the group. The answer they give is incentivized by giving them 5 NOK if they answer correctly. This is a classic design solution to assess the importance of gender differences in confidence.

In Part 3 the participants perform the same counting task, but now they are asked to choose what type of payment they want: either piece-rate as in Part 1 or competitive pay-

[4]We conducted a pilot of 40 students at the University of Oslo in the beginning of April 2019. Participants were recruited through the mailing list of OECONLAB of students who previously have agreed to receive invitations to experiments.

ment as in Part 2. This choice constitutes our main dependent variable measuring willingness to compete. After they make their decisions, the respondents start the counting task in Part 3. Importantly, in the case of competitive pay the respondents are competing against their group's (the same group as in Part 2) performance in Part 2. This assures that payment is based on a setting where everyone competes, and therefore that the competition is with everyone and not only the ones with a high willingness to compete. In the classic design, competing with individuals that have already played is also the solution to control for altruism, as the respondent's choices will not affect the payoffs of the other players. However, in the present experiment, the altruism component is always controlled for as the respondents play against people that have already finished their experiment.

After completing Part 3, participants answer questions concerning how many correct answers they believe they provided in Part 1, guess how many correct answers the other participants have provided on average, and are asked about causal attribution. They also receive information about how many correct answers they actually provided in each of Part 1, 2 and 3 before proceeding to Part 4.

Part 4 consists of answering questions about risk aversion, altruism, attitudes related to gender equality, integration in the Norwegian society, survey measures of competitiveness and a vignette experiment measuring discrimination. Respondents are then informed about which part is selected for payment, and how much they will earn for participating. Finally, the respondents are given the choice to be paid to their bank accounts or to donate the money they have earned to a charity (The Red Cross, Doctors without borders, or UNICEF).[5] The complete questionnaire can be found in Appendix Section A.3.

Respondents were invited to participate in the survey in a text message. The text message described that participating in the study was voluntary and that participants could earn

[5]In total 45 percent of the participants donated and they donated in total NOK 80 155 (approximately 9000 USD at the time of the experiment).

money by following a link and answering some questions. The link took the respondents to a Qualtrics web page where more information about the study was provided. Consenting participants continued to the study. A couple of days after the invitation was sent out, a reminder text message was sent to people who had not yet answered the survey.[6] Data was collected between May and August 2019.

B) Data and coding of main variables

Our main dependent variable measures the willingness to compete by the choice made in Part 3. We code *Compete* to equal 1 if the respondent chose competitive remuneration and zero if piece-rate is chosen.[7]

Our main measure of gender equality culture is the female labor force participation rates (FLFP) in the country of ancestry in 2000, as reported in the World Development Indicators online database.[8] This is a standard measure used in papers using the epidemiological approach in economics (for a review see Fernández (2011)). We measure FLFP in 2000 to have as complete coverage for our countries of ancestry as possible. We take the natural log of FLFP to capture that a given percentage point difference in FLFP is likely more important at lower levels of FLFP. As we show in Figure 2, log FLFP generally correlates with other aspects of gender equality and the use of log FLFP also allows for comparisons with other studies of ancestry culture in Norway (Finseraas and Kotsadam, 2017; Finseraas et al., 2020).

As a complement, we also include a second measure, namely the World Economic Forums

[6]The first text message read: "The University of Oslo and the Frisch Centre invite you to a research study. Contribute to research and earn 50-400 NOK. Read more about the research here (Link). Participate here (Link)." The reminder read: "We remind you about the invitation to participate in a research study. Your response is important for the research. Participate here (Link)".

[7]Unless otherwise stated, all our tests, hypotheses, and codings are as pre-registered.

[8]https://databank.worldbank.org/data/home, variable SL.TLF.ACTI.FE.ZS. FLFP is the percentage of female population aged 15-64 who are currently employed or seeking work. The underlying data is based mostly on labor force surveys. For Yugoslavia we take the average of Bosnia and Herzegovina, and Croatia, which are the two former Yugoslavian countries in our sample. For Faroe Islands we use data from Statistics Faroe Islands (https://statbank.hagstova.fo/pxweb/en/H2/H2__AM/)) for the year 2005.

Gender gap index (GGI) as a proxy of culture. The index is based on 14 different country level indicators and is taken from the Global Gender Gap reports made by World Economic Forum.[9] We use the values from the 2016 report. This measure is also popular in the literature and has previously been used to study culture (Blau et al., 2020; Fryer Jr and Levitt, 2010; Guiso et al., 2008; Kaiser, 2019; Nollenberger et al., 2016). GGI only exists for 52 of our 59 ancestry countries. As seen in the upper left quadrant of Figure 2, the two measures of culture correlate highly. In addition, log FLFP in 2000 is correlated with FLFP in 1970, women in politics, and the gender attitudes reported in WVS. In Table 1 we show the definition and coding of the gender attitudes scale and of the other variables that we use from the survey.

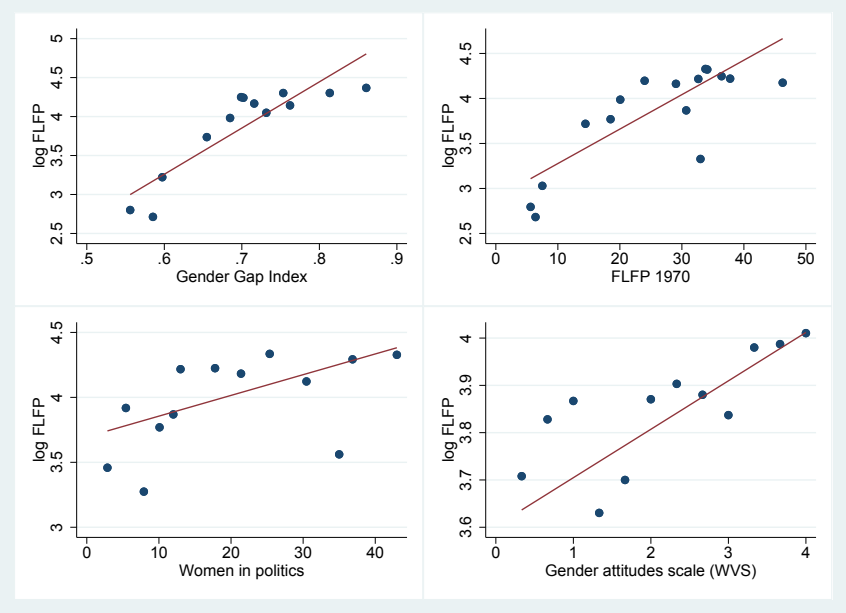

Figure 2: The correlation between FLFP and a) GGI, b) FLFP 1970, c) Women in politics and d) Gender attitudes scale (WVS)

[9]The 14 variables are divided into four overall areas of inequality: Economic participation and opportunity (Labour force participation; Wage equality for similar work; Estimated earned income; Legislators, senior officials and managers); Educational attainment (Literacy rate; Enrollment in primary education; Enrollment in secondary education; Enrollment in tertiary education); Health and survival (Sex ratio at birth; Healthy life expectancy) and Political empowerment (Women in parliament; Women in ministerial positions; Years with female head of state)

Table 1: Coding and definition of variables.

(1) Variable	(2) Question	(3) Coding
Risk	In general, how willing are you to take risks?	1=not willing to take risk at all; ... 10=very willing to take risk
Confidence	Guess of how well they performed in the counting task relative ... to the other group members	1=first place; 4=fourth place
Guess p1	How many tasks do you think you solved in Part 1	continuous
Overestimation	The ratio of Guess p1 to actual performance	Guess p1/own performance
Overconfidence	The ratio of Guess p1 to the guess of the performance of an average other.	Guess p1/performance of others
Control	To what extent do you think your result in Part 1 is due to controllable ... (i.e., effort) versus uncontrollable (i.e., chance and difficulty) factors?	1 =no control; 10= full control
Gender attitudes scale	The average of of these three variables: Being a housewife is just as fulfilling as working for pay	0: Strongly agree, 1: Agree, ... 2: Do not know 3: Disagree, ... 4: Strongly disagree.
	On the whole, men make better political leaders than women do	As above
	A university education is more important for a boy than for a girl	As above
Control	How much freedom of choice and control in life you have over the ... way your life turns out	1: none at all, 10: a great deal
Make parents proud	One of my main goals in life has been to make my parents proud	As gender attitudes
Live with parents	Do you live with your parents?	1:Yes, 0=No
Voted	Did you vote at the last election?	1:Yes, 0=No
Important to self	Which characteristics, if any, do you consider to be are especially ... important to encourage children to learn at home?*	
...Gender equality		1:listed characteristic, 0: did not
...Religion		as above
...Competitiveness		as above
...Hard work		as above
...Obedience		as above
Important to parents	Which characteristics, if any, did your parents emphasize in your childhood?*	
...Gender equality		as above
...Religion		as above
...Competitiveness		as above
...Hard work		as above
...Obedience		as above

Notes: *We ask respondents about what characteristics they think are especially important to encourage kids to develop. They can choose up to 5 characteristics out of 13. The 13 cha istics: Independence; Feeling of responsibility; Imagination; Tolerance and respect for other people; Thrift, saving money and things; Determination, perseverance; Religious faith; Unsel ness; Obedience; Politeness; Gender equality; Competitiveness; and Hard work. We also ask the respondents what characteristics their parents put focus on when they themselves grew

C) Empirical strategy and hypotheses

We start by testing if there is a gender difference in the total sample by estimating the following regression:

$$Compete_i = \beta Female_i + \chi X_i + \epsilon_i \tag{1}$$

where i indexes individuals. The hypothesis is that β is negative (i.e., that women are less likely than men to choose to compete). X_i is a set of birth year fixed effects in the baseline specification and we will present results with and without these controls. To make the models fully saturated, we always partition the covariate space and add control variables as indicator variables rather than using their multivalued codings (Athey and Imbens, 2017). If cells are too small, with less than 5 percent of the observations, adjacent cells are combined. When using interaction terms, we will retain the continuous coding of the variables and standardize the variables for presentational purposes. If we have missing values on explanatory variables, we will also show results where we code the variables as zero and include dummy variables controlling for missing status so that we do not lose observations. We use robust standard errors in all estimations.

We move on to investigate the extent to which the cross-ancestry country differences explain variation in female and male competitiveness. In doing so, we first restrict the sample to either the female or the male respondents, add our measure of gender equal culture, which we will call *Culture* for short from here on, and estimate the following regression:

$$Compete_{ic} = \lambda Culture_c + \chi X_i + \epsilon_{ic} \tag{2}$$

We add the subscript c for country of ancestry. The measure of culture will be standard-

ized to have mean zero and standard deviation of 1. The error term, ϵ_{ic} is now clustered at the country of ancestry level. The main specification is one without any controls and where the cultural proxy used is log FLFP. The main hypothesis is that λ is statistically significantly different from zero. Note that we treat it as an open question whether there is a smaller or larger difference for individuals with a background in more equal countries.

We then test if the gender difference is moderated by our proxy for gender equal culture. In doing so, we use the full sample, add country of ancestry fixed effects and an interaction term between *Female* and our measure of *Culture* and estimate the following regression:

$$Compete_{ic} = \beta Female_i + \delta Country_c + \lambda Culture_c * Female_i + \chi X_i + \epsilon_{ic} \tag{3}$$

Given that β is negative, if we find that λ is positive (negative) it shows that the gender difference in competition is smaller (larger) for individuals whose parents come from a country with higher gender equality.

D) The population and sample

Our study population is defined as people born in Norway between 1980 and 2000 with at least one parent born outside of Norway in one of 59 different countries with the highest number of individuals recorded in the Population Register in Norway.[10] See Appendix Table A.1 for a list of countries and sample sizes in our study.

We aimed at recruiting up to 40 participants from each country background: 20 women and 20 men. We knew that the Population Register could provide a phone number for at least 71 people from each of the 59 ancestry countries in our sample countries. Hence, we were quite certain that we would not be able to have 20 individuals in each country-gender

[10]Restricting the study population to be born between 1980 and 2000 ensures that people in the sample were not too different from each other at the same time as these age cohorts have a parent generation consisting of a fair share of immigrants from a variation of ancestry countries, giving us enough Norwegians with parents born outside Norway to recruit from.

cell. The invited sample consists of either all people from the 59 country backgrounds with fewer than 200 people, or a random draw of 200 people from each of the countries with more than 200 people.

Since the Population Register could provide a phone number for less than 200 people from some of the country backgrounds, a potential concern is that the size of the samples from the different countries were related to our main measure of *Culture*. To investigate this worry, the distribution of the invited sample of individuals with parents from different countries is shown in Figure 3, Panel A. We see that we have a random draw of 200 individuals from 31 country backgrounds but for some country backgrounds, there are considerably fewer individuals. Fortunately, we see in Panel B that in the invited sample the country background sample sizes seem unrelated to our main measure of *Culture*.

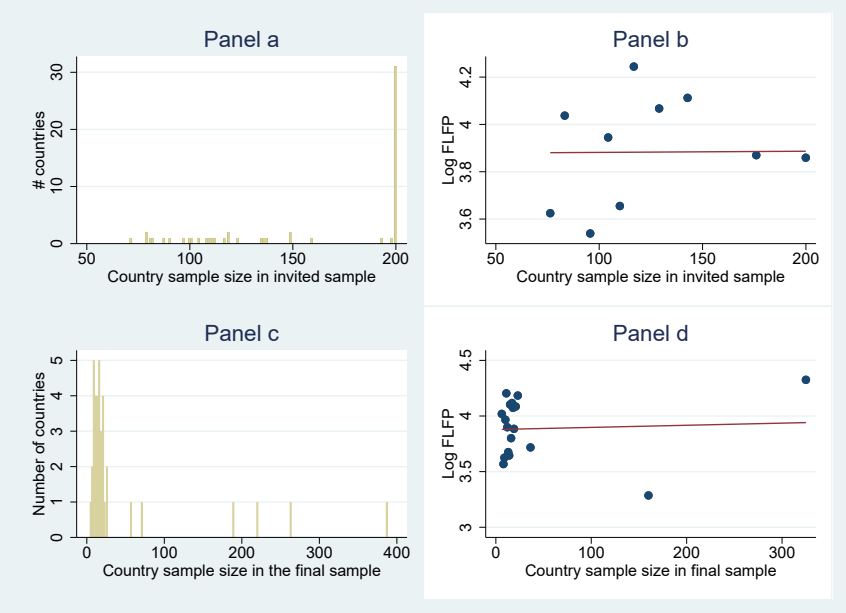

Figure 3: Distribution of background country sample sizes and relation to FLFP in the invited and final sample.

Once we knew how many individuals we had managed to recruit from the different countries we also oversampled individuals at the tails of the FLFP distribution. We chose this

strategy in order to increase power (List et al., 2011). More specifically, our pre-registered decision rule was the following: if we would not get enough consenting participants from a country with a FLFP higher than the median FLFP (i.e., FLFP above 57), we would invite more individuals of the same gender from the three countries in the upper tail of the FLFP distribution with most potential second generation respondents. These three country backgrounds are Sweden, Denmark, and Vietnam. If we would not get enough consenting participants from a country with a below-median FLFP (FLPF below 57), we would invite more individuals of the same sex from the three countries in the lower tail of the FLFP distribution with most potential second-generation respondents. These three countries are Pakistan, Somalia, and Iran. In total we got 1,943 consenting respondents that completed at least the competition experiment (Part 3). The distribution of background country sample sizes in the final sample is illustrated in Panels C and D of Figure 3. We discuss and test for differential response rates further in Section B).

III Main Experimental Results

In this section we present the basic experimental results. We start off with investigating gender differences in performance and competitiveness in Section A). In Section B) we proceed to discuss the results related to our tests of the effects of gender equal culture on competitiveness.

A) Gender difference in performance and willingness to compete

As expected, there is no gender difference in the performance (number of correct counts) of men and women in the counting task. In the piece-rate task (Part 1), men on average reported 8.73 correct answers and women reported 8.84 correct answers. In the tournament task (Part 2), men on average reported 10.02 correct answers and women reported 10.18. As can be seen from Table 2, these differences are not statistically significant. The distribution of performance is also very similar across gender (see Appendix Figure A.1).

Table 2: Gender differences in performance and competitiveness.

	(1) Performance piece rate	(2) Performance competition	(3) Compete
Female	0.11	0.16	-0.14***
	(0.13)	(0.13)	(0.022)
Mean dep. var. for men	8.73	10.02	0.41
No. of observations	1943	1943	1943
R-squared	0.00	0.00	0.02

Notes: Robust SE in parentheses.

In Column 3 of Table 2 we show the gender difference in willingness to compete for the whole sample. While 41 percent of the men choose to compete, only 27 percent of the women do so. The difference is highly statistically significant and also large as women are 34 percent less likely to compete than men. There are also gender differences in our alternative measures of competitiveness, and our behavioral measure of competitiveness is correlated with these other measures, see Appendix Section A.2.

In Figure 4 we show the relationship between performance and competitiveness as well as earnings from Part 3 for men and women. In the left side of the figure we see that willingness to compete increases with performance for both men and women, but more so for men. In the right side of the figure we show the relation between performance in Part 1 (piece-rate) and earnings in Part 3 (choice between piece-rate and competition). On average, there is no statistically significant difference in earnings between men and women in Part 3. However, there are more men earning zero, and more men earning a lot.[11]

[11]In Appendix Table A.4 we show some measures intended to capture the external relevance of competitiveness in our sample. Previous studies have shown competitiveness to be correlated with earnings and education (Flory et al., 2015; Reuben et al., 2019; Buser et al., 2014). As we show in Panel A, the correlation between choosing to compete and labor market earnings in our data is relatively weak, perhaps due to the young age of our sample. We see that competitiveness is correlated with higher earnings for women. We also see in Panel B that competitiveness is positively, but very weakly correlated with years of education for both women and men, but not statistically significantly so. Finally, we show in Panel C that competitiveness is correlated with the probability of being enrolled in or having completed a STEM higher education.

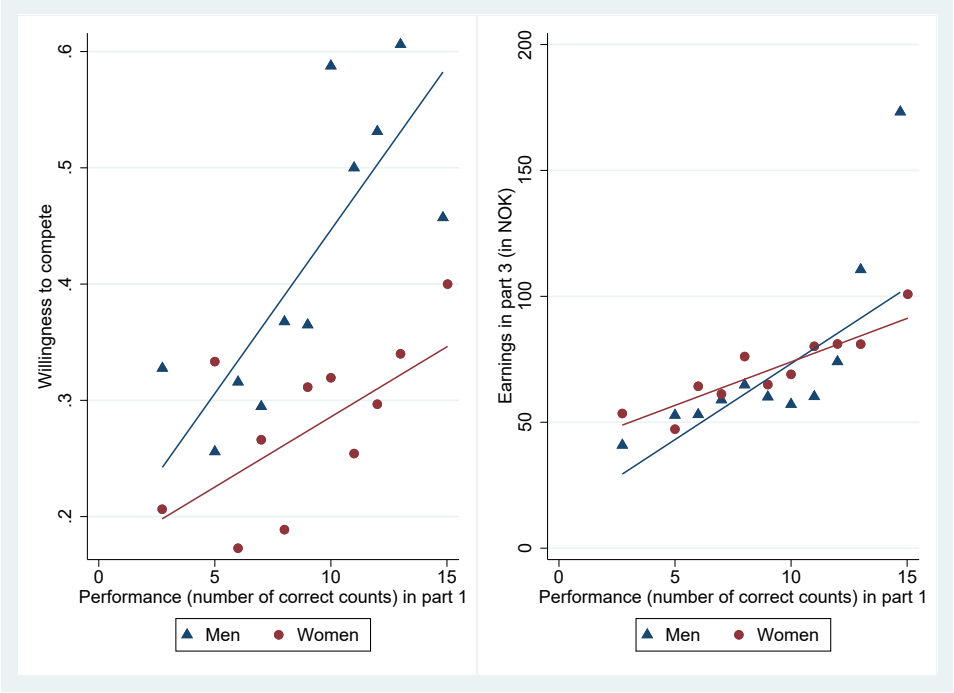

Figure 4: Relationship between performance and competitiveness as well as earnings

B) The effects of culture on willingness to compete

We conjecture that gender equal culture affects willingness to compete. Column 1 of Table 3 shows that the main measure of *Culture*, log female labor force participation (FLFP) in the country of ancestry, is positively correlated with willingness to compete for women. A one standard deviation higher value of log FLFP (a standard deviation in FLFP corresponds to around 24 percentage points) is statistically significantly correlated with a 2.1 percentage points higher willingness to compete for women (p = .025). Column 2 shows that the correlation is reversed for men. Men with parents from countries with more women working are less likely to want to compete. The difference for men is statistically significant at the 10 percent level (p = .071). We thereby find support for our two main hypotheses which were that gender equal culture is correlated with competitiveness for women and men.[12]

[12]Also, when adjusting for the fact that we are testing two hypotheses using the false discovery rate method developed by Benjamini and Hochberg (1995) we see that the hypothesis with the lowest p-value passes the test precisely as p =.025. This method minimizes the false non-discovery rate while only ad-

Table 3: Gender difference in competition and FLFP.

	(1) Compete	(2) Compete	(3) Compete	(4) Compete
Female			-0.14***	-0.14***
			(0.015)	(0.015)
Log FLFP	0.021**	-0.022*		-0.022*
	(0.0092)	(0.012)		(0.012)
Female*Log FLFP			0.046***	0.044***
			(0.012)	(0.012)
Mean dep. var. in sample	0.27	0.41	0.33	0.33
No. of observations	1067	876	1943	1943
R-squared	0.00	0.00	0.06	0.02
Sample	Women	Men	All	All
Country FE	No	No	Yes	No
Mean FLFP			57.78	57.78
SD FLFP			24.17	24.17

Notes: Log FLFP is standardized with mean 0 and a standard deviation of 1. Robust SE clustered at the ancestry country level in parentheses.

In Column 3 we show that the gender difference is moderated by our proxy for gender equal culture. In doing so, we use the full sample, add country of ancestry fixed effects, and an interaction term between Female and log FLFP (note that the log FLFP coefficient itself is subsumed by the fixed effects). We see that the gender gap in a country with the average level of FLFP (log FLFP is standardized to have mean zero) is of 14 percentage points and this gender gap reduces by more than 30 percent in countries with a one standard deviation higher FLFP. In Column 4 we show that the results are similar if we estimate the relationship without ancestry country fixed effects and instead include log FLFP. In Figure 5 we show the results graphically in a binned scatterplot where each bin contains equally many individuals and the superimposed regression lines are based on the full underlying individual level data. In Columns 1 and 2 of Appendix Table A.5 we show that the gender difference, as well as the culture effects, are very similar when we add year of birth fixed effects as additional control

justing the critical values based on other true hypotheses. The false discovery rate method developed by Benjamini and Hochberg (1995) implies that the m p-values of the i hypotheses are ordered from low to high and that the critical value of the p-value is then p(i) = a*i/m. In our case, with 2 hypotheses and a significance level (a) of 0.05, the critical p-value would be 0.025 for the one with the lowest p-value (0.05* 1/2, which is the same as a Bonferroni correction). For the second hypothesis, the critical p-value is 0.05 (0.05*2/2).

variables.[13]

As we find a gender difference in the effect of ancestry culture on willingness to compete, we are much more confident that the relationship is related to gendered culture. As highlighted in Finseraas and Kotsadam (2017), finding similar correlations for both sexes would show that it is not, in fact, gendered culture that affects the outcome. It could still have been culture, however, but it is the comparison across gender that controls for all factors that affect men and women equally, such as non-gendered aspects of upbringing, parental networks, and parental resources. Comparing men and women with ancestry from the same countries further controls for omitted characteristics correlated with ancestry female labor force participation and inherited outcomes, but uncorrelated with gender, such as work ethics. In fact, the variation retained is by construction the part of ancestry female labor force participation that affects women and men differently.

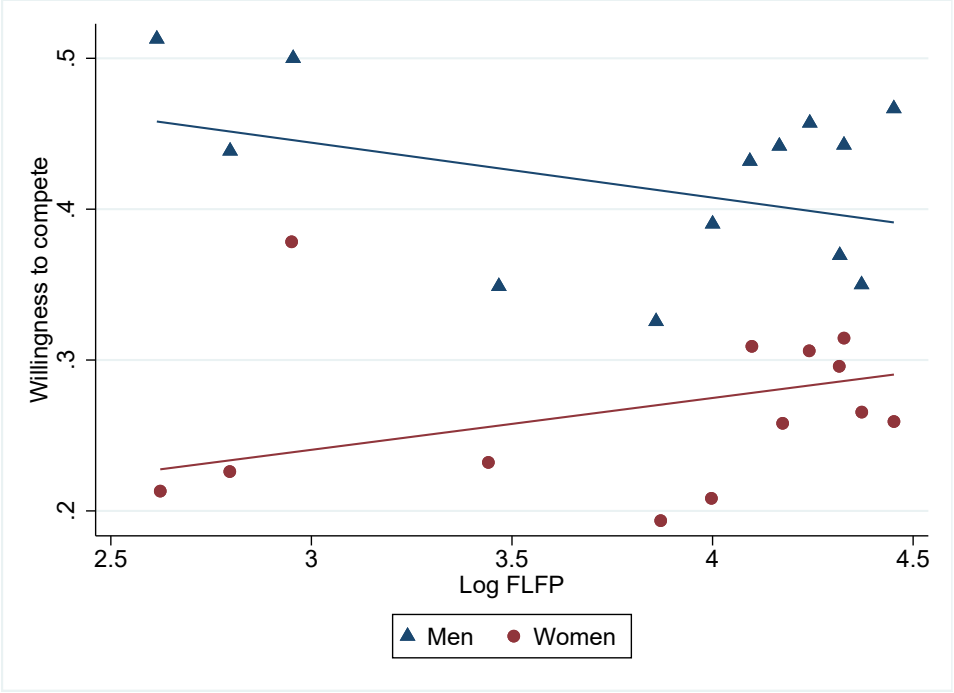

Figure 5: Culture and willingness to compete for men and women

[13]Appendix Tables A.2 and A.3 show that performance is correlated with FLFP but there is no difference in this effect by gender. These analyses were not pre-registered.

Table 4: Competition and Gender index.

	(1) Compete	(2) Compete	(3) Compete	(4) Compete
GGI	0.029***	0.0027		0.0027
	(0.0057)	(0.014)		(0.014)
Female*GGI			0.31*	0.31*
			(0.17)	(0.17)
Female			-0.36***	-0.36***
			(0.13)	(0.12)
Mean dep. var. in sample	0.28	0.41	0.34	0.34
No. of observations	989	828	1817	1817
R-squared	0.00	0.00	0.05	0.02
Sample	Women	Men	All	All
Country FE	No	No	Yes	No
Mean GGI			0.72	0.72
SD GGI			0.09	0.09

Notes: Gender index is standardized with mean 0 and a standard deviation of 1. Robust SE clustered at the ancestry country level in parentheses.

Table 4 shows the results when using our complementary measure of *Culture*, namely the Gender gap index (GGI). Column 1 shows a similar picture as our main measure of culture, where women are more likely to choose to compete in more gender equal countries. However, the reversed pattern for men is not observed and the interaction term is only statistically significant at the 10 percent level.[14]

C) Is parental ancestor culture internalized?

In order to investigate whether Norwegians with parents born outside Norway have internalized the attitudes from their parents' home countries, we compare the responses given to survey questions from the World Values Survey (WVS) for the 43 ancestry countries included in both our study and WVS. We then investigate whether it matters if both or just one parent is born abroad.[15]

[14]Appendix Figure A.2 displays country level gender differences in willingness to compete and our measures of *Culture*. We note that the gender difference is decreasing in both measures. Appendix Figure A.3 shows the values with country names as well, both with all countries and when only keeping countries with at least 5 observations.

[15]We also pre-registered that we would investigate if culture affects gender discrimination using a vignette experiment based on Finseraas et al. (2016). This vignette experiment presents candidates with different names (signalling gender) but with otherwise identical characteristics for a leadership position in a bank. The respondents are then asked to evaluate how good they think the candidate fits the position

In Column 1 of Table 5 we see that for most of the variables the answers given in our survey correlate with the answers given in the WVS in the ancestor country (the gender attitude scale, disagreeing that making parents proud is important, characteristics that they want their own children to develop, and living with parents). There is however, no statistically significant correlation for feeling of control. As such gender attitudes, and several other attitudes and reported behaviors, seem to be affected by gender equal culture.[16]

A different way of testing whether gender attitudes are shaped by the home country culture of parents is to investigate the relationship between the gender attitudes reported in our survey and log FLFP. We show these results in Column 2 of Table 5. Log FLFP is strongly correlated with most of the other variables. Perhaps most importantly, it is correlated with the gender attitudes scale.[17] We also confirm the results in Finseraas et al. (2020) that ancestry country FLFP is not correlated with voting for second generation immigrants in Norway.

Previous literature has found signs of stronger vertical transmission of for instance religion in families with homogamous marriages, in other words where both partners share the same cultural background (Bisin and Verdier, 2011). If indeed gender attitudes are transferred

ranging from 1=very poorly to 6=very good, which we call *Score*. As we see in Appendix Table A.8, however, there is no baseline discrimination as the female candidate (Ida in the vignette) is not given a lower score than the male candidate. Neither is there any statistically significant relation between FLFP and Ida in the total sample or for men and women separately.

[16]In order to interpret the magnitudes of these correlations we compare a standardized version of the correlations in Table 5 with the correlation between these variables and gender as well as education. The results are reported in Appendix Tables A.9 to A.11. We find that most correlations to ancestor country are stronger than the correlation with gender (except for the gender equality scale and the importance of hard work), see Appendix Table A.9, and also stronger than the correlation with standardized education (except for living with parents and the importance of obedience), see Appendix Table A.11.

[17]In Column 4 of Appendix Table A.5 we see that women on average report more gender equal attitudes than men. For men, there is a positive correlation between gender attitudes and culture, implying that men with parents from countries with higher female labour force participation have more gender equal attitudes. For women, the coefficient is very similar and the gender difference in the cultural effect on gender attitudes is not statistically significant. Furthermore, as we show in Table A.12, there is no significant correlation between the gender equality scale and competitiveness (for neither sex) nor does controlling for the scale weakens the effects of culture.

Table 5: Correlations with variables included in the WVS.

	Correlation with WVS values in ancestor country	Correlation with log FLFP
Gender attitude scale	0.15**	0.097**
Control	0.070	0.16***
Making parents proud	0.35***	0.25***
Live with parents	0.89***	-0.13***
Voted	NA	0.0088
Important to self:		
Gender equality	NA	-0.019*
Religion	0.30***	-0.075***
Competitiveness	NA	-0.023***
Hard work	0.11**	-0.042***
Obedience	0.19***	-0.015
Important to parents:		
Gender equality	NA	0.0012
Religion	NA	-0.16***
Competitiveness	NA	-0.0020
Hard work	NA	-0.014
Obedience	NA	-0.024

Notes: The table presents regression results where we have used robust SE clustered at the ancestry country level. NA means not applicable as the variable is not in WVS.

from parents to children, we should expect that the effect of culture is stronger when both parents are born abroad relative to one parent born in the ancestor country and the other in Norway. This is also the case. In Table 6 we show the main culture effects separately by those having one parent born abroad only (Column 1) and those with both parents born abroad (Column 2). We see that there is no cultural effect for those with only one parent born abroad while the effect is large for those with both parents born abroad. However, whether the cultural effect is stronger for children who have two parents born abroad because people who marry somebody from the same ancestry country are different from those who marry somebody from the host country (for instance they might value the ancestry culture more) or because the cultural effect becomes stronger when both parents transfer the same culture, is not known. Irrespective of whether the difference between having one or two parents from another country is driven entirely by selection or not, it shows that the effect of culture on competitiveness is strong if both parents are born abroad. These regressions were not

Table 6: Gender difference in competition and FLFP. Split by one or both parents born abroad.

	(1) Compete	(2) Compete	(3) Compete
Female	-0.14***	-0.098***	-0.096***
	(0.052)	(0.022)	(0.025)
Female*Log FLFP	-0.0086	0.080***	0.079***
	(0.079)	(0.018)	(0.019)
One parent born abroad			0.069
			(0.042)
Female*One parent born abroad			-0.065
			(0.048)
Log FLFP*One parent born abroad			-0.055
			(0.055)
Mean dep. var. in sample	0.35	0.32	0.34
No. of observations	1079	821	1900
R-squared	0.08	0.11	0.06
Sample: parents born abroad	One	Both	All

Notes: Log FLFP is standardized with mean 0 and a standard deviation of 1. Robust SE clustered at the ancestry country level in parentheses.

pre-registered.

IV Alternative explanations

Having established that there is a differential correlation between ancestry gender culture and competitiveness for women and men we proceed in this section to investigate alternative explanations behind these effects. In Section A) we investigate the role of other factors at the individual and ancestor country level. In Section B) we investigate the potential role of selection into the experiment.

A) General factors at the individual and country level

It is common to investigate whether the gender difference in competitiveness can be explained by gender differences in risk attitudes or confidence. We see in Columns 1 and 2 of Table 7 that there are gender differences in risk and confidence, where men are more willing to take risk and are more confident than women.[18] We see that there is no statistically

[18]Note that a positive coefficient on confidence implies less confidence as 1 refers to the respondent believing to come first and 4 refers to the respondent believing to come fourth in the tournament.

significant cultural effect on risk or confidence.

We also include additional variables which have been used by Apicella et al. (2017). In Column 3 of Table 7 we include $Guessp1$ and see that women guess that they will have 0.9 less correct answers compared to men's guesses. In Column 4 we include a measure of $Overestimation$. This is the ratio of $Guessp1$ to actual performance. A value greater than one means that one has overestimated own performance, a value less than one means that one has underestimated own performance. While men seem to correctly guess their performance, women underestimate their performance. In Column 5 we include a measure of $Overconfidence$. This measure instead takes the ratio of $Guessp1$ to the guess of the performance of an average other. A value greater than one means that the person thinks she did better than the average other, a value less than one means that the person thinks she did worse than the average other. Here we see that men are slightly overconfident and women underconfident.[19] Finally, we include a test for differential causal attribution by adding the variable $Control$. We see that both men and women seem to attribute a lot of the result to controllable factors, but women less so than men. With respect to culture effects we see that $Female * FLFP$ is only statistically significantly correlated with $Overconfidence$ such that women from more gender equal countries are less overconfident.

Table 8 shows how including additional control variables affects the gender difference in competition. While performance is correlated with willingness to compete, the gender difference is not related to performance as seen in Columns 1 and 2. Confidence explains some of the gender gap, but a substantial gap still exists after controlling for participant's individual guesses of relative position (Column 3). As seen in Column 4, risk attitudes do not affect the gender gap much. Column 5 includes all control variables, still leaving a substantial gender gap in willingness to compete.

[19]Previous studies have also found that women in Scandinavia are underconfident (e.g., Dahlbom et al. (2011).

Table 7: Gender and culture differences in other variables.

	(1) Risk	(2) Confidence	(3) Guess p1	(4) Overestimation	(5) Overconfidence	(6) Control
Female	-0.35***	0.23***	-0.91***	-0.098**	-0.066***	-0.32***
	(0.066)	(0.037)	(0.20)	(0.042)	(0.014)	(0.099)
Female*Log FLFP	-0.053	0.0027	-0.025	0.013	-0.028**	0.0059
	(0.059)	(0.038)	(0.18)	(0.044)	(0.013)	(0.097)
Mean dep. var. for men	6.34	2.07	8.02	0.99	1.04	7.48
No. of observations	1909	1976	1917	1901	1901	1918
R-squared	0.05	0.05	0.06	0.08	0.06	0.04
Country FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Log FLFP is standardized with mean 0 and a standard deviation of 1. All regressions include country fixed effects. Robust SE clustered at the ancestry country level in parentheses.

Column 6 of Table 8 includes the same control variables when we estimate the effect of *Culture*. We note that these controls may themselves also be affected by culture, which may introduce a post-treatment bias. Regardless, the effect of culture increases when including the controls.[20] Hence, while individual differences explain part of the gender gap in competitiveness (compare the female coefficient in column 1 and column 5) they do not reduce the importance of culture (compare the Female*FLFP coefficient in column 6 to the one in Table 3).

The gender difference in the effect of ancestry culture implies that the results are driven by factors that affect women and men differently. As such, the result shows that gender culture is important. Nonetheless, it is interesting to see how other factors at the country level correlate with the gender gap and to see how the relationship between our main measure of culture and gender differences in competitiveness holds up when we control for other factors at the country level. To investigate this we add data on country level education, share of women in politics, GDP per capita and share of different religions. These analyses were not pre-registered.

[20] Adding performance is inconsequential to the culture effect but adding confidence and risk both increases the culture effect as seen in Appendix Table A.7. In Column 3 of Appendix Table A.5 we show that the results are very similar when dummy variables for missing observations are included so as to not lose observations.

Table 8: Gender difference with individual level controls

	(1) Compete	(2) Compete	(3) Compete	(4) Compete	(5) Compete	(6) Compete
Female	-0.14***	-0.14***	-0.11***	-0.13***	-0.11***	-0.11***
	(0.021)	(0.021)	(0.021)	(0.022)	(0.022)	(0.017)
Performance under piece rate	0.019***				0.0036	0.0024
	(0.0038)				(0.0063)	(0.0068)
Performance under competitive pay		0.022***			0.0056	0.0061
		(0.0037)			(0.0054)	(0.0048)
Believe 2nd			-0.21***		-0.20***	-0.20***
			(0.028)		(0.029)	(0.025)
Believe 3rd			-0.34***		-0.31***	-0.31***
			(0.029)		(0.032)	(0.030)
Believe 4th			-0.34***		-0.32***	-0.32***
			(0.037)		(0.040)	(0.034)
Risk				0.020***	0.015***	0.018***
				(0.0054)	(0.0054)	(0.0061)
Overestimation					-0.036**	-0.042*
					(0.018)	(0.025)
Overconfidence					0.028	0.031
					(0.022)	(0.021)
Control					-0.0044	-0.0064
					(0.0051)	(0.0060)
Belief					0.0039	0.0045
					(0.0038)	(0.0058)
Female*Log FLFP						0.059***
						(0.019)
Mean dep. var. for men	0.41	0.41	0.41	0.41	0.41	0.34
No. of observations	1943	1943	1942	1906	1858	1858
R-squared	0.03	0.04	0.09	0.03	0.11	0.15
Country FE	No	No	No	No	No	Yes

Notes: Robust SE clustered in parentheses, clustered at the ancestry country level in Column 6. Log FLFP is standardized with mean 0 and a standard deviation of 1.

In Panel A of Table 9 we show the results for interacting the country level variables with gender (Female). The regressions still control for country fixed effects so the variables themselves are subsumed by the fixed effects. We see that the share of Protestants and Hindus, the average years of schooling, and the GDP per capita in year 2000 in the ancestry country are correlated with smaller gender gaps in competitiveness. The share of Muslims in the ancestry country is correlated with a larger gender gap. In Panel B we add these variables to a specification where we include our main cultural variable (FLPF*Female). We see that only the share of Hindus is statistically signifiant in this specification, while our main cultural effect is very stable. Hence, it seems as if female labor force participation in the parents country of birth is a meaningful proxy for culture even when other important country level characteristics are controlled for.

B) Selection into the experiment

A concern in most lab experiments is that respondents may not be representative of the overall population. In our case, selection into the experiment may also bias the results if the selection is different for men and women from different countries. For instance, if only highly educated women from countries with low FLFP participate while men of all educational backgrounds from the same countries participate, educational attainment would be a confounding factor for our conclusions.

As a first test of differential selection across culture, we test if response rates correlate with our measure of *Culture* and whether it does so differently for men and women. Invitations to equally many people from each country-gender group were sent out in the first week of the experiment. The smallest group available to us, were women with parents from Afghanistan (31 individuals). In the first week of the experiment, we therefore invited 31 people from each ancestry country background. We create a variable, *Response rate*, for each group based on the percentage that replies. Our pre-specified test is to regress the response rate on log FLFP

Table 9: Other country level characteristics.

(a) Other country level characteristics as measures of culture.

	(1) Compete	(2) Compete	(3) Compete	(4) Compete	(5) Compete	(6) Compete	(7) Compete
Female	-0.14***	-0.14***	-0.14***	-0.15***	-0.15***	-0.15***	-0.14***
	(0.018)	(0.025)	(0.019)	(0.022)	(0.020)	(0.016)	(0.023)
Female*Years of schooling	0.044**						
	(0.019)						
Female*Women in politics		0.010					
		(0.020)					
Female*GDP pc 2000			0.034*				
			(0.019)				
Female*Catholics				0.0058			
				(0.018)			
Female*Protestants					0.031**		
					(0.015)		
Female*Muslims						-0.045***	
						(0.013)	
Female*Hindus							0.031***
							(0.012)
Mean dep. var. in sample	0.34	0.33	0.33	0.34	0.34	0.34	0.34
No. of observations	1761	1577	1857	1849	1849	1849	1849
R-squared	0.05	0.06	0.06	0.06	0.06	0.06	0.06

(b) Control for other country level characteristics.

	(1) Compete	(2) Compete	(3) Compete	(4) Compete	(5) Compete	(6) Compete	(7) Compete
Female	-0.15***	-0.15***	-0.14***	-0.15***	-0.15***	-0.15***	-0.14***
	(0.017)	(0.020)	(0.016)	(0.016)	(0.016)	(0.017)	(0.016)
Female*Log FLFP	0.054**	0.075**	0.038*	0.049***	0.043**	0.042	0.051***
	(0.023)	(0.033)	(0.020)	(0.013)	(0.018)	(0.065)	(0.013)
Female*Years of schooling	0.0018						
	(0.028)						
Female*Women in politics		-0.019					
		(0.025)					
Female*GDP pc 2000			0.013				
			(0.022)				
Female*Catholics				0.00032			
				(0.017)			
Female*Protestants					0.0084		
					(0.018)		
Female*Muslims						-0.0065	
						(0.060)	
Female*Hindus							0.040***
							(0.0084)
Mean dep. var. in sample	0.34	0.33	0.33	0.34	0.34	0.34	0.34
No. of observations	1761	1577	1857	1849	1849	1849	1849
R-squared	0.06	0.06	0.06	0.06	0.06	0.06	0.06

Notes: All regressions control for ancestry country fixed effects. Log FLFP is standardized with mean 0 and a standard deviation of 1. Robust SE clustered at the ancestry country level in parentheses.

Table 10: Response rates and FLFP.

	(1)	(2)	(3)	(4)
	Response rate	Response rate	Response rate	Response rate
Log FLFP	-0.0010	0.0078		0.0078
	(0.012)	(0.0082)		(0.0082)
Female*Log FLFP			-0.0096	-0.0088
			(0.019)	(0.018)
Female			0.016	0.017
			(0.027)	(0.026)
Mean dep. var. in sample	0.10	0.09	0.10	0.10
No. of observations	1243	1015	2258	2258
R-squared	0.00	0.03	0.34	0.04
Sample	Women	Men	All	All
Country FE	No	No	Yes	No
Mean FLFP			56.56	56.56
SD FLFP			24.74	24.74

Notes: Log FLFP is standardized with mean 0 and a standard deviation of 1. Robust SE clustered at the ancestry country level in parentheses.

for men and women separately and we also regress it on Female, country fixed effects, and Female*FLFP for the full sample. As seen in Table 10, response rates are not significantly correlated with FLFP.[21], which reduces our concern of differential selection across culture.

We also kept track of how easy it was to get the respondents to answer among those that answered. Assuming that there is a correlation between hard to reach respondents and non-respondents in their competitive behavior this may teach us something about the selection problem (Heffetz and Rabin, 2013; Heffetz and Reeves, 2019). Around 70 percent of our sample participated only after a reminder had been sent out a couple of days after the first invitation. In Table 11 we show that there is a gender gap and a culture effect in both the sample of early responders and the sample of late responders. Furthermore, both effects are larger for the late responders. As late responders might be a better proxy for the effects among non-responders, this implies that the effects may be even larger than those presented here.

[21]Having very few individuals from some countries will introduce noise in our measures and our main results are even stronger if we only keep countries that have at least 5 men and 5 women in the sample, as seen in Table A.6. This analysis was not pre-registered.

Table 11: Effects for individuals answering before and after a reminder.

	(1) Compete	(2) Compete	(3) Compete	(4) Compete	(5) Compete	(6) Compete
Female	-0.17***	-0.075*	-0.075*	-0.16***	-0.080***	-0.074**
	(0.026)	(0.039)	(0.039)	(0.021)	(0.030)	(0.030)
After reminder			0.076**			0.078***
			(0.036)			(0.027)
After reminder*Female			-0.091*			-0.092**
			(0.047)			(0.040)
Female*Log FLFP				0.049***	0.042**	0.0065
				(0.017)	(0.016)	(0.016)
After reminder*Female*Log FLFP						0.054**
						(0.025)
Mean dep. var. in sample	0.43	0.36	0.41	0.34	0.32	0.33
No. of observations	1361	582	1943	1361	582	1943
R-squared	0.03	0.01	0.02	0.07	0.10	0.06
Sample	Late	Early	All	Late	Early	All
Country FE	No	No	No	Yes	Yes	Yes
Mean FLFP				57.64	58.10	57.78
SD FLFP				24.65	23.00	24.17

Notes: Late refers to having answered after the reminder is sent and *Early* refers to having answered before the reminder was sent out. Robust SE in parentheses, clustered at the ancestry country level in columns 4-6. Log FLFP is standardized with mean 0 and a standard deviation of 1.

To further investigate selection issues we merge our survey data with information available from Norwegian administrative registers. In Table 12 we show descriptive statistics of our sample as well as the population living in Norway of the same ages and with parents born in the same countries. We see that our sample seems to have slightly higher education, as do their parents, compared to the population at whole. Our sample have lower earnings, which is probably driven by a lifecycle bias whereby individuals that stay in school longer have lower earnings at young ages. The samples are fairly similar on demographic characteristics.

We also test for selection effects by using the entire population in our age groups from the 59 countries in the registry data and for each variable X in Table 12 we run regressions of the type:

Table 12: Comparison of experimental sample with the population.

	(1) Experimental sample		(2) Population	
	Mean	SD	Mean	SD
Education	15.34	2.69	14.62	2.93
Mother education	13.84	3.85	13.43	3.75
Father education	14.03	3.48	13.60	3.51
Earnings	200917	259057	219344	254131
Mother earnings	405767	300623	366541	314854
Father earnings	538374	462426	462569	549544
Married	0.11	0.31	0.12	0.33
Divorced	0.01	0.11	0.02	0.12
Widow	0.00	0.00	0.00	0.01
Single	0.88	0.33	0.86	0.35
Number of siblings	2.27	1.51	2.17	1.52
Household size	2.64	1.57	2.61	1.46
Birthyear	1993.15	5.65	1991.75	5.79
N	1942		136426	

Notes: The experimental sample consists of the participants in our experiment and the population refers to all people living in Norway of the same ages and with parents born in the same countries.

$$X_{ics} = \alpha Sample_s + \beta Female_i + \delta Culture_c + \psi Culture_c * Sample_s + \kappa Female_i * Sample_s + \mu Culture_c * Female_i + \lambda Culture_c * Female_i * Sample_s + \chi YoB_i + \epsilon_{ics}, \quad (4)$$

where *Sample* refers to our experimental sample and *YoB* is a set of year of birth fixed effects. As log FLFP is standardized, α gives us the difference between our sample and the total population sample for men from the country with average FLFP. κ shows whether this difference is different for women. Both of these coefficients are interesting and important for external validity. The regression result will also tell us if there is differential selection for men, ψ, and the added differential selection for women λ. Both of these are important for the internal validity of the estimates and we are most worried about λ being statistically significantly different as this would imply that there is differential selection across culture of

women as compared to men even when country fixed effects are controlled for.

In Table 13 we see that ψ, i.e. the coefficient for *Culture*Sample*, is not statistically significant for any variable. λ, i.e., the coefficient for *Culture*Female*Sample*, is only statistically significantly different for one variable, Divorced. It is, however, very close to zero and one significant coefficient out of twelve does not make us concerned. Taken at face value, the result implies that women are more likely to be included in our sample if they are divorced *and* are from countries with higher gender equality. In any case, we show in Column 1 of Appendix Table A.13 that our results are robust to controlling for all the variables in Table 12, also when interacted with female (Column 2 of Table A.13).

While controlling for these other factors may lead to a post treatment bias, as culture is likely to affect these variables as well, the stability of the results reduces the concern that other important factors are correlated with the gender difference in behavior and cross country differences in gender culture. In particular, we were worried about socioeconomic status affecting the behavior of women and men differently and we pre-registered that we would test if parents earnings constitute a threat for our analysis. Almås et al. (2015) find that kids in Norway from lower socioeconomic backgrounds are less willing to compete. They furthermore find that this interacts with gender so that the gender difference is largest among kids with a higher socioeconomic background. In particular, it is the boys from the lower SES families that compete less in their study.[22] In our sample there is no interaction between sex and parental earnings to predict competitiveness, which reduces our concern

[22]We pre-registered that we would investigate if the pattern we observe is consistent with the explanation in Almås et al. (2015) by asking: - Is there a correlation between FLFP and SES (measured as parents earnings in the most recent year for which we have data)? - Is the gender difference in competition negatively correlated with FLFP? - Is the gender difference driven more by men than by women? If the answers to these three questions were all yes, we would face a problem in differentiating our cultural argument from the argument in Almås et al. (2015). We would then also control for parental earnings in additional regressions, despite problems of post treatment bias. The answers to the questions are not yes, and the result hold up well when controlling for earnings as well as other variables. We also note that there is no interaction between sex and parental earnings to predict competitiveness in our sample.

that socioeconomic status affects the behavior of men and women differently.

With respect to external validity we see that our sample is generally positively selected also when we control for birth year fixed effects. With such controls they are also positively selected with respect to earnings. Women are generally less selected than men (Female*Sample), which is not surprising given that women have a higher response rate. Overall, we conclude that differential selection into the experiment is unlikely to be the driver of our results.

Table 13: Tests of differential selection.

(a) Selection tests using demographic variables.

	(1) Married	(2) Divorced	(3) Widow	(4) Single	(5) Nr siblings	(6) HH size
Sample	0.036***	-0.00066	-0.000040	-0.035***	0.15***	0.046
	(0.0096)	(0.0021)	(0.000024)	(0.0095)	(0.050)	(0.051)
Female	0.037***	0.0087***	0.00023***	-0.046***	0.0059	0.060***
	(0.0031)	(0.00059)	(0.000079)	(0.0033)	(0.011)	(0.014)
Log FLFP	-0.035**	-0.0052***	-0.000020	0.040**	-0.40***	-0.16***
	(0.015)	(0.0015)	(0.000018)	(0.016)	(0.097)	(0.043)
Log FLFP*Sample	0.0094	0.00092	0.0000073	-0.010	0.039	-0.038
	(0.0073)	(0.0029)	(0.000031)	(0.0066)	(0.053)	(0.060)
Female*Log FLFP	-0.0083**	-0.0026***	0.000062	0.011**	-0.058***	-0.012
	(0.0038)	(0.00087)	(0.000068)	(0.0043)	(0.015)	(0.019)
Female*Sample	-0.041***	0.00054	-0.00021***	0.040***	-0.076	-0.12*
	(0.011)	(0.0033)	(0.000073)	(0.011)	(0.052)	(0.062)
Log FLFP*Female*Sample	0.0016	0.0086**	-0.000068	-0.010	0.031	-0.053
	(0.0079)	(0.0033)	(0.000066)	(0.0080)	(0.056)	(0.054)
Mean dep. var. in sample	0.12	0.02	0.00	0.86	2.17	2.61
No. of observations	138285	138285	138285	138285	138315	119728
R-squared	0.17	0.03	0.00	0.21	0.08	0.11

(b) Selection tests using education and earnings.

	(1) Education	(2) Mother	(3) Father	(4) Earnings	(5) Mother	(6) Father
Sample	1.03***	0.34	0.48*	15855.0**	36651.5	78816.0**
	(0.12)	(0.31)	(0.24)	(7855.9)	(22307.7)	(32448.8)
Female	0.87***	-0.0080	-0.0045	-41571.2***	-56.1	3063.9
	(0.020)	(0.013)	(0.017)	(3750.9)	(1323.5)	(2927.9)
Log FLFP	0.26***	1.17***	0.82***	3063.1	68033.6***	85114.9***
	(0.062)	(0.28)	(0.21)	(4359.4)	(12124.2)	(15727.6)
Log FLFP*Sample	-0.21	0.036	-0.14	-862.7	13869.0	4628.0
	(0.14)	(0.23)	(0.18)	(5228.9)	(15015.2)	(21056.2)
Female*Log FLFP	-0.057***	-0.015	-0.0019	-882.2	1547.7	4497.8*
	(0.017)	(0.014)	(0.017)	(5566.4)	(1201.6)	(2257.6)
Female*Sample	-0.43***	-0.020	-0.16	15961.6*	-7712.4	-34071.4**
	(0.15)	(0.16)	(0.12)	(9350.8)	(14788.9)	(16575.7)
Log FLFP*Female*Sample	0.16	-0.11	-0.13	3695.2	-7260.6	-14397.1
	(0.14)	(0.13)	(0.11)	(5868.9)	(12080.1)	(10956.1)
Mean dep. var. in sample	14.63	13.44	13.61	219168.11	367105.61	463660.11
No. of observations	122456	121122	118855	138316	131386	130599
R-squared	0.08	0.10	0.05	0.31	0.07	0.05

Notes: Log FLFP is standardized with mean 0 and a standard deviation of 1. Robust SE clustered at the ancestry country level in parentheses. All regressions control for year of birth fixed effects.

V Conclusion

It is well known that women are less willing to enter into competitions than men (Niederle, 2015; Niederle and Vesterlund, 2011) but less is known about where these differences originate from and what role culture plays in shaping these differences. There are differences in the gender gap across contexts, but these differences do not follow a consistent pattern. Furthermore, even if there are differences across places it is not clear if those differences come from differences in preferences and beliefs (what we label culture) or from differences in reward systems and incentives due to different institutions or endowments.

In a pre-registered competition experiment with a large sample of Norwegian born individuals we find that the gender gap in willingness to compete is lower for individuals with parents born in more gender equal countries. The lower gender gap is driven by both genders behaving differently and the results are stronger if both parents are born abroad. We also find positive correlations between gender attitudes reported in this survey and answers reported to the same questions in parents' home country, suggesting that cultural differences transferred from parents to children through upbringing matters for gender attitudes. Our results are not only driven by general factors that affect competitiveness, such as risk aversion and confidence. Nor do the results seem to be driven by other ancestry level factors not related to gender equality, such as levels of education or GDP per capita. By connecting data from the experiment to data from Norwegian administrative registers, we can investigate selection effects to a much larger extent than other studies. While the participants in our experiment seem to be positively selected as compared to the respective population in Norway, such selection effects do not seem consequential for our results as there is little differential selection across gender in combination with culture. Our results are also robust when controlling for a host of variables at the individual level including parental education and earnings.

Our results strongly suggest that culture matters for the gender differences in competitive preferences. This is not to say that institutions are not important, they are. We know from previous studies that institutions and policies do matter (Booth et al., 2018; Zhang, 2019), and that rules such as affirmative action and preferential treatment may reduce the differences (Balafoutas and Sutter, 2012; Niederle et al., 2013; Sutter et al., 2016). Our results rather imply that policy changes are likely to have long lasting effects as differences seem to propagate across generations. It is furthermore likely that institutions and culture interact in creating gender differences (Alesina and Giuliano, 2015; Bisin and Verdier, 2017).

We find these differences along cultural lines in Norway, one of the most gender equal countries in the world. Whether the effects of culture are different in other countries is an important and interesting question that we leave for future research. In particular, we urge future research to investigate the effects of culture in other settings using well-powered and pre-registered experiments so that we can build up a credible evidence base on the role of both culture and institutions for gender differences in competitive appetite.

References

Alesina, Alberto and Paola Giuliano, "Culture and institutions," *Journal of Economic Literature*, 2015, *53* (4), 898–944.

Almås, Ingvild, Alexander W Cappelen, Kjell G Salvanes, Erik Ø Sørensen, and Bertil Tungodden, "Willingness to compete: Family matters," *Management Science*, 2015, *62* (8), 2149–2162.

Andersen, Steffen, Seda Ertac, Uri Gneezy, John A List, and Sandra Maximiano, "Gender, competitiveness, and socialization at a young age: Evidence from a matrilineal and a patriarchal society," *Review of Economics and Statistics*, 2013, *95* (4), 1438–1443.

Apicella, Coren L, Elif E Demiral, and Johanna Mollerstrom, "No gender difference in willingness to compete when competing against self," *American Economic Review*, 2017, *107* (5), 136–40.

Athey, Susan and Guido W Imbens, "The Econometrics of Randomized Experiments," in "Handbook of Economic Field Experiments," Vol. 1, Elsevier, 2017, pp. 73–140.

Balafoutas, Loukas and Matthias Sutter, "Affirmative action policies promote women and do not harm efficiency in the laboratory," *Science*, 2012, *335* (6068), 579–582.

Benjamini, Yoav and Yosef Hochberg, "Controlling the False Discovery Rate: A Practical and Powerful Approach to Multiple Testing," *Journal of the Royal Statistical Society. Series B (Methodological)*, 1995, *57* (1), 289–300.

Bisin, Alberto and Thierry Verdier, "The economics of cultural transmission and socialization," in "Handbook of social economics," Vol. 1, Elsevier, 2011, pp. 339–416.

_ **and** _ , "On the joint evolution of culture and institutions," Technical Report, National Bureau of Economic Research 2017.

Blau, Francine D, Lawrence Kahn, Matthew L Comey, Amanda R Eng, Pamela A Meyerhofer, and Alexander Willén, "Culture and Gender Allocation of Tasks: Source Country Characteristics and the Division of Non-market Work among US Immigrants," Technical Report, National Bureau of Economic Research 2020.

Bönte, Werner, Sandro Lombardo, and Diemo Urbig, "Economics meets psychology: experimental and self-reported measures of individual competitiveness," *Personality and Individual Differences*, 2017, *116*, 179–185.

Booth, Alison and Patrick Nolen, "Choosing to compete: How different are girls and boys?," *Journal of Economic Behavior & Organization*, 2012, *81* (2), 542–555.

_ , Elliott Fan, Xin Meng, and Dandan Zhang, "Gender differences in willingness to compete: The role of culture and institutions," *The Economic Journal*, 2018, *129* (618), 734–764.

Boschini, Anne, Anna Dreber, Emma von Essen, Astri Muren, and Eva Ranehill, "Gender, risk preferences and willingness to compete in a random sample of the Swedish population," *Journal of Behavioral and Experimental Economics*, 2019, *83*, 101467.

Buser, Thomas, Muriel Niederle, and Hessel Oosterbeek, "Gender, competitiveness, and career choices," *The Quarterly Journal of Economics*, 2014, *129* (3), 1409–1447.

Cárdenas, Juan-Camilo, Anna Dreber, Emma Von Essen, and Eva Ranehill, "Gender differences in competitiveness and risk taking: Comparing children in Colombia and Sweden," *Journal of Economic Behavior & Organization*, 2012, *83* (1), 11–23.

Coffman, Lucas C and Muriel Niederle, "Pre-analysis plans have limited upside, especially where replications are feasible," *Journal of Economic Perspectives*, 2015, *29* (3), 81–98.

Dahlbom, L, Albin Jakobsson, Niklas Jakobsson, and Andreas Kotsadam, "Gender and overconfidence: are girls really overconfident?," *Applied Economics Letters*, 2011, *18* (4), 325–327.

Dariel, Aurelie, Curtis Kephart, Nikos Nikiforakis, and Christina Zenker, "Emirati women do not shy away from competition: Evidence from a patriarchal society in transition," *Journal of the Economic Science Association*, 2017, *3* (2), 121–136.

Falk, Armin and Johannes Hermle, "Relationship of gender differences in preferences to economic development and gender equality," *Science*, 2018, *362* (6412), eaas9899.

Fernández, Raquel, "Does Culture Matter?," in Jess Benhabib, Matthew O. Jackson, and Alberto Bisin, eds., *Handbook of Social Economics*, North-Holland: Elsevier, 2011, pp. 481–510.

_ **and Alessandra Fogli**, "Culture: An Empirical Investigation of Beliefs," *American Economic Journal: Macroeconomics*, 2009, *1* (1), 146–177.

Finseraas, Henning and Andreas Kotsadam, "Ancestry Culture and Female Employment. An Analysis Using Second Generation Siblings," *European Sociological Review*, 2017, *33* (3), 382–392.

_ , _ , **and Javier Polavieja**, "Ancestry Culture, Assimilation, and Voter Turnout in Two Generations," *Political Behavior*, 2020.

_ , **Åshild A. Johnsen, Andreas Kotsadam, and Gaute Torsvik**, "Exposure to female colleagues breaks the glass ceiling: Evidence from a combined vignette and field experiment," *European Economic Review*, 2016, *90*, 363–374.

Flory, Jeffrey A, Andreas Leibbrandt, and John A List, "Do competitive workplaces deter female workers? A large-scale natural field experiment on job entry decisions," *The Review of Economic Studies*, 2015, *82* (1), 122–155.

Gneezy, Uri, Kenneth L Leonard, and John A List, "Gender differences in competition: Evidence from a matrilineal and a patriarchal society," *Econometrica*, 2009, *77* (5), 1637–1664.

Guiso, Luigi, Ferdinando Monte, Paola Sapienza, and Luigi Zingales, "Culture, gender, and math," *Science*, 2008, *320* (5880), 1164–1165.

_ , **Paola Sapienza, and Luigi Zingales**, "Does Culture Affect Economic Outcomes?," *Journal of Economic Perspectives*, 2006, *20* (2), 23–48.

Heffetz, Ori and Daniel B Reeves, "Difficulty of Reaching Respondents and Nonresponse Bias: Evidence from Large Government Surveys," *Review of Economics and Statistics*, 2019, *101* (1), 176–191.

_ **and Matthew Rabin**, "Conclusions regarding cross-group differences in happiness depend on difficulty of reaching respondents," *American Economic Review*, 2013, *103* (7), 3001–21.

Jr, Roland G Fryer and Steven D Levitt, "An empirical analysis of the gender gap in mathematics," *American Economic Journal: Applied Economics*, 2010, *2* (2), 210–40.

Kaiser, Tim, "Nature and evoked culture: Sex differences in personality are uniquely correlated with ecological stress," *Personality and Individual Differences*, 2019, *148*, 67–72.

Khachatryan, Karen, Anna Dreber, Emma Von Essen, and Eva Ranehill, "Gender and preferences at a young age: Evidence from Armenia," *Journal of Economic Behavior & Organization*, 2015, *118*, 318–332.

Lee, Soohyung, Muriel Niederle, and Namwook Kang, "Do single-sex schools make girls more competitive?," *Economics Letters*, 2014, *124* (3), 474–477.

Lezzi, Emanuela, Piers Fleming, and Daniel John Zizzo, "Does it matter which effort task you use? A comparison of four effort tasks when agents compete for a prize," *A Comparison of Four Effort Tasks When Agents Compete for a Prize (April 15, 2015)*, 2015.

List, John A, Sally Sadoff, and Mathis Wagner, "So you want to run an experiment, now what? Some simple rules of thumb for optimal experimental design," *Experimental Economics*, 2011, *14* (4), 439.

Lowes, Sara, "Matrilineal kinship and gender differences in competition," Technical Report, Working paper, Harvard University. 2018.

_ , Nathan Nunn, James A Robinson, and Jonathan L Weigel, "The evolution of culture and institutions: Evidence from the Kuba kingdom," *Econometrica*, 2017, *85* (4), 1065–1091.

Niederle, M, "Gender," *Handbook of Experimental Economics*, 2015.

Niederle, Muriel and Lise Vesterlund, "Do women shy away from competition? Do men compete too much?," *The Quarterly Journal of Economics*, 2007, *122* (3), 1067–1101.

_ and _ , "Gender and competition," *Annu. Rev. Econ.*, 2011, *3* (1), 601–630.

_ , Carmit Segal, and Lise Vesterlund, "How costly is diversity? Affirmative action in light of gender differences in competitiveness," *Management Science*, 2013, *59* (1), 1–16.

Nollenberger, Natalia, Núria Rodríguez-Planas, and Almudena Sevilla, "The math gender gap: The role of culture," *American Economic Review*, 2016, *106* (5), 257–61.

North, Douglass C and Robert Paul Thomas, *The rise of the western world: A new economic history*, Cambridge University Press, 1973.

Reuben, Ernesto, Paola Sapienza, and Luigi Zingales, "Taste for competition and the gender gap among young business professionals," 2019.

Sutter, Matthias, Daniela Glätzle-Rützler, Loukas Balafoutas, and Simon Czermak, "Cancelling out early age gender differences in competition: an analysis of policy interventions," *Experimental Economics*, 2016, *19* (2), 412–432.

Tungodden, Jonas, "Preferences for Competition: Children Versus Parents," Technical Report 2018.

Zhang, Y Jane, "Culture, institutions and the gender gap in competitive inclination: Evidence from the communist experiment in China," *The Economic Journal*, 2019, *129* (617), 509–552.

Appendix

A.1 Tables and Figures discussed in the paper

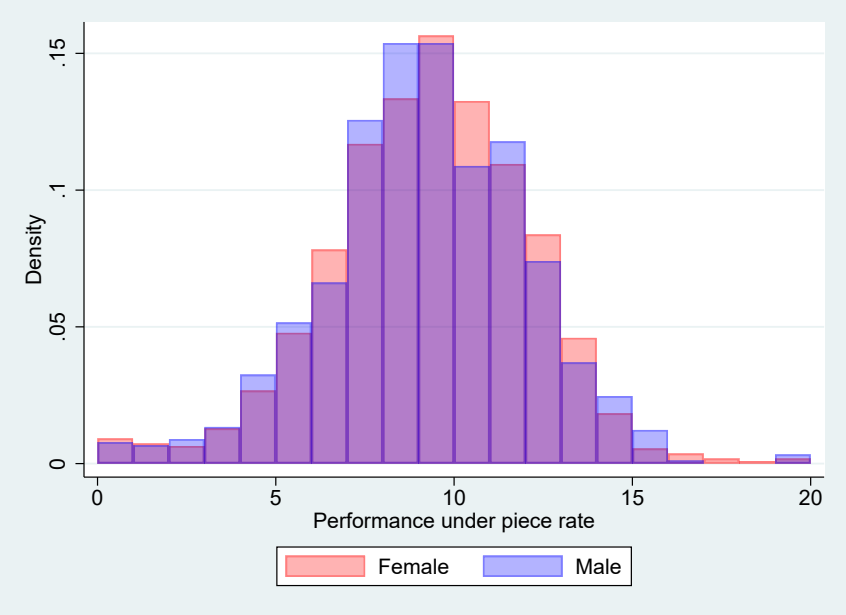

Figure A.1: Distribution of performance

Table A.1: Completed answers.

Background country	**Completed answers**		
	Men	**Women**	**Total**
Afghanistan	4	5	9
Algeria	7	6	13
Argentina	8	4	12
Australia	3	13	16
Austria	5	5	10
Bangladesh	6	4	10
Belgium	8	7	15
Bosnia and Herzegovina	5	13	18
Brazil	7	12	19
Canada	9	9	18
Chile	4	10	14
China	8	5	13
Colombia	6	6	12
Croatia	4	3	7
Denmark	133	130	263
Eritrea	4	7	11
Ethiopia	5	11	16
Faeroe Islands	4	6	10
Finland	9	8	17
France	11	15	26
Gambia, The	2	3	5
Germany	9	9	18
Ghana	2	7	9
HongKong	2	7	9
Hungary	4	5	9
Iceland	8	13	21
India	6	7	13
Iran, Islamic Rep.	26	45	71
Iraq	6	10	16
Ireland	5	10	15
Israel	1	6	7
Italy	10	7	17
Japan	4	4	8
Kenya	4	9	13
Korea, Rep.	9	10	19
Lebanon	1	8	9
Madagascar	3	8	11
Morocco	8	12	20
Netherlands	10	13	23
Pakistan	110	110	220
Peru	4	2	6
Philippines	6	6	12
Poland	13	13	26
Portugal	4	7	11
Romania	11	5	16
Russian Federation	6	15	21
Somalia	24	33	57
South Africa	5	6	11
Spain	5	11	16
Sri Lanka	10	9	19
Sweden	174	213	387
Switzerland	8	13	21
Syrian Arab Republic	4	4	8
Thailand	5	10	15
Turkey	8	6	14
United Kingdom	8	13	21
United States	9	8	17
Vietnam	88	101	189
Yugoslavia	4	10	14
Total	876	1067	1943

Table A.2: Performance under competitive pay (Part 2) and FLFP.

	(1) Performance	(2) Performance	(3) Performance	(4) Performance
Female			0.17	0.15
			(0.12)	(0.12)
Log FLFP	0.23**	0.32***		0.32***
	(0.10)	(0.12)		(0.12)
Female*Log FLFP			-0.062	-0.088
			(0.10)	(0.100)
Mean dep. var. in sample	10.14	9.99	10.07	10.07
No. of observations	1086	891	1977	1977
R-squared	0.01	0.01	0.06	0.01
Sample	Women	Men	All	All
Country FE	No	No	Yes	No
Mean FLFP			57.50	57.50
SD FLFP			24.29	24.29

Notes: Log FLFP is standardized with mean 0 and a standard deviation of 1. Robust SE clustered at the ancestry country level in parentheses.

Table A.3: Performance under piece-rate (Part 1) and FLFP.

	(1) Performance	(2) Performance	(3) Performance	(4) Performance
Female			0.073	0.076
			(0.11)	(0.10)
Log FLFP	0.25***	0.22*		0.22*
	(0.089)	(0.13)		(0.13)
Female*Log FLFP			0.031	0.030
			(0.11)	(0.10)
Mean dep. var. in sample	8.79	8.71	8.76	8.76
No. of observations	1086	891	1977	1977
R-squared	0.01	0.01	0.06	0.01
Sample	Women	Men	All	All
Country FE	No	No	Yes	No
Mean FLFP			57.50	57.50
SD FLFP			24.29	24.29

Notes: Log FLFP is standardized with mean 0 and a standard deviation of 1. Robust SE clustered at the ancestry country level in parentheses.

Table A.4: External relevance of competitiveness in our sample.

(a) Competitiveness and labor market earnings.

	(1) Earnings	(2) Earnings	(3) Earnings	(4) Earnings	(5) Earnings	(6) Earnings	(7) Earnings
Compete	17.3*	25.5	4.11	29.9*	1.87	26.7*	0.30
	(9.85)	(15.8)	(12.7)	(16.9)	(13.4)	(14.4)	(13.5)
Mean dep. var. in sample	200.92	181.26	224.84	187.08	234.39	184.57	232.65
No. of observations	1942	1066	876	982	821	969	815
R-squared	0.47	0.43	0.53	0.43	0.54	0.45	0.53
Sample	All	Women	Men	Women	Men	Women	Men
Controls	No	No	No	p. edu	p. edu	+earnings	+earnings

(b) Competitiveness and years of education.

	(1) Education	(2) Education	(3) Education	(4) Education	(5) Education	(6) Education	(7) Education
Compete	0.18	0.22	0.32*	0.21	0.27	0.21	0.28
	(0.12)	(0.16)	(0.18)	(0.16)	(0.18)	(0.16)	(0.18)
Mean dep. var. in sample	15.34	15.51	15.13	15.58	15.17	15.60	15.16
No. of observations	1890	1040	850	980	818	968	812
R-squared	0.19	0.23	0.17	0.26	0.22	0.27	0.22
Sample	All	Women	Men	Women	Men	Women	Men
Controls	No	No	No	p. edu	p. edu	+earnings	+earnings

(c) Competitiveness and STEM education.

	(1) Stem	(2) Stem	(3) Stem	(4) Stem	(5) Stem	(6) Stem	(7) Stem
Compete	0.065***	0.059**	0.053**	0.052**	0.057**	0.082**	0.082*
	(0.017)	(0.023)	(0.027)	(0.023)	(0.027)	(0.035)	(0.045)
Mean dep. var. in sample	0.14	0.10	0.18	0.10	0.18	0.17	0.33
No. of observations	1890	1040	850	980	818	617	452
R-squared	0.04	0.04	0.06	0.06	0.08	0.06	0.06
Sample	All	Women	Men	Women	Men	Women high edu	Men high edu
Controls	No	No	No	p. stem	p. stem	p. stem	p. stem

Notes: Earnings are measured in 2017 and divided by 1000 for presentational purposes. All regressions control for year of birth fixed effects. Panels A and B have the same control variables. Columns 4 and 5 control for parents' education. Columns 6 and 7 control for parents' education and parents earnings in 2017. In Panel C we instead control for parents having stem education in Columns 4 and 5 and in Columns 6 and 7 we limit the sample to people having higher education. Robust SE in parentheses.

Table A.5: Auxiliary regressions: Controlling for year of birth, adding missing observations, and correlation with gender equality.

	(1) Compete	(2) Compete	(3) Compete	(4) Gender Equality
Female	-0.14***	-0.14***	-0.11***	0.35***
	(0.022)	(0.015)	(0.016)	(0.043)
Log FLFP				0.094***
				(0.029)
Female*Log FLFP		0.045***	0.052***	0.0023
		(0.012)	(0.016)	(0.052)
Mean dep. var. in sample	0.41	0.33	0.33	3.09
No. of observations	1943	1943	1943	1890
R-squared	0.03	0.06	0.14	0.07
Sample	All	All	Including missing	All
Country FE	No	Yes	Yes	No
Year of birth FE	Yes	Yes	No	
Other controls	No	No	Yes	

Notes: Log FLFP is standardized with mean 0 and a standard deviation of 1. Robust SE clustered at the ancestry country level in parentheses. The regressions in Columns 1 and 2 control for year of birth fixed effects. In Column 3 we replace missing observations with zero and add dummy variables for missing observations.

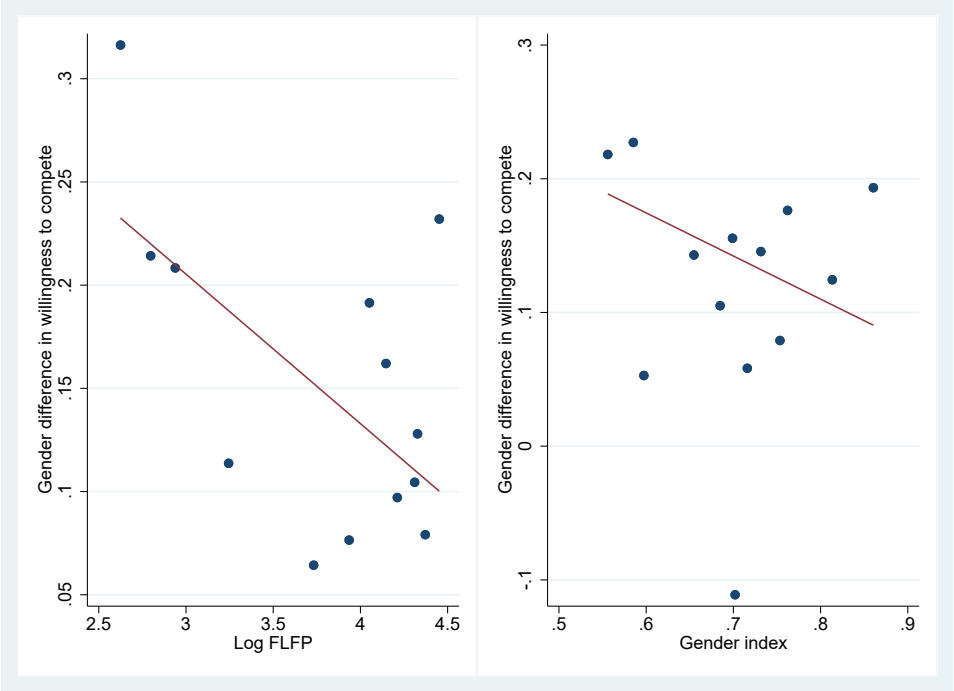

Figure A.2: Country level gender difference in willingness to compete and our two measures of culture: Log FLFP and Gender index.

Table A.6: Competition and FLFP. Sample restricted to countries with at least 5 women and 5 men.

	(1)	(2)	(3)	(4)	(5)
	Compete	Compete	Compete	Compete	Compete
Log FLFP	0.026***	-0.022*		-0.022*	
	(0.0085)	(0.013)		(0.013)	
Female*Log FLFP			0.050***	0.048***	0.056***
			(0.012)	(0.011)	(0.018)
Female			-0.14***	-0.14***	-0.11***
			(0.015)	(0.014)	(0.017)
Performance under piece rate					0.0054
					(0.0052)
Performance under competitive pay					0.0048
					(0.0053)
Believe 2nd					-0.22***
					(0.024)
Believe 3rd					-0.34***
					(0.029)
Believe 4th					-0.33***
					(0.040)
Risk					0.017**
					(0.0066)
Mean dep. var. in sample	0.27	0.41	0.34	0.34	0.34
No. of observations	935	800	1735	1735	1706
R-squared	0.00	0.00	0.05	0.02	0.14
Sample	Women	Men	All	All	All
Country FE	No	No	Yes	No	Yes
Mean FLFP			58.04	58.04	58.25
SD FLFP			24.66	24.66	24.58

Notes: Log FLFP is standardized with mean 0 and a standard deviation of 1. Robust SE clustered at the ancestry country level in parentheses.

Table A.7: Competition and FLFP. Adding controls.

	(1) Compete	(2) Compete	(3) Compete	(4) Compete	(5) Compete
Female*Log FLFP	0.047***	0.047***	0.047***	0.049***	0.052***
	(0.012)	(0.015)	(0.015)	(0.013)	(0.017)
Female	-0.14***	-0.11***	-0.11***	-0.13***	-0.11***
	(0.015)	(0.016)	(0.016)	(0.015)	(0.017)
Performance under piece rate	0.0075		0.0048		0.0054
	(0.0052)		(0.0052)		(0.0054)
Performance under competitive pay	0.017***		0.0069		0.0056
	(0.0055)		(0.0052)		(0.0051)
Believe 2nd		-0.22***	-0.21***		-0.21***
		(0.027)	(0.026)		(0.023)
Believe 3rd		-0.34***	-0.32***		-0.32***
		(0.031)	(0.030)		(0.030)
Believe 4th		-0.34***	-0.31***		-0.31***
		(0.040)	(0.040)		(0.039)
Risk				0.021***	0.015**
				(0.0065)	(0.0063)
Mean dep. var. in sample	0.33	0.33	0.33	0.34	0.34
No. of observations	1943	1942	1942	1906	1905
R-squared	0.08	0.13	0.13	0.07	0.14
Sample	All	All	All	All	All
Country FE	Yes	Yes	Yes	Yes	Yes
Mean FLFP	57.78	57.79	57.79	57.96	57.97
SD FLFP	24.17	24.17	24.17	24.09	24.09

Notes: Log FLFP is standardized with mean 0 and a standard deviation of 1. Robust SE clustered at the ancestry country level in parentheses.

Table A.8: Vignette to test discrimination of female leaders.

	(1) Score	(2) Score	(3) Score	(4) Score
Ida	0.035	0.036	0.049	0.018
	(0.052)	(0.052)	(0.070)	(0.078)
Log FLFP		0.074*	0.067	0.080
		(0.038)	(0.054)	(0.054)
Ida*Log FLFP		-0.034	-0.0066	-0.065
		(0.054)	(0.075)	(0.078)
Mean dep. var. in sample	4.41	4.41	4.48	4.32
No. of observations	1915	1915	1048	867
R-squared	0.00	0.00	0.00	0.00
Sample	All	All	Women	Men

Notes: Log FLFP is standardized with mean 0 and a standard deviation of 1. Robust SE clustered at the ancestry country level in parentheses.

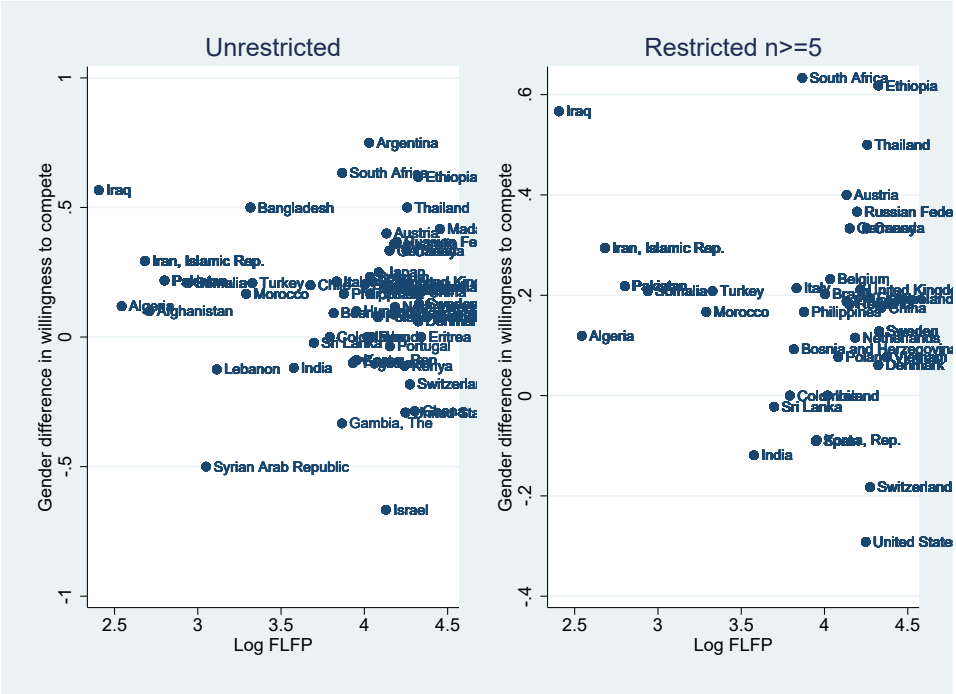

Figure A.3: Gender differences and country names

Table A.9: Standardized variables.

	(1) GE	(2) Proud	(3) Live with p	(4) Control	(5) Obedience	(6) Religion	(7) Work
Gender equality	0.12**						
	(0.051)						
Making parents proud		0.21***					
		(0.028)					
Live with parents			0.28***				
			(0.043)				
Control				0.029			
				(0.034)			
Obedience					0.074***		
					(0.017)		
Religion						0.28***	
						(0.061)	
Hard work							0.038**
							(0.017)
Mean dep. var.	0.00	-0.00	-0.00	0.00	0.00	0.00	0.00
No. of observations	1408	1411	1377	1422	1703	1703	1703
R-squared	0.01	0.05	0.08	0.00	0.01	0.08	0.00

Notes: The outcome variables and independent variables are standardized. DOES NOT INCLUDE YEAR AND GENDER FE. SHOULD IT?

Table A.10: Correlation with female as comparison.

	(1) GE	(2) Proud	(3) Live with p	(4) Control	(5) Obedience	(6) Religion	(7) Work
Female	0.51***	-0.084	-0.0097	0.12*	-0.082	-0.077	-0.18***
	(0.059)	(0.061)	(0.052)	(0.063)	(0.054)	(0.082)	(0.035)
Mean dep. var.	-0.00	-0.00	0.00	-0.00	-0.00	0.00	-0.00
No. of observations	1407	1410	1376	1421	1706	1706	1706
R-squared	0.06	0.00	0.00	0.00	0.00	0.00	0.01

Notes: The outcome variables are standardized. DOES NOT INCLUDE YEAR AND GENDER FE. SHOULD IT? It obviously includes gender here.

Table A.11: Correlation with standardized education as comparison.

	(1) GE	(2) Proud	(3) Live with p	(4) Control	(5) Obedience	(6) Religion	(7) Work
Standardized Education	0.097***	0.027	-0.38***	0.033	-0.11***	0.018	-0.018
	(0.023)	(0.037)	(0.030)	(0.022)	(0.015)	(0.035)	(0.018)
Mean dep. var.	0.01	0.00	0.00	0.01	0.00	-0.01	0.00
No. of observations	1374	1377	1344	1388	1659	1659	1659
R-squared	0.01	0.00	0.15	0.00	0.01	0.00	0.00

Notes: The outcome variables and independent variables are standardized. DOES NOT INCLUDE YEAR AND GENDER FE. SHOULD IT?

Table A.12: Gender equality scale and competitiveness.

	(1) Compete	(2) Compete	(3) Compete	(4) Compete
Female	-0.17***	-0.17***	-0.17***	-0.17***
	(0.025)	(0.026)	(0.020)	(0.020)
Female*Log FLFP			0.046***	0.054***
			(0.017)	(0.016)
Gender equality scale (GE)	0.0079	0.022	0.0070	0.024
	(0.014)	(0.016)	(0.014)	(0.017)
Female*GE		-0.032*		-0.035*
		(0.018)		(0.019)
GE*Log FLFP				-0.0080
				(0.012)
Female*GE*Log FLFP				0.028
				(0.020)
Mean dep. var.	0.43	0.43	0.43	0.43
No. of observations	1407	1407	1407	1407
R-squared	0.06	0.06	0.07	0.07

Notes: Log FLFP is standardized with mean 0 and a standard deviation of 1. Robust SE clustered at the ancestry country level in parentheses.

Table A.13: Adding control variables from administrative registers.

	(1) Compete	(2) Compete
Female	-0.14***	-0.12***
	(0.017)	(0.020)
Education	0.027***	0.023
	(0.010)	(0.018)
Female*Log FLFP	0.035*	0.049***
	(0.018)	(0.014)
Mother education	0.0011	0.0050
	(0.011)	(0.025)
Father education	-0.0042	0.013
	(0.012)	(0.018)
Earnings	0.025	-0.00042
	(0.018)	(0.028)
Mother earnings	0.018	0.026
	(0.019)	(0.034)
Father earnings	0.0096	-0.0091
	(0.013)	(0.022)
Married	0.012	0.12
	(0.065)	(0.084)
Divorced	-0.19***	-0.26*
	(0.053)	(0.15)
Widow	0	0
	(.)	(.)
Single	0	0
	(.)	(.)
Number of siblings	0.0061	-0.011
	(0.016)	(0.017)
Household size	0.0024	-0.018
	(0.011)	(0.021)
Birthyear	0.0029	0.012
	(0.019)	(0.026)
Female*Married		-0.20***
		(0.070)
Female*Divorced		0.076
		(0.23)
Female*Widow		0
		(.)
Female*Single		0
		(.)
Female*Education		0.0023
		(0.025)
Female*Mother education		-0.011
		(0.034)
Female*Father education		-0.030
		(0.027)
Female*Earnings		0.043
		(0.027)
Female*Mother earnings		-0.016
		(0.036)
Female*Father earnings		0.042
		(0.027)
Female*Number of siblings		0.033
		(0.022)
Female*Household size		0.035
		(0.025)
Female*Birthyear		-0.022
		(0.029)
No. of observations	1778	1778
R-squared	0.07	0.08

Notes: All continuous control variables are standardized to have mean zero and a standard deviation of 1.

A.2 Other measures of competitiveness

Table A.14 shows gender differences in competitive appetite using alternative measures of competitiveness. Column 1 shows the results for "Personal development motives" (PDM), which is a four item scale from Bönte et al. (2017). The items are: "I can improve my competence by competing", "Competition allows me to judge my level of competence", "I use competition as a way to prove something to myself" and "Competition allows me to measure my own success". Answers are given on a scale from 1 (completely disagree) to 7 (completely agree). We use the mean of these four questions, Cronbach's $\alpha = 0.845$. As illustrated in Column 1, the PDM reveals a gender difference as well. Column 2 controls for our main measure of willingness to compete and though the two concepts are correlated, the gender difference in our behavioral measure remains. Column 3 shows that *Compete* is also correlated with a gender difference measured using a self-reported competitiveness scale. This measure includes four questions with answers given on a scale from 1 (completely disagree) to 7 (completely agree): "I like situations where I compete against others", "I enjoy competing against others", "I find competitive situations unpleasant", and "When I try to reach a goal I prefer to compete against others instead of trying to reach the goal on my own". We reverse code the answers to the question "I find competitive situations unpleasant" and we create a mean score of the four questions, Cronbach's $\alpha = 0.838$. Column 4 shows that also this index measures something beyond the behavioral measure of willingness to compete.

Table A.14: Gender differences in other measures of competition.

	(1) PDM	(2) PDM	(3) Competition index	(4) Competition index
Female	-0.66***	-0.61***	-0.79***	-0.73***
	(0.068)	(0.069)	(0.063)	(0.063)
Compete		0.34***		0.42***
		(0.072)		(0.067)
Mean dep. var. for men	4.62	4.62	5.14	4.73
No. of observations	1909	1905	1910	1906
R-squared	0.05	0.06	0.08	0.09

Notes: Robust SE in parentheses.

A.3 The complete questionnaire, translated from Norwegian

**=new page

** Welcome to this study within social science! This study consists of 4 parts, and in the 3 first parts you will do a task on time (90 sec) that consists of counting the numb of ones and zeros in tables. The last part is several questions about you and your opinions. You will be paid kr 50-400 for participating. Try to complete the entire survey without being disturbed, it will take approx. 20 minutes. Before we start with the survey itself, we will inform you about how we take care of your privacy. ** Information about your privacy:

- This is a research study conducted by The Ragnar Frisch Centre for Economic Research, and financed by the Norwegian Research Council. Contact director Sverre Kittelsen (sverre.kittelsen@frisch.uio.no, phone 91843889) if you have questions or comments.
- The Data Protection Officer at the Frisch Centre, Erik Hernæs (erik.hernas@frisch.uio.no, phone 91132437) has evaluated the project.
- The purpose of collecting information about you is to use it in a research project. The information we collect, will only be used for research purposes. We can only collect information about you to this study if you consent to it.

- The basis of the lawfulness is this project is Personopplysningsloven §8 Artikkel 6 1.e) og 6.3.b) i Personvernforordningen og Personopplysningsloven §8 jfr. Artikkel 6.1.a) i Personvernforordningen.
- We will not give the personal data that we collect to anyone else. It is voluntary to participate in this study, and you can withdraw from the study as long as the study is ongoing without stating a reason.
- To invite you to participate in this study, we have used your phone number. To be able to pay you for participating, we will ask you to provide us your name, address, and bank account. When the survey is answered, and you have received your payment, all this information will be deleted. You will also get the possibility of donating your payment to charity if you prefer not to provide us with this information.
- To make the survey as short as possible, we would like to use information about you that already exists in public registers at Statistics Norway. To be able to collect this information about you from Statistics Norway, we need your personal identification number. If you consent to it, we will be able to collect the following information about you from Statistics Norway: gender, age, municipality of residence, country of birth, municipality of birth, country background, citizenship, pensionable income , trygder , family conditions (number of siblings, parity, gender of siblings, number of children, gender of children, number of people in household, marital status, family type) and highest completed education, and parents' country of birth, pensionable income and highest completed education. When Statistics Norway has linked this information together, your personal identification number will be deleted. The dataset we receive from Statistics Norway will not include your personal identification number.
- All personal data will be deleted, at the latest at the project completion 31.12.2024.

- You have the right to ask for access to, correction of or deletion of personal data that we have collected about you.
- You have the right to complaint to the Norwegian Data Protection Agency in case you think your personal data is not treated in accordance with GDPR.
- You can disregard answering single questions.
- We will send out maximum one reminder.

** Declaration of Consent

I consent to

- participating in this questionnaire.
- that the specified information about me can be collected from Statistics Norway.
- that the collected information can be used in this research project.
- that I can withdraw from this study as long as it is ongoing.

I consent (1) I do not want to participate in this study (2)

** Instructions Thanks for participating in this study! This study consists of 4 parts, and you will be paid for one of the four parts. In addition, all will regardless get kr 50 as thanks for participating. The rules for payment are different in the 4 parts, and we will explain you the rules before each part starts. When you have completed all 4 parts, the computer will randomly select which part you will be paid for. **

Rules for Part 1 – the piece-rate part In Part 1 we will ask you solve a series of problems by counting the number of ones (1) in tables consisting of zeros (0) and ones (1) as in the table below. You will be given 90 seconds to count 1's in as many tables as possible. After the 90 seconds are up you will automatically continue to the next page.

In Part 1, you get kr 5 per table you solve correctly in the 90 seconds. Your payment does not decrease if you provide an incorrect answer to a table. Now click the arrow to get started with Part 1.

** Part 1 – the piece-rate part Please count the number of 1s in each table below and provide the answer. How many 1s are there?

** Rules for Part 2 – The Tournament part

In Part 2 you will be given 90 seconds to count the ones in a series of tables with zeros (0) and ones (1). In Part 2 your payment depends on how many tables you provide correct answers for relative to that of three other persons participating in this study. You will not receive any information about the three others, and they will not receive any information about you. If you solve most correct answers, you will be paid kr 20 for each correct answer. If you are not best, your payment from Part 2 will be kr 0.

Now click to on the arrow to get started with Part 2.

**

Part 2 – Tournament part.

This is Part 2.

Please count the number of 1s in each table below and provide the answer. How many 1s are there?

** Providing a correct answer to the question below will be rewarded with a payment of kr 5 in addition to what you already have earned in Part 2. How do you think you did in Part 2?

- I won (1)
- I came second (2)

- I came third (3)
- I came last (4)

** Rules for Part 3: Chosen payment

In Part 3 you also will be given 90 seconds to count ones in a series of tables with zeros (0) and ones (1). But in Part 3 you can choose which form of payment from the two forms of payment from Part 1 and Part 2 you want to apply for you in Part 3. Piece-rate: You will be paid kr 5 for each correct answer you provide Tournament: If you solve more tables than the others in your group did in Part 2, you will be paid kr 20 for each correct answer you have given. If you are not best, your payment from Part 3 will be kr 0. How do you want to be paid for Part 3?

- Piece-rate (kr 5 per correct answer) (1)
- Tournament (kr 20 per correct answer if you win, otherwise kr 0) (2)

** Part 3 This is Part 3. Please count the number of 1s in each table below and provide the answer. How many 1s are there?

** How many problems do you think you solved correctly in Part 1 (the piece-rate part)? ** What do you think is the average number of correct problems solved in Part 1 among those participating in this survey?

** Now you will get to know how many correct answers you managed in Part 1, 2 and 3:

Correct answers in Part 1: Correct answers in Part 2: Correct answers in Part 3:

** To what extent do you think your result in Part 1 is due to controllable (i.e., effort) versus uncontrollable (i.e., chance and difficulty) factors? Please answer on a scale from 1 to 10 where 1= due to factors that I have no control over, and 10=due to factors that I could control.

- Part 1 – Piece-rate (1)
- Part 2 - Tournament (2)
- Part 3 – Chosen payment (3)

** Part 4 I this part, we ask you to answer several questions. If this payment is selected to be the task you will be paid for, you will be paid an amount between kr 25 and kr 50 for answering these questions. ** Now we want you to take the perspective of an employee in a Norwegian bank and consider an applicant for a vacant position as the department manager in your department. You will be shown a job advertisement and a description of an applicant which you shall evaluate.

** DEPARTMENT MANAGER The department is going to appoint a new department manager. The department manager is the link between the bank's management and the employees. For some, this position will be demanding(, and its suits a person who likes to compete). The position requires high skills. As department manager, one is responsible not just for oneself, but also for the other employees in the department. A potential candidate - Ida Hansen/Martin Hansen Ida Hansen/Martin Hansen is educated within the field of economics and administration and was among the top 20% best in her (study) cohort. Has been the leader of a youth organization(, and likes to compete). Comes from a middle-sized city in the eastern part of Norway, and has a sister, dad is an engineer, and mother is a teacher. Ida/Martin's motivation for applying the position is that working within the banking sector is both meaningful and important. Ida Hansen/ Martin Hansen would very much like to become a squad leader. Indicate how well suited you think she/ he is for the job: (1=very badly, 6=very well)

Indicate how well suited you think others think she/ he is for the job: (1=very badly, 6=very well) ** Here is a list of qualities that children can be encouraged to learn at home.

Which, if any, do you consider to be especially important? Please choose up to five! Independence Feeling of responsibility Imagination Tolerance and respect for other people Thrift, saving money and things Determination, perseverance Religious faith Unselfishness Obedience Politeness Gender equality Competitiveness Hard work

** Here is a list of qualities that children can be encouraged to learn at home. Which, if any, did you parents emphasize in your childhood? Please choose up to five!

Independence Feeling of responsibility Imagination Tolerance and respect for other people Thrift, saving money and things Determination, perseverance Religious faith Unselfishness Obedience Politeness Gender equality Competitiveness Hard work

** Below follows some claims. For each claim, please mark on the scale what fits for you from 1 (does not apply at all) to 7 (fully applies).

I enjoy competing against others I find competitive situations unpleasant I like situations where I compete against others When I try to reach a goal, I prefer to compete against others instead of trying to reach the goal on my own I can improve my competence by competing Competition allows me to judge my level of competence I use competition as a way to prove something to myself Competition allows me to measure my own success

** Have you been a leader in an organization (for instance in a job, recreational activity, sports, culture or politics)?

- Yes (1)
- No (2)

**

What language do you normally speak at home?

- Only Norwegian (1)

- Norwegian and other language (3)
- Other language (2)

Do you live with your parents?

- Yes (1)
- No (2)

Which language do you normally speak with your parents?

- Only Norwegian (1)
- Norwegian and other language (3)
- Other language (2)

Did you vote at the last parliamentary election?

- Yes (1)
- No (2)

** Some people feel they have completely free choice and control over their lives, while other people feel that what they do has no real effect on what happens to them. Please use this scale where 1 means "no choice at all" and 10 means "a great deal of choice" to indicate how much freedom of choice and control you feel you have over the way your life turns out.

**

How do you see yourself: Are you a person who is generally willing to take risks, or do you try to avoid taking risks? "Not willing to take risk at all" (1), "very willing to take risk" (10).

**

Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people? Most people can be trusted (1), Need to be very careful (2)

**

Imagine the following situation: Du unexpectedly receive 10 000 kroner.

How much of this would you give to a charity? (values between 0 and 10 000 kroner is allowed)

**

If Part 4 is the randomly selected part that you will be paid for, you will receive kr 25 for having answered the questions in Part 4.

Do you want to negotiation for a higher pay? If yes, press "I want to negotiate"

** How much do want to be paid for Part 4?

**

Ok, you get kr for Part 4.

**

What do you think of the performance of others who participate?

What do you believe is the average number of correct answers provided by women participating in this survey (including yourself if you are a woman) in Part 1?

What do you believe is the average number of correct answers provided by men participating in this survey (including yourself if you are a man) in Part 1?

**

For each of the following statements below, please indicate how strongly you agree or disagree with each. Do you strongly disagree (1), disagree (2), agree (3), strongly agree (4) or don't know (5)?

Being a housewife is just as fulfilling as working for pay On the whole, men make better political leaders than women do. A university education is more important for a boy than for a girl. On the whole, men make better business executives than women do. One of my main goals in life has been to make my parents proud

**

You have now almost completed the survey. The only thing remaining, is that you will get to know which part the computer has randomly selected for your payment.

You will be paid for Part _. Your payment for participating in this study will be kr 50 plus what you earned in Part _. In Part _ you earned kr _. In total you earned _kr.

**

In order to pay you for participating in the study, we need your name, address and bank account. This will be given to the accounting department, but they will not see any of your answers. All your personal data will be stored on a secure server which only researcher working on this project have access to. When payment is completed, we will delete name, address and bank account numbers. Payments will be paid out when we are finished data collection, in about 3 weeks time.

Payment. How do you want your payment?

- I wish to be paid for participating (1)
- I wish to donate my payment to a charity (2)

**

If you do not want to report your name, address and bank account number (or feel generous), you can choose to donate your payment to a charity. You can choose between the Red Cross, Doctors without borders or Unicef.

Thanks for participating!

**

Please provide your payment information here:

Name Adress Postal code City Bank account (11 digits). Please make sure you bank account is correct, otherwise we are not able to pay you.

Thanks for participating!

**

Do you have any comments to the survey?

**