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Buser, Thomas; Ranehill, Eva; van Veldhuizen, Roel

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Gender differences in willingness to compete: The role of public observability

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Thomas Buser
Eva Ranehill
Roel van Veldhuizen

Gender Differences in Willingness to Compete: The Role of Public Observability

Discussion Paper

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Wissenschaftszentrum Berlin für Sozialforschung gGmbH
Reichpietschufer 50
10785 Berlin
Germany
www.wzb.eu

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Thomas Buser, Eva Ranehill, Roel van Veldhuizen
Gender Differences in Willingness to Compete: The Role of Public Observability

Affiliation of the authors:

Thomas Buser
University of Amsterdam and Tinbergen Institute

Eva Ranehill
University of Zürich

Roel van Veldhuizen
WZB Berlin Social Science Center

Wissenschaftszentrum Berlin für Sozialforschung gGmbH
Reichpietschufer 50
10785 Berlin
Germany
www.wzb.eu

Abstract

Gender Differences in Willingness to Compete: The Role of Public Observability

by Thomas Buser, Eva Ranehill and Roel van Veldhuizen*

A recent literature emphasizes the importance of the gender gap in willingness to compete as a partial explanation for gender differences in labor market outcomes. However, whereas experiments investigating willingness to compete typically do so in anonymous environments, real world competitions often have a more public nature, which introduces potential social image concerns. If such image concerns are important, we should expect public observability to further exacerbate the gender gap. We test this prediction using a laboratory experiment that varies whether the decision to compete, and its outcome, is publicly observable. Across four different treatments, however, all treatment effects are close to zero. We conclude that the public observability of decisions and outcomes does not exert a significant impact on male or female willingness to compete, indicating that the role of social image concerns related to competitive decisions may be limited.

Keywords: gender differences; competitiveness; social image; experiment

JEL classification: C91, D03, J16

* E-mail: . t.buser@uva.nl, eva.ranehill@econ.uzh.ch, roel.vanveldhuizen@wzb.eu.
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1. Introduction

Gender differences in labor market outcomes remain a primary policy concern. Women have lower labor market participation, are underrepresented in positions of power, and earn lower wages even when occupying similar positions as men. Economists have proposed a number of reasons that may explain these differences, including discrimination, family constraints, and preferences for certain occupations (see Goldin, 2014, for an overview).

More recently, a large literature in experimental economics documents that men are more willing to seek out competitive environments than women (see e.g. Niederle, 2016, for an overview of this literature). This gender difference in willingness to compete may explain why women are less likely to be found in top positions since obtaining highly remunerated and prestigious jobs often requires competing for them. Applying for promotions or new positions, and bargaining for higher wages, can similarly be thought of as competitive activities.[1]

Most studies in this area rely on laboratory experiments that build on a paradigm introduced by Niederle and Vesterlund (2007). In these experiments, participants perform a real-effort task and choose between individual piece-rate compensation and a winner-take-all tournament. These studies typically find that, conditional on performance, men are substantially more likely to choose the tournament, particularly in male-stereotyped tasks such as solving math problems.[2] More recently, several studies have shown that experimental measures of willingness to compete predict the selection of more challenging educational trajectories (Buser, Niederle, and Oosterbeek 2014; Zhang 2013; Buser, Peter and Wolter 2017) and correlate with labor market outcomes (Reuben, Wiswall, and Zafar 2015; Reuben, Sapienza, and Zingales 2015; Buser, Geijtenbeek and Plug 2016).

These studies share the feature that the decision of whether or not to compete is typically made in an anonymous environment, where only the experimenter directly observes a participant's choices. In relevant career settings, however, the choice of whether or not to enter a competition—such as, for example, taking a competitive exam or participating in a promotion contest at work—is usually observable to others.

This is important, because public observability may increase the role of social image concerns, and particularly concerns about gender-related norms about the appropriateness of competitive behavior (Eagly 1987). For example, women may shy away from *public* displays of competitive behavior if social norms prescribe that an aggressive or competitive attitude is inappropriate for women, or if such displays are at odds with gender stereotypes and self-perceived

[1] Consequently, the gender difference in willingness to compete has received considerable attention in recent years, both in scientific journals and in mainstream media. Recent academic publications include Villeval (2012), Balafoutas and Sutter (2012), Buser, Niederle and Oosterbeek (2014) and Flory, Leibbrandt and List (2015), among many others. Recent mainstream media examples include the Washington Post (Guo, 2015), Metro UK (Waugh, 2015) and the Chicago Tribune (Elejalda-Ruiz, 2016).

[2] The gender difference can be reduced by gender quotas and other affirmative action policies (e.g., Balafoutas and Sutter, 2012; Niederle, Segal and Vesterlund, 2013).

gender identity (Akerlof and Kranton 2000; Rudman and Glick 1999; Rudman and Glick 2001; Bénabou and Tirole, 2006). Men, on the other hand, may be encouraged to engage in competitive behaviors when the decision is publicly observable since gender stereotypes prescribe a more agentic and competitive behavior on behalf of men (Phelan and Rudman 2010).[3]

This line of reasoning is supported by a growing body of literature that provides evidence that the gender gap in willingness to engage in competitive behaviors depends on social and contextual factors related to gender stereotypes. Notably, the large majority of studies documenting the gender gap in willingness to compete explore behavior in stereotypically male real-effort tasks. Studies using more gender-neutral tasks sometimes find substantially smaller, and insignificant gender gaps (e.g. Dreber et al. 2014, Shurchkov 2012, and Grosse et al. 2014; but see also Wozniak et al. 2014 for a different result).

Focusing individuals' attention on gender identity has also been shown to impact competitive and risky behavior. Cadsby et al. (2013) explore the gender gap in willingness to compete among MBA students who are either primed with their gender and family identity, or with their professional identity, and find that women primed with their professional identity are significantly more willing to compete than their female peers primed with a gender and family identity. Similarly, several studies document smaller or even reverse gender gaps in competitiveness in matriarchal societies, where it is common for women to occupy prestigious positions (Gneezy, Leonard and List 2009, Andersen et al. 2013).

All of this suggests that concerns for social image and compliance with gender-role expectations may play a significant role in driving the gender gap in willingness to compete. Empirical evidence suggests that public observability may increase the importance of such concerns in related settings. For example, in a recent study Bursztyn et al. (2017) find that single female MBAs express significantly lower professional ambition and leadership tendencies when they expect their answers to be available to their peers than when they answered the same questions privately. A number of studies also indicate that women who display gender incongruent behavior suffer backlash, and adapt their behavior accordingly. For example, Bowles, Babcock and Lai (2007) show that women are more penalized than men for initiating negotiations. Women take this into account and are less likely than men to initiate negotiations on behalf of themselves, but not on behalf of others (Amanatullah and Morris 2010, Amanatullah and Tinsley 2013).[4]

[3] While we here emphasize the impact of observability on women's competitive choices, there is also evidence that men displaying counter stereotypical behavior experience backlash (See Phelan and Rudman 2010 for an overview of this literature).

[4] Even the expressions of attitudes and beliefs that depart from gender-role expectations may come with a social image cost. Consistent with a penalty for gender incongruent behavior, Heatherington et al. (1993), and Ludwig et al. (2016) find that women are more modest than men when having to state their own abilities in public, but not in private. Research also demonstrates that a large gap in social confidence emerges during adolescence. Alan et al. (2016) find that female students are less willing to perform a more difficult, higher reward version of a numeric real effort task when they have to perform the task in public in front of the class compared to when their decision and performance are private.

If social image concerns are important, and public observability increases their effect, we would expect the gender gap in willingness to compete to further increase when decisions are publicly observable. Moreover, public observability of the competition *outcome* may also matter for social image. While engaging in competitions may correspond to existing male gender norms and therefore enhance male social image, a publicly observable loss may undermine it. Hence publicly announcing the outcome of a competition could potentially attenuate men's excessive willingness to compete. Since in professional settings, the outcome of a competition is often observable to others, it is important to investigate the effect of public observability of outcomes on the gender gap in willingness to compete.

We test these hypotheses using a choice that closely approximates the choice introduced by Niederle and Vesterlund (2007), but vary the degree to which an individual's competitive choices and outcomes are publicly observable. The approach to vary the degree of public observability in an experimental setting has previously been used successfully to generate image concerns (Ewers and Zimmermann 2015). Based on the evidence cited above, we expect the gender gap in willingness to compete to be further exacerbated when choices are publicly observable in comparison to when they are anonymous, but attenuated when outcomes are also made public.

In our experiment, all participants perform an arithmetic task three times. As in the Niederle and Vesterlund (2007) design, participants first perform the task under an individual piece rate compensation scheme. This round serves as a baseline measure of participants' ability. In the second round, all participants perform under a competitive compensation scheme. They are randomly matched with another participant, and gain twice their piece rate payment if they perform better than their opponent and nothing otherwise. This round serves as a measure of the participants' ability to solve exercises under competition. In the third and final round, participants choose whether to solve exercises according to the incentives in round 1 or round 2, and this binary choice serves as our measure of a participant's willingness to compete.

We implemented four different conditions that varied the degree of public observability. In the *Public Choice* condition, before the start of round 3, but after making their binding choice of whether to compete, participants had to stand up, introduce themselves and publicly announce their decision. In the *Control* condition, participants stood up and introduced themselves, but their decision remained private. Comparing these conditions allows us to investigate whether making the choice to compete publicly observable increases the gender gap in willingness to compete. In the *Public Outcome* condition, those participants who opted for competition had to publicly announce not only their choice but also the outcome of the competition at the end of the third round. This allows us to test whether making the outcome of a competition observable to others attenuates the gender gap in willingness to compete. Finally, to facilitate comparison with previous research, we implemented a *Private* condition, which omits the public introduction that is part of all other conditions and is therefore closest to the standard design by Niederle and Vesterlund (2007).

To preview our results, we find no significant effect of publicity on the gender gap in willingness to compete, or on the choices made by each gender separately. The effects go in the expected directions: women are slightly less and men are slightly more likely to choose competition when choices are publicly observable. These effects are attenuated when outcomes are also publicly observable. However, the observed effects are small in magnitude and far from statistically significant.

In a similar vein as in Bowles, Babcock and Lai (2007), we also use a vignette experiment to elicit participants' attitudes towards competitive men and women, and find no evidence that competitive women are rated less favorably than competitive men. Both competitive men and competitive women are rated less favorably than their non-competitive counterparts.

An increasing number of scientific studies find that willingness to compete matters for real life outcomes related to educational choices and labor market outcomes. At the same time a large share of existing studies on the gender gap in competitiveness explore this gap in a specific setting, similar to the one introduced by Niederle and Vesterlund (2007). It is important for both researchers, organizations, and policy makers to understand how different aspects of the decision making context may reinforce, or mitigate, the gender gap in willingness to compete. Our results matter, for example, when deciding on the transparency of the institutions used to elect leaders, or promote managers.[5] From the perspective of the academic literature on the willingness to compete, our results also suggest that the standard design in the literature is robust to changing the level of public observability.

The rest of this paper is organized as follows. Section 2 describes the experimental design, Section 3 presents the results, and Section 4 concludes.

2. Experimental Design

Our experiment was run at the experimental economics laboratory of the Technical University Berlin in June and July 2016. For each session, we invited 28 participants (14 men and 14 women), at most 24 of whom could participate. We ran 17 sessions with 24 participants and three sessions with 20, 21 and 22 participants respectively for a total of 471 participants. Participants' average age was 24. 32 percent majored in engineering, 16 percent double-majored in economics and engineering, 12 percent majored in economics, 12 percent in science or math, 11 percent in humanities or social sciences and 17 percent in something else. The experiment was programmed in Ztree (Fischbacher, 2007) and participants were recruited using ORSEE (Greiner, 2015). Average earnings were 19.70 Euros (including a 5 Euro show-up fee). Table 1 presents the number of male and female participants in our experiment by condition.

[5] The transparency of the employment process in the public sector is often discussed, and many countries, such as, for example, Norway, have increased the transparency of public sector hiring through making applicant lists publicly available (see e.g., https://uio.easycruit.com/career-center/login/register?iso=gb#).

Table 1: Participants per condition

Condition	Control	Public Choice	Public Outcome	Private	Total
Male	56	60	56	59	231
Female	64	60	59	57	240
Total	120	120	115	116	471

Participants were randomly assigned to a computer upon entering the laboratory. Each participant received their show-up fee, and was told the experiment consisted of three separate parts, each of which would contribute to the final payment. Instructions for the respective parts were only provided after the previous part had finished. All payments in the experiment were displayed in experimental currency units (ECUs), which were converted to Euros at a rate of 10 ECUs per Euro. All instructions can be found in the online appendix.

Part 1: Elicitation of risk preferences

In part one, we elicited participants' risk preferences using the investment game (Gneezy and Potters, 1997; Charness and Gneezy, 2012). Participants were given an endowment of 20 ECUs and were asked which fraction of their endowment they wished to allocate to a safe option and to a risky investment. The safe option simply stored the endowment until the end of the experiment, whereas the investment returned 2.5 times the invested amount with 50% probability, and zero otherwise. Hence the investment had a greater expected value, but was also riskier.

This task has been used by a large number of studies to measure individual risk preferences. The more risk averse the participant, the less she should invest. We elicited risk preferences at the beginning of the experiment in order to prevent the outcomes of the other parts of the experiment from influencing participants' investment decisions. Participants were not told about the outcome of the investment until the end of the study.

Part 2: Elicitation of willingness to compete

Part two closely followed the design of Niederle and Vesterlund (2007) and consisted of three rounds. In each round, participants had four minutes to work on a task. The task involved solving as many addition problems consisting of five two-digit numbers as possible within the time limit of 4 minutes.

Performance was incentivized differently in the three rounds. In round one, participants were paid a piece rate, collecting 5 ECUs for each exercise they solved correctly. In round two, participants were paid according to a two-person winner-takes-all tournament. Each participant was compared with a random other participant from the same session. If her performance beat the score of her opponent, she received 10 ECUs per exercise she solved correctly. If her performance was worse, she did not receive any payment. In case of a tie, the computer randomly determined which of the two

contestants won the tournament. In round three, participants could choose which of these two incentive schemes to apply to their performance. If a participant chose to compete, her performance was compared with the round three performance of a randomly chosen other participant, independently of whether this other participant had chosen to compete or not. At the end of the experiment, one out of the three rounds was randomly selected for payment. No feedback on relative performance was provided except at the end of round three, when all participants who chose to compete learned whether they won or lost.[6]

We ran four different conditions which differed only in the way we implemented the competition choice in round three. In the *Public Choice* condition, participants were asked to publicly announce their chosen incentive to all other participants in the session. Specifically, at the onset of the third round, participants were informed that they would each make their choice of payoff scheme on their screen and then walk up to the front of the lab. There they would say their first name and announce their choice in front of all participants present. Participants were instructed to say "Hi, my name is <name> and I chose to compete" or "Hi, my name is <name> and I chose the piece rate", depending on their decision, and nothing else.[7] The order in which participants came to the front was determined randomly. The first participant only made his announcement once everybody had registered their choice in the computer. After all participants had introduced themselves and announced their decisions, they were asked to sit down again and the third round proceeded based on their choices.

In the *Control* condition, participants went through the same steps as in the Public Competition condition, but without announcing their competitive decision. Specifically, after making their choice of incentive scheme, they were asked to come to the front of the lab and say "Hi, my name is <name>", and nothing else. This allows us to separate the effect of publicly announcing the choice from the effect of having to go to the front of the lab to introduce oneself.

The third condition, *Public Outcome*, was identical to Public Choice, except that we asked participants to stand up a second time after they finished working on the exercises. This time, we asked them to come forward one by one and say "I chose the piece rate" or "I chose to compete and I won/lost the competition", depending on what they chose and the outcome of the competition. As in the previously described conditions, participants were informed about these steps before making the choice of incentive.

Finally, to better compare our results to the existing literature, we also ran a fourth condition (*Private*), in which choices and outcomes were private and participants did not have to get up to announce their name in public. This allows us to determine whether any form of public statement

[6] Participants were informed prior to their decision that they would receive immediate feedback at the end of round three in case they chose the competition.
[7] The experimenter double-checked that all participants reported their true choice. Only one participant misreported his choice across all relevant conditions.

changes people's willingness to compete. The first three conditions were randomly allocated over the first 15 sessions. We added the Private condition after we observed the results of the first three conditions, and conducted it three weeks after the initial sessions.

Past studies have found that beliefs about relative performance (confidence) are an important determinant of individual and gender differences in willingness to compete (Niederle and Vesterlund 2011; Gillen, Snowberg and Yariv 2016; Van Veldhuizen 2016). To measure their confidence, we asked participants at the very end of Part 2, after the third round of the task, to guess their rank among all participants in their session in Round 2 (the forced tournament). Participants received a bonus of 10 ECUs (1 Euro) at the end of the experiment if their guessed rank was correct.[8] Payoff maximization therefore requires reporting the modal expected rank; the same approach has been used by Niederle and Vesterlund (2007) and others.

Part 3: Vignettes

In accordance with the idea that gender stereotypes and social norms may impact the competitive behavior of men and women, we elicited participants' attitudes towards competitive women and men. This was implemented to get a glimpse at possible mechanisms, should we observe a change in behavior across conditions. Based on the approach in Bowles, Babcock and Lai (2007), participants were given the CV and some interview notes for a hypothetical candidate for an internship position at a Berlin-based bank. We experimentally varied the gender of the candidate and whether he/she was described as competitive, and then asked participants to rate the candidate on a number of general personality traits.[9] Participants then had to judge, on a seven-point scale, whether the applicant had the skills for the job, whether hiring the applicant would be beneficial for the company, whether working with the applicant would be enjoyable, and how likely they would be to hire the candidate. In addition, we also asked participants to guess how the candidate was assessed on the same four dimensions by other participants in the session. These guesses were incentivized using the method for eliciting social norms of Krupka and Weber (2013).

If gender stereotypes are important, we would expect participants to rate competitive men more favorably and competitive women less favorably than their non-competitive counterparts. Full instructions are presented in the online appendix. Participants were randomly allocated to one of the four information conditions within each session.

After everyone had finished part three, we gave participants a brief questionnaire asking them about their gender, field of study, and age. They then received feedback on their income from the

[8] In case of ties, tied participants were randomly assigned a rank from the set of appropriate ranks. For example, two participants tied for the 11th and 12th rank in the session would be assigned each of the two ranks with a probability of 0.5.

[9] We manipulated the candidate's competitiveness by adding the following sentence to her interview notes: "(S)he also said that (s)he found competitive environments stimulating, and asked if the bank provides a ranking of the interns hired for the year's summer internship program, after the program is completed."

three parts of the experiment. Participants were then asked to collect their payment and leave the laboratory.

3. Results

We begin by presenting descriptive statistics of behavior in the risk and competition parts of the experiment, pooled across all four conditions. The vignette results will be discussed at the end of the section.

Table 2: Descriptive statistics (Pooled sample)

	(1) Men	(2) Women	(3) Gender difference:
Competing	0.567	0.221	0.346***
	(0.497)	(0.416)	(0.042)
Score round 1 (Piece Rate)	7.965	7.013	0.953**
	(3.430)	(2.902)	(0.292)
Score round 2 (Tournament)	9.316	8.033	1.283***
	(3.838)	(3.059)	(0.319)
Guessed rank	8.922	11.975	-3.053***
	(5.521)	(5.617)	(0.513)
Investment (risk)	13.632	10.958	2.674***
	(6.206)	(5.204)	(0.527)
Observations	231	240	471

Notes: Columns 1 and 2 show averages over all conditions (standard deviations in parentheses). Column 3 shows the gender difference (standard errors in parentheses). Investment is the amount invested in the part 1 investment task in ECU. *p<0.10, **p<0.05, ***p<0.01; significance levels are from t-tests for the gender difference.

Main Results

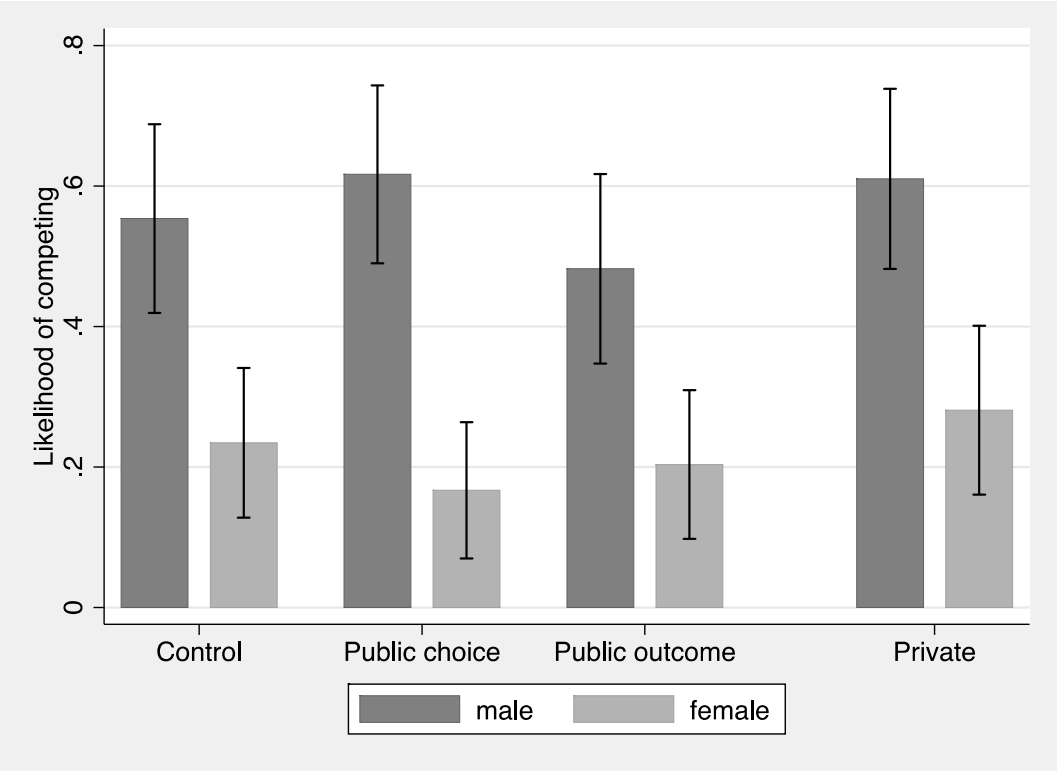
Table 2 presents average choices and outcomes across all conditions, separately by gender. It shows that men are more than twice as likely as women to choose the tournament scheme in round 3 (57 percent versus 22 percent). Men also score significantly higher than women in the two first rounds of the task, under piece rate and under competitive incentives. Further, in line with previous research, men are more confident than women, ranking themselves three spots better on average. This gender difference in confidence remains significant, and equals two ranking spots, when controlling for actual performance.[10] Finally, men are significantly more risk taking, investing an average of 14 ECUs (out of 20 ECUs) in the investment task while women invest 11 ECUs.

Turning to our main results, Figure 1 shows the proportion of participants who choose the competition by gender and condition. In the Control condition, 55 percent of men and 23 percent of women choose to compete. In the Private condition, both men and women are slightly more likely to choose competition than in the Control condition, resulting in a very similar gender gap (61 percent of

[10] When we regress guessed rank on gender, round 2 rank dummies and round 2 score dummies, the gender coefficient is equal to 2.037 (p-value < 0.001).

men and 28 percent of women choose to compete). These results suggest that having participants stand up and publicly introduce themselves does not affect the gender difference in competition choices.

Figure 1: Proportion choosing competition by condition and gender



Note: The bars represent the proportion of participants who choose the competitive payment scheme over the piece-rate payment scheme. The error bars represent 95% confidence intervals.

We now move on to compare the choices of men and women in the Control condition with those in the Public Choice and Public Outcome conditions. Compared to Control, men in the Public Choice condition are 6 percentage points more likely to compete and women are 7 percentage points less likely to compete. By contrast, the proportion of men who choose competition in the Public Outcome condition is 7 percentage points lower than in the Control condition while the proportion of women is virtually identical. This also means that the gender gap in the Public Outcome condition is smaller than the gender gap in the Public Choices condition.

While these effects on willingness to compete go in the hypothesized directions, the effect sizes are modest. We will now use regression analysis to determine the statistical significance of the effects and their robustness to the inclusion of controls for performance, beliefs, and risk preferences.

All regressions in Table 3 control for performance in a flexible way by including round 2 score dummies. Participants only received condition-specific instructions after round 2 which ensures that performance in round 2 captures ability to perform in a competition rather than any potential effects of the experimental conditions on performance. In further specifications, we control for risk

preferences and beliefs in a flexible way by adding investment-task choice dummies and dummies for guessed rank.

In columns 1 to 5, we explore whether the gender gap in the likelihood of choosing competition is due to gender differences in performance, confidence, and risk preferences. In column 1, we regress compensation scheme choice across all conditions on a female dummy, controlling for round 2 score dummies. Conditional on performance, women are 30 percentage points less likely to choose competition compared to men. In columns 2 to 5, we show that gender differences in risk attitudes and confidence can at least partially explain this gender gap in compensation scheme choice. Conditional on belief and lottery choice dummies, women are 16 percentage points less likely to choose for competition. These findings are in line with the literature on gender and competitiveness (see e.g., Van Veldhuizen, 2016). Additionally controlling for age and field of study dummies in column 5 does not alter the gender coefficient.

In columns 6 to 9, we test our hypotheses. Here, we regress a compensation scheme choice dummy on condition dummies separately for men and women. Controlling for performance, the effect of publicly announcing the choice is a mere 2 percentage points for men (column 6). In the Public Outcome condition, men are 5 percentage points less likely to choose competition compared to Control and 7 percentage points less likely compared to Public Choice. This difference all but disappears when additionally controlling for beliefs, risk preferences and demographics in column 8. None of the effects are close to being statistically significant.[11]

[11] These results also don't change if we instead run the regressions including controls for the different treatments, and their interaction with gender, as well as include the control variables as continuous variables.

Table 3: Regression results

	(1)	(2)	(3)	(4)	(5)	(6) male:	(7) female:	P-val. (6)-(7)	(8) male:	(9) female:	P-val. (8)-(9)
Female	-0.295***	-0.220***	-0.226***	-0.163***	-0.159***						
	(0.043)	(0.045)	(0.044)	(0.045)	(0.046)						
Public Choice (T1)						0.020	-0.038	0.60	0.021	-0.034	0.58
						(0.093)	(0.070)		(0.089)	(0.076)	
Public Outcome (T2)						-0.045	-0.007	0.74	0.014	0.027	0.91
						(0.095)	(0.078)		(0.100)	(0.079)	
Private						0.006	0.067		0.049	0.088	
						(0.084)	(0.081)		(0.085)	(0.079)	
Score FE (round 2)	√	√	√	√	√	√	√		√	√	
Lottery FE		√		√	√				√	√	
Belief FE			√	√	√				√	√	
Age, study major					√				√	√	
T1-T2						0.065	-0.032		0.007	-0.061	
P-val.(T1-T2)						0.51	0.65	0.40	0.95	0.45	0.53
R-squared	0.251	0.353	0.360	0.445	0.448	0.206	0.121		0.502	0.414	
N	471	471	471	471	471	231	240		231	240	

Note: The table reports results from OLS regressions of a dummy for choosing the competitive payment scheme on gender and condition dummies. Score FE means round 2 score dummies, Lottery FE means dummies for the chosen investment level in the investment task and Belief FE means dummies for the guessed rank in round 2. Age is measured in years, and study major is a set of dummy variables for 8 different fields of study. Robust standard errors are in parentheses. *p<0.10, **p<0.05,***p<0.01

In columns 7 and 9, we repeat this exercise for the female subsample. As for men, the effects of the conditions are close to zero conditional on performance. Women are 4 percentage points less likely to enter the tournament in Public Choice compared to Control, while the effect of Public Outcome is nearly zero.

As hypothesized, the effects sometimes go in opposite directions for men and women. Compared to Control, the gender gap is therefore 6 percentage points larger in Public Choice (5 percentage points when additionally controlling for beliefs and risk preferences) and 4 percentage points smaller in Public Outcome (1 percentage point when additionally controlling for beliefs and risk preferences). Finally, controlling for performance, risk preferences, confidence and demographics, the gender gap is approximately 7 percentage points smaller in Public Outcome compared to Public Choice.

We test whether these changes in the gender gap across conditions are significant by testing whether the estimated effects for men and women differ from each other in a statistically significant way. The p-values reported in Table 3 demonstrate that this is never the case, which is to be expected given the modest size of the effects ($p>0.58$).

In summary, we find effects in the hypothesized directions. Women are slightly less likely to opt for competition when choices are public and men are slightly less likely to opt for competition when outcomes become public too. However, these effects are modest in size and never close to being statistically significant.

Vignettes

In Part 3, we implemented a vignette study to determine whether people judge competitiveness in professional settings differently in women than in men. The results are reported in Table 4. Overall, participants rate both competitive men and competitive women as less enjoyable to work with, and state it less likely that they would hire them than less competitive candidates. However, this effect is larger and robustly significant only for male candidates. Thus, consistent with our main results we find no evidence of a more pronounced backlash against competitive women than against competitive men. Moreover, when asked to guess the modal evaluation made by others participants indicate that they expect other participants to share these feelings.[12]

[12] We cannot exclude that participants to some extent understood the purpose of the study and adjusted their behavior in order not to display any bias. However, we judge it unlikely. In order to diminish these concerns each participant evaluated only one candidate, and could therefore not compare across candidates and easily guess the purpose of the study. Moreover, the study did not mention gender in any explicit way. Addressing the concern that participants were made aware of the gender gap in competitiveness during the study by observing the other participants' choices, additional analysis does not indicate that participants in the Private and the Control conditions rated the job candidates differently than participants in the Public Choice and Public Outcome conditions.

Table 4: Vignette results

	(1) Skilled	(2) Beneficial	(3) Enjoyable	(4) Hire
Self:				
Female, not competitive	-0.010	0.052	0.303*	0.070
	(0.110)	(0.125)	(0.173)	(0.159)
Male, competitive	-0.154	-0.205	-0.504***	-0.402**
	(0.108)	(0.126)	(0.182)	(0.167)
Female, competitive	-0.096	-0.124	-0.222	-0.154
	(0.119)	(0.136)	(0.182)	(0.156)
Others:				
Female, not competitive	-0.043	0.043	0.166	0.051
	(0.104)	(0.102)	(0.134)	(0.129)
Male, competitive	-0.145	-0.231**	-0.496***	-0.350***
	(0.111)	(0.108)	(0.144)	(0.135)
Female, competitive	-0.120	-0.150	-0.335**	-0.142
	(0.118)	(0.111)	(0.141)	(0.127)
Observations	471	471	471	471

Note: The table reports results from 8 OLS regressions using the vignette results as outcomes variables. All outcome variables are on a 7-point scale. "Skilled" is the answer to the question "How likely is it that the candidate has the skills for the job? (Scale: not at all likely-extremely likely)"; "Beneficial" is the answer to the question "How beneficial would it be to have this candidate working for you? (Scale: not at all beneficial-extremely beneficial)"; "Enjoyable" is the answer to the question "How much would you enjoy having this candidate working for you? (Scale: not at all enjoyable-extremely enjoyable)"; "Hire" is the answer to the question "How likely is it that you would hire this candidate for the position? (Scale: not at all likely-extremely likely)". "Others" refers to participants' guess of the answer most commonly chosen by others. Independent variables are dummies for the "Female, not competitive", "Male competitive" and "Female competitive" treatments; the "Male, not competitive" treatment serves as the baseline. Robust standard errors are in parentheses. *p<0.10, **p<0.05,***p<0.01

4. Conclusions

Our experiment examines whether the well-documented gender gap in willingness to compete increases when competitive decisions are observable to others, as compared to when they are anonymous. If an aggressive and competitive attitude is incongruent with gender norms and expectations about female behavior, public observability may make women less willing to compete due to concerns about social image and a desire to conform to gender roles (Akerlof and Kranton 2000). Similarly, men could become even more likely to compete when their decision is public in order to conform to male gender roles.

If the gender gap in willingness to compete is larger when decisions are directly observable, the gender gap in willingness to compete in previous studies may have underestimated the gender gap in willingness to compete in more realistic settings. Knowing whether this is the case is important for managers, educators and policy makers, since previous experimental studies have found a positive correlation between willingness to compete in laboratory studies and educational and labor market related decisions. For example, application procedures for internal positions in a company can be made more or less confidential. Also, gossip could be detrimental to the advancement of women in

organizations as they may be less willing to ask to be considered for promotions or bonuses if they think their colleagues will find out. The decision to apply to a competitive school or university could be similarly affected.

Our experiment is carefully designed to isolate the public observability of the decision of whether to compete (and the public observability of the competition outcome) from all other factors. While we find a large gender gap in willingness to compete, this gap does not increase when participants have to publicly announce their decisions. In particular, the choices of women hardly react to the public observability of the decision at all.

In addition, participants in our vignette study do not report less favorable attitudes towards competitive women compared to competitive men. In fact, participants dislike – and expect others to dislike – competitive people of both genders, and especially competitive men. While this suggests that there is no specific stigma associated with competitive women, it does not imply that other forms of stereotypes play no role for the participants in our sample. On the contrary, previous studies suggest that the large gender gap that is generally observed in this literature, and that we also observe across all four conditions, is at least partly driven by women's lower confidence in the stereotypically male task used in most of the literature. Instead, our results indicate that willingness to compete is not rated more favorably in men, and hence emphasizing the importance of gender norms over competitive behaviors norms does not change the gender gap in willingness to compete.

Many organizations and governments are currently considering different ways forward to increase gender equality. Our results help inform this process and indicate that increased transparency, which is sometimes proposed as a measure to decrease discrimination, does not imply a change in behavior on behalf of women (or men), nor does it necessarily imply backlash. It is also good news for countries like, for example, Norway, which are considering transparency legislation that makes public the identity of all applicants to government positions. The informed choice of institutions to promote and elect leaders can help increase the number of women at top positions.

Finally, our results are reassuring from the perspective of the existing experimental economics literature on gender differences in willingness to compete, since they suggest that the results of the standard design are robust to changes in the amount of public observability.

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