CENTRE FOR DECISION RESEARCH & EXPERIMENTAL ECONOMICS

University of Nottingham
UK | CHINA | MALAYSIA

Discussion Paper No. 2020-13

Helena Fornwagner, Monika Pompeo & Nina Serdarevic

Him or her? Choosing competition on behalf of someone else

June 2020

CeDEx Discussion Paper Series
ISSN 1749 - 3293

CENTRE FOR DECISION RESEARCH & EXPERIMENTAL ECONOMICS

The Centre for Decision Research and Experimental Economics was founded in 2000, and is based in the School of Economics at the University of Nottingham.

The focus for the Centre is research into individual and strategic decision-making using a combination of theoretical and experimental methods. On the theory side, members of the Centre investigate individual choice under uncertainty, cooperative and non-cooperative game theory, as well as theories of psychology, bounded rationality and evolutionary game theory. Members of the Centre have applied experimental methods in the fields of public economics, individual choice under risk and uncertainty, strategic interaction, and the performance of auctions, markets and other economic institutions. Much of the Centre's research involves collaborative projects with researchers from other departments in the UK and overseas.

Please visit http://www.nottingham.ac.uk/cedex for more information about the Centre or contact

Suzanne Robey
Centre for Decision Research and Experimental Economics
School of Economics
University of Nottingham
University Park
Nottingham
NG7 2RD
Tel: +44 (0)115 95 14763
suzanne.robey@nottingham.ac.uk

The full list of CeDEx Discussion Papers is available at

http://www.nottingham.ac.uk/cedex/publications/discussion-papers/index.aspx

Him or her?
Choosing competition on behalf of someone else

Helena Fornwagner* Monika Pompeo† Nina Serdarevic‡

June 4, 2020

Abstract

We extend the literature on competitive behaviour by investigating environments in which the choice to compete is not made by an individual themselves, but by someone else. Choosing on behalf of others is an integral part of life and gender may be an important factor in shaping the perceived suitability of individuals for career promotions in competitive environments. We assign subjects either the role of an agent or a principal in an experiment. Agents perform a real effort task and a randomly assigned principal chooses whether the agent performs under a piece rate or tournament incentive scheme. Before making a decision for the agent, we vary whether the principal is informed about the agent's gender or not. Regardless of whether gender is revealed, we find no gender gap in competitiveness when principals are choosing for agents. In terms of determinants of the principals' choices, we observe that expectations about their agent's performance, as well as the principal's own preferences for risk and competitiveness matter for the decision to make others compete. In addition, we replicate existing results reporting that women are less willing to enter the tournament than men when choosing themselves. We compare both decision environments and show that efficiency (defined as average performance and earnings) does not suffer, whereas the winners' performance is lower when principals decide for agents. Taken together, our results suggest that allowing others to decide has the potential to increase the representation of women in competitive situations, many of which resemble the labour market.

JEL Classification: J16, C91, D01

Keywords: competitiveness, gender differences, decision-making for others, laboratory experiment

*University of Innsbruck, Department of Public Finance. Email: helena.fornwagner@uibk.ac.at

†University of Nottingham, School of Economics. Email: monika.pompeo@nottingham.ac.uk

‡University of Bergen, Department of Economics. Email: nina.serdarevic@uib.no

1 Introduction

Despite important advancement over the past century, differences in labour market outcomes between women and men are highly persistent (see, e.g. European Commission, 2019). Possible explanations focus on discrimination (Black & Strahan, 2001), anticipated discrimination (Charness, Cobo-Reyes, Sanches, & Meraglia, 2018; Fisk & Overton, 2019), gender differences in preferences regarding the type of employment, rank or position (Clain, 2000), or problems in combining family and career (Mason, Wolfinger, & Goulden, 2013). Another explanation considers gender differences in preferences for competition, suggesting that women tend to shy away from competitive environments. This explanation has attracted a lot of attention in recent years and sparked a large body of literature (for a survey, see Niederle, 2017). In this paper, we extend this literature by investigating environments in which the choice to compete is not made by an individual herself, but by someone else.

Many decisions in life are made on behalf of others (Füllbrunn, Luhan, & Sanfeycd, 2020). Importantly, this also applies to decisions in the context of competitions. For example, superiors in a law firm often decide whom to assign the toughest, more prestigious and potentially more rewarding cases, and who gets the safe bets. Similar situations can be found in academia, where professors assign their students to more or less competitive research projects. Moreover, many companies have recently adopted sponsorship programmes in which an experienced manager chooses a mentee to work alongside. These programmes were designed with the aim of contributing to the advancement of women's careers (Baldiga & Coffman, 2018; Eby, Allen, Evans, Ng, & DuBois, 2008). The idea is that the manager should promote the mentee's career by choosing high-profile projects for her or recommending her for promotions, gaining recognition in the process. The mentee performing well may boost the reputation and earnings of both the manager and the mentee. In all of these situations, gender may be a decisive factor that affects the worthiness and perceived capability of the person for which the decision is taken. Regardless of the importance of understanding determinants affecting competitiveness decisions when choosing for others, we are not aware of any papers examining the role of gender in these situations.[1]

We employ a laboratory experiment using a modified version of the task by Niederle and

[1] We are only aware of the working paper by Tungodden (2019), who examines how parents make competitive decisions for their children. In this setting, parents always know the gender of their child. This makes it impossible to causally examine the role of information about gender in taking decisions for others.

Vesterlund (2007). We divide subjects between two fixed roles: agents and principals. Each principal is randomly matched with one agent. The agents are asked to perform a real effort task, first under a piece rate (Stage 1) and then under a competitive tournament payment scheme (Stage 2). The principal's main job is to choose which payment scheme to apply to his or her randomly assigned agent's next performance in the real effort task (Stage 3). Between treatments, we experimentally vary the amount of information that is given to the principal before he or she makes the decision. In *GenderInfo*, the principals are provided with the agent's gender, which is not the case in *NoGenderInfo*. In both treatments, principals earn exactly the same as their agents in Stage 3. We compare the choice of payment scheme and the agents' performance in these treatments to the *OwnDecision* treatment, which aims at replicating previous results on competitiveness, where subjects decide for themselves. Our design is particularly well suited to examine how the gender of the subjects in both roles interacts when making competitiveness choices on behalf of others, at the same time allowing us to control for factors such as performance, attitudes and beliefs.

We contribute to the existing literature on gender differences in competitiveness and on taking decisions for others by offering the following main results. First, when subjects choose for themselves, we replicate Niederle and Vesterlund (2007) and find a significant gender gap in competitiveness (henceforth GGC). In particular, men are 1.6 times more likely to compete compared to women. We proceed to show that there is no GGC for principals' choices. This is due to significantly more women being sent to the tournament in *GenderInfo* compared to *OwnDecision*. Third, to test whether the agent's gender affects the principal's choice, we compare the principal's choice in *GenderInfo* to *NoGenderInfo*. Our results show that revealing the agent's gender does not affect the principal's decision.

In terms of determinants of the principal's choice, we find that the principal's beliefs about the agent's preferred incentive scheme significantly affect the principal's choice. In particular, we observe that principals tend to match what they believe to be their agent's preference. Moreover, beliefs about how well the agent performed, rather than their actual performance, matter for the principal's decision. Finally, we investigate efficiency concerns related to being made to compete. We show that, in general, efficiency (defined as average performance or earnings in Stage 3) does not suffer, whereas the winner's performance is lower when one is made to compete.

The rest of the paper is structured as follows: **Section 2** summarises the related literature

to point out our respective contributions. In **Section 3**, we present determinants which might lie behind a principal's decisions. In **Section 4**, we outline the experimental design. **Section 5** presents the data, **Section 6** provides the data analysis, and **Section 7** concludes the paper.

2 Related Literature

2.1 Willingness to compete

Our paper speaks to the vast literature on the GGC. When subjects are asked to decide which payment scheme they want for themselves, fewer women tend to choose the competitive type compared to men (see, e.g., Almås, Cappelen, Salvanes, Sørensen, & Tungodden, 2016b; Balafoutas & Sutter, 2019; Datta Gupta, Poulsen, & Villeval, 2013; Niederle & Vesterlund, 2007; Niederle, 2017; Saccardo, Pietrasz, & Gneezy, 2018; Sutter & Glätzle-Rützler, 2015). The GGC has been replicated in different contexts and has been found to be robust to different specifications.[2] This is particularly relevant given that the willingness to compete correlates with a number of choices and characteristics that are important in professional careers and earnings. For example, subjects scoring higher on the competitiveness scale are more likely to choose competitive educational courses (e.g., Almås, Cappelen, Salvanes, Sørensen, & Tungodden, 2016a; Buser, Niederle, & Oosterbeek, 2014, 2020; Reuben, Wiswall, & Zafar, 2017), have a higher income (e.g. Buser, Geijtenbeek, & Plug, 2018; Kamas & Preston, 2015; Reuben, Sapienza, & Zingales, 2015) and to become entrepreneurs (Berge, Bjorvatn, Pires, & Tungodden, 2015).

Given the implications of these findings, research has since focused on ways to close the GGC. For example, some studies change the institutional environment in a way that favours women (using, e.g., quotas) to reach gender balance in competitive environments (Balafoutas & Sutter, 2012; Niederle & Vesterlund, 2007; Leibbrandt et al., 2018; Baldiga & Coffman, 2018). These programmes effectively close the GGC, but have also been reported to backfire on those being favoured (Fallucchi & Quercia, 2018; Leibbrandt et al., 2018). To avoid these side-effects, researchers started identifying alternative interventions, interventions that apply to both men and women, but also lead to closing the GGC. For example, priming subjects with power (Balafoutas, Fornwagner, & Sutter, 2018) or with a professional, work-related identity (Cadsby,

[2]Exceptions include matriarchal societies in which women and men are equally competitive (Andersen, Ertac, Gneezy, List, & Maximiano, 2013) or more competitive than men (Gneezy, Leonard, & List, 2009), and girls' schools (Booth & Nolen, 2012), where female students have been found to be more competitive compared to those enrolled in mixed schools.

Servátka, & Song, 2013) has proved to be a promising, low-cost intervention. Moreover, giving subjects feedback about how they performed relative to others successfully engages women to compete (Wozniak, Harbaugh, & Mayr, 2016). This is similar to giving advice, where once subjects are informed about potential earning implications of the GGC, they tend to be more likely to compete (Kessel, Mollerstrom, & van Veldhuizen, 2019).

2.2 Taking decisions for others

This study also closely relates to existing work on letting individuals take decisions on behalf of others, in the context of competitive, risk, and payment choices.[3] Looking at competitive choices, we are only aware of the study by Tungodden (2019), who shows that parents choose more competition for boys than for girls. In general, the study reports that fathers are more likely than mothers to send their child into competition and that parents respond more to the ability of boys than girls, which leads to many high-ability girls not being chosen for competition. First, we differ from Tungodden (2019) in terms of sample, as our subjects are all adults choosing for anonymous strangers. Second, we vary the information provided to the deciding person, either including or excluding the gender of the person for whom the decision is made, allowing for a causal investigation of the effect of information about gender.

We also add to the literature on taking risky decisions on behalf of others, as sending an individual to a tournament can be interpreted as a risk-loaded choice. Up to now, studies have shown mixed results. Some papers find that subjects tend to be more risk loving when investing money on behalf of others, whereas others find increased risk aversion (for an overview of the existing literature, see Eriksen, Kvaløy, & Luzuriaga, 2020; Friedl, Pondorfer, & Schmidt, 2020).

In a broader sense, we also contribute to the literature on delegation.[4] Importantly, in our setting, one person always takes a decision on behalf of another subject, and that subject has no choice but to follow this decision. This particular feature of our design is similar to Bottino, García-Muñoz, and Kujal (2016), who focus on compulsory delegation in a dictator game, experimentally varying whether the agent's gender is revealed. They report that over time both male and female principals delegate more to male agents.

It is important to note that deciding for others might have undesired effects when it comes to performance. Being made to compete can induce pressure to perform well, which might

[3] See Füllbrunn et al. (2020) for a recent special issue on decision-making for others.

[4] For a summary, see the papers by Erat (2013); Fershtman and Gneezy (2001); Hamman, Loewenstein, and Weber (2010).

result in "choking under pressure" (e.g., Cohen-Zada, Krumer, Rosenboim, & Shapir, 2017). Also, forcing subjects into a decision does not necessarily lead to higher gains. For example, Exley, Niederle, and Vesterlund (2020) examine the context of negotiations and find that, when forced to negotiate, women achieve worse outcomes than when they decide on their own. This is attributed to the fact that individuals often have a better grasp of their own ability. On the contrary, being made to compete may also have a positive effect on performance by affecting self-esteem; feeling as though someone believes in you may boost your confidence, which is found to be a good proxy for tournament entry (Croson & Gneezy, 2009; Balafoutas et al., 2018; Gneezy & Rustichini, 2004).

3 Determinants of the Principal's Decision

We proceed to identify three main determinants that may affect the principal's choice of payment scheme, beyond the standard assumption of rational payoff maximisation.

Determinant 1: Beliefs about the agent's performance. One criterion which could influence the principal's choice of payment scheme is belief about their agent's performance in the task. Previous evidence suggests that performance in a stereotypically male task tends to be evaluated in favour of men (Egan, Matvos, & Seru, 2017; Sarsons, 2017; Spencer, Steele, & Quinn, 1999). For example, consider a female agent who solved the same number of sums as a male agent. There are at least two reasons why the principal may evaluate the female agent's performance differently. First, both genders are found to underestimate females' ability when it comes to simple maths tasks (Reuben, Sapienza, & Zingales, 2014). Second, following attribution theory, the performance of the female agent is more likely to be attributed to luck than merit (Cash, Gillen, & Burns, 1977). We control for this potential determinant by employing an incentivised question asking the principal to evaluate the agent's past performance, first under the piece rate and then under the tournament payment scheme. Gender differences in average evaluation might explain why female agents are less likely to be chosen for the competition.

Determinant 2: Beliefs about the agent's preferences. Although it is in the principal's financial interest to choose the payment scheme under which he or she thinks the agent will earn the highest payoff, this choice may be affected by what he or she believes is the agent's preference (i.e., anticipated preferences). For example, if a principal believes that his or her assigned agent would prefer to work under the piece rate, instead of being sent into the tournament, he or

she will be less likely to choose the competitive payment scheme for the agent. Also, even if a principal assumes that the agent would prefer not to be sent into the tournament, he or she may act paternalistically and choose what he or she believe to be the best for the agent, which does not necessarily coincide with the agent's preference (Ambuehl, Bernheim, & Ockenfels, 2019). While Tungodden (2019) finds that those parents who act paternalistically are more likely to send their daughters into competition, we do not expect paternalism to be a key determinant when principals decide for strangers.

Principals' beliefs about agents' preferences in the context of a maths task, generally considered to be a stereotypically male task, may be influenced by both implicit and explicit stereotypes (Becker et al., 1971; Bertrand, Chugh, & Mullainathan, 2005). For instance, mentors who have an informational advantage over their mentee offer different advice to males and females (Chakraborty, 2019). We control for anticipated preferences by including an incentivised question asking the principals to guess which payment scheme their agents would have chosen for themselves. If principals' beliefs are affected by explicit or implicit gender biases, we expect that they will systematically overestimate the male agents' willingness to compete compared to their female counterparts. If the majority of principals act in accordance with these anticipated preferences, we will find a GGC in the principals' choices between male and female agents.[5]

Determinant 3: Principal's own preferences. The fact that principals decide on behalf of someone else allows us to study the effect of their preferences on their chosen compensation scheme for the agent. That is, whether the principals' competitiveness and risk preferences significantly predict their decisions. Given the evidence showing that women tend to shy away from competitive environments, it is plausible to think that female principals are less likely to make their agents compete than their male counterparts, irrespective of their assigned agents' gender. Similarly, based on findings on gender differences in risk preferences (e.g., Croson & Gneezy, 2009), female principals might be less likely to choose the tournament for their agents. Hence, we ask the principals which payment scheme they would choose for themselves and their attitudes towards risk and competition. If the decision to make others compete depends on the principal's gender, we would find that male principals are more likely than female principals to send their agents into the tournament, regardless of the agents' gender.

[5]Two factors that we are not able to investigate with our design, and which have the potential to influence beliefs, are (i) altruistic concerns of the principals (i.e., the principal chooses the payment scheme that he or she thinks will maximise the agent's payoff); (ii) principal's concern that the agent will retaliate with poorer performance if the principal chooses something the agent does not want.

4 Experimental Design

We conduct a laboratory experiment programmed using LIONESS (Giamattei, Molleman, Seyed Yahosseini, & Gächter, 2019). Subjects are informed at the beginning of the experiment that they will go through different stages, out of which one is randomly chosen for payment at the end of the experiment. They are not told what each stage entails before they have completed the previous one. Table 1 provides a summary of the experiment. The precise content varies depending on the underlying treatment and the assigned role as described below.

Table 1: Main features of the experimental design

Role	Stage 1	Stage 2		Stage 3	Stage 4
Decision-maker	Piece rate Belief own ranking	Tournament Belief own ranking	Own choice	Working time	Risk
Agent (A)	Piece rate Belief own ranking	Tournament Belief own ranking	Belief about P's choice Own preference	P's choice revealed Working time	Risk
Principal (P)	Trial	Waiting time	Choice for A Beliefs + own preference	Waiting time	Risk

Our measure of competitiveness is based on Niederle and Vesterlund (2007). Thus, we employ a real effort task, which participants first perform under a piece rate payment (Stage 1) and then under a competitive payment scheme (Stage 2). Afterwards, we vary between treatments if participants select one of these payment schemes themselves, which applies to their next performance, or if another person chooses the payment scheme for them (Stage 3). In each stage, participants have five minutes to perform the task, which consists of adding up a series of five random numbers.[6] The final score is given by the number of problems correctly solved.[7]

In Stage 4, all participants go through an incentivised version of the Holt and Laury (2002) lottery task to measure risk preferences. It is important to control for risk preferences of the person deciding about the tournament entry, as previous studies have found that the more risk-seeking a person is, the more likely he or she is to enter a tournament (Niederle & Vesterlund, 2007). Next, subjects are asked a series of non-incentivised survey questions measuring their willingness to compete (Fallucchi, Nosenzo, & Reuben, 2019) and their self-reported maths skills.

[6]Subjects were prohibited from using a calculator, but were told they could use the pen and paper positioned next to their keyboard. Participants write their answer in the input box on the screen and press the submit button. Once the button is pressed, a new set of numbers appears. The subjects discover whether their answer was correct right after sending it, receive information about how many correct answers they have overall, but do not get feedback on how they perform in comparison to other participants.

[7]According to the existing literature, performance should not differ based on gender. For a meta-analysis see Hyde, Fennema, and Lamon (1990).

Additionally, principals are asked in an incentivised way to state their beliefs about the average performance of women and men under the piece rate and tournament payment scheme. Last, we collect data on basic demographics using a standard questionnaire. Detailed experimental instructions can be found in the Supplementary Online Material (henceforth referred to as SOM).

4.1 Treatments

Subjects are randomly allocated to one of the following treatments: *OwnDecision*, *GenderInfo*, or *NoGenderInfo*. *OwnDecision* replicates Niederle and Vesterlund (2007), where subjects decide for themselves if they want to enter a tournament in Stage 3. Participants in *GenderInfo* and *NoGenderInfo* are randomly allocated to the role of a principal or agent; subjects keep their role throughout the study. Each principal is randomly matched with one agent. The main task of the principals is to decide which payment scheme they want to apply to their assigned agents' next performance in Stage 3. The amount of information the principal receives before making the decision varies depending on the treatment. In *GenderInfo*, the principal is informed about the agent's gender, whereas this is not the case in *NoGenderInfo*.[8] Additionally, principals receive information on the agent's past performance in Stage 1 and Stage 2, age and residence in both treatments.[9] The additional information on age should not vary too much across subjects, given that they are all university students. Similarly, information about the residence was restricted to either United Kingdom or other.[10] This design feature follows the study by e.g., Castillo and Petrie (2010).

4.1.1 Agents

Agents solve as many sums as possible over the different stages of the competitiveness task, providing us with their performance under both payment schemes. They perform the task in fixed groups of four, consisting of two men and two women. Agents receive information about the gender composition of their group, but no further information about the other participants.

[8]Previous studies conveyed gender with, for instance, the use of avatars (Bohren, Imas, & Rosenberg, 2019; Charness et al., 2018), photographs (Castillo & Petrie, 2010) or names (Brock & De Haas, 2019) signalling a subject's gender. We decided for the most simple, and we think, cleanest way, and just stated the gender in *GenderInfo*, but not in *NoGenderInfo*.

[9]This is done in order to avoid making gender too salient. Although *GenderInfo* and *NoGenderInfo* are designed to disentangle the effect of gender on the principal's decision, providing the principal only with the agent's performance and gender would have made the objective of the study too salient.

[10]The agents' information is provided by the subjects at the beginning of the experiment. The fact that this was the same for all participants means that it should not have raised concern or suspicion in the participants.

In each stage, agents receive feedback on their own performance, but not on how they perform in comparison to others. The stages and the respective payment schemes are as follows: In Stage 1, *Piece Rate*, agents are paid £0.50 per correct answer. In Stage 2, *Tournament*, only the agent with the highest number of correctly solved sums earns £2 per answer. The rest of the group receives no payment for this stage. In the event of a tie, the winner is chosen randomly. At the end of the experiment, agents are informed whether or not they won the tournament. In an incentivised way, they are asked to guess their rank, first relative to other players in the room (after Stage 1) and second, relative to the other members of their group (after Stage 2).[11]

In Stage 3, *Choice*, the principal decides under which payment scheme the agent performs. Details on the principal's decision are provided in the next section. Before the agents discover which compensation scheme has been chosen, we elicit, with the use of monetary incentives for correct guesses, which payment type the agents believe has been chosen for them by the principals. Then, agents are asked which payment scheme they would have chosen for themselves. This allows us to control for whether the agents' preferences affect their subsequent performance in Stage 3. Afterwards, agents are told which payment scheme has been chosen on their behalf and are asked to perform again. Agents are told that another randomly chosen participant, Player B, will choose the payment scheme in Stage 3. In Stage 3, agents are paid £0.50 per correct answer if the principals choose the piece rate payment scheme. If a principal chooses for his or her agent to compete, the agent's performance in Stage 3 must be higher than the performance of all other group members in Stage 2 in order to win.[12] If the agent wins, he or she earns £2 for each correctly solved sum. Otherwise, the agent is not paid if this stage is randomly chosen for payment. In the event of ties, the winner is chosen randomly. Subjects assigned to *OwnDecision* go through the same stages as agents and have the same monetary incentives, but choose the payment scheme by themselves in Stage 3.

4.1.2 Principals

As shown in Table 1, principals start the experiment with a two-minute, non-incentivised trial round of the real effort task. The main objective is to allow them to familiarise themselves with

[11] Please note that at the end of the experiment, out of all guesses one is randomly chosen for payment for each subject and is paid on top of the final earnings. We paid £0.50 if the chosen guess is correct. This payment structure is used for all incentivised guesses and beliefs in the experiment.

[12] Please note that this design feature makes sure that one participant is always competing against three others in Stage 3. Thus, the winning probability in Stage 2 and Stage 3 is always 25%. More details on the advantages of comparing Stage 3 to Stage 2 performance are provided by Niederle and Vesterlund (2007).

the real effort task, thus enabling them to make more informed decisions. Compared to agents, who get five minutes to perform the real effort task, we reduce the working time for principals to two minutes. This makes it more challenging for the principal to use his or her performance as a benchmark when deciding for the agent. After the trial stage, principals are asked to choose the payment scheme for a randomly assigned agent (presented to them as Player A). If they choose the piece rate, both of them are paid £0.50 for each correct answer by the agent. If they choose the tournament, they both receive £2 per correct answer if the agent's score in Stage 3 exceeds that of the other group members in Stage 2. Otherwise, they both receive no payment. Next, principals are asked in an incentivised way to guess which incentive scheme the agent would have chosen for him or herself. They are also asked how well they think the agent performed in Stage 1 relative to the other players in the room and in Stage 2, relative to the other group members. Finally, we ask them which incentive scheme they would have chosen for themselves.

5 Data

A total of 688 students (343 men and 345 women) participated in our experiment. Data were collected in March 2020 at the University of Nottingham's Centre for Decision Research and Experimental Economics (CeDEx).[13,14,15] Subjects were recruited using ORSEE (Greiner, 2015), following the standard procedures of the lab. Participants are on average 21.83 years old and 65.41% of them are UK residents. For the 45 minutes (on average) that it took the subjects to complete the experiment, they received a payoff of £10.40 (including a £4 show-up fee). Tables SOM 1 and SOM 2 show that participants are comparable over treatments in terms of main characteristics (age, sex, UK residency, etc.) and provide further details on descriptive statistics. We use the Holt and Laury (2002) lottery task to classify the participants' risk preferences based on the total number of risky choices (see Figure SOM 1). Risk preferences do not differ between the decision-makers in *OwnDecision* and the principals in the two information treatments (Wilcoxon rank-sum test, $p = 0.925$). With respect to gender, we find women to be more risk-averse than men (Wilcoxon rank-sum test, $p < 0.05$).

[13]The study received approval from the ethical board of the University of Nottingham by 27/01/2020.

[14]Our experiment was pre-registered on aspredicted.org. The title for the pre-registration is "Her or Him? Choosing on behalf of someone else"(#33924).

[15]All data were collected before UK universities were affected by the COVID-19 pandemic.

Table 2: Number of participants by treatment and role

	Random role			
Treatments	Principal	Agent	Decision-maker	Total
OwnDecision	/	/	144	144
GenderInfo	136	136	/	272
NoGenderInfo	136	136	/	272
Total	272	272	144	688

Table 2 describes the distribution of subjects by treatment and role. In all treatments, we have the same amount of male and female agents and decision-makers, in order to have gender balanced groups in Stage 2 and Stage 3. In *GenderInfo* and *NoGenderInfo*, we have 67 male and 69 female principals, yielding a total of 135 male and 137 female principals across the two treatments. In Table SOM 3, we provide the gender composition of each principal-agent pair in *GenderInfo* and *NoGenderInfo*. Over both treatments, we have 69 pairs consisting of a male principal and male agent (MM), 66 pairs consisting of a female principal and a female agent (FF), 67 pairs of a female principal and a male agent (FM) and 70 pairs of a male principal and a female agent (MF). Although the gender of the agent cannot affect the principal's decision in *NoGenderInfo*, to make things more comparable, we made sure to have a similar number of same-sex and mixed-sex pairs.

6 Results

This section is structured as follows. We first analyse the performance in the real effort task in the three treatments. Second, we examine tournament entry decisions when subjects choose for themselves compared to when principals decide on their behalf. Third, we explore determinants that may shed light on the principals' decisions. We conclude the analysis by examining efficiency concerns related to taking competitive decisions on behalf of others.

6.1 Performance

We find that men perform better than women in Stage 1 in *OwnDecision* (Wilcoxon rank-sum test, $p < 0.05$) and *GenderInfo* (Wilcoxon rank-sum test, $p < 0.10$).[16] In line with the existing literature on competitiveness, we do not find a gender difference in performance under the

[16]This is not the first study to find a gender difference in performance under the piece rate. Our results are in line with, for instance, Charness et al. (2018), who find that males perform significantly better in the same summation task.

tournament scheme in Stage 2 for any of the three treatments. In Stage 3, men perform better than women under the tournament payment scheme only in *NoGenderInfo* (Wilcoxon rank-sum test, $p < 0.05$). Moreover, agents' performance significantly increases between Stage 1 and Stage 2 within each treatment (signed rank sum tests, $p < 0.01$, for each treatment respectively), possibly due to some learning effects or because subjects may be more motivated to exert effort in the tournament than in the piece rate. The increase in performance does not differ between men and women (Wilcoxon rank-sum tests, $p > 0.282$) or between treatments (Kruskal Wallis test, $p = 0.936$). Figure SOM 2 shows the cumulative distributions of performance in each stage by treatment and by gender.

6.2 Gender gap in competitiveness

Figure 1: Tournament entry rates by gender and treatment (N = 416)

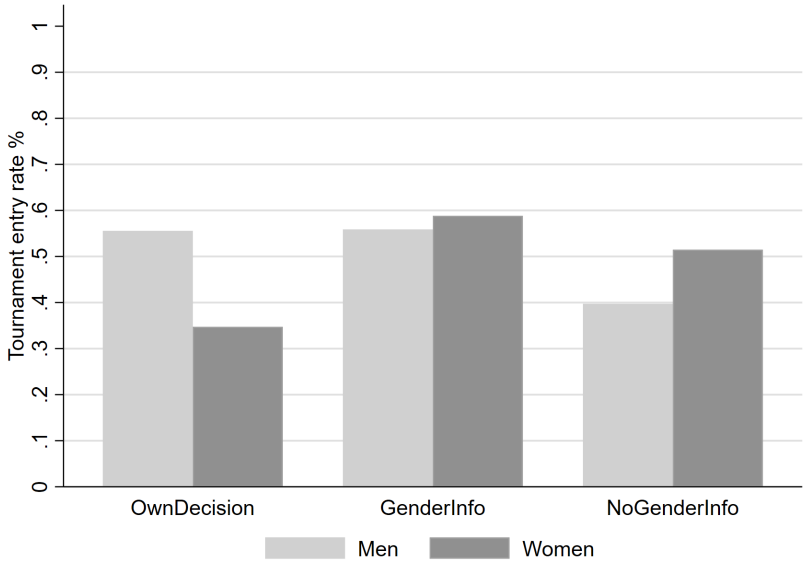


Figure 1 reports the competing rates for each treatment by the agent's and decision-maker's gender. In *OwnDecision*, 34.72% of women choose to enter the tournament, compared to 55.56% of men. That is, men are 1.6 times more likely to choose competition than women when deciding for themselves. The difference is statistically significant ($\chi^2(1)$, $p < 0.05$). This finding is line with the literature on competitiveness, which finds a GGC (see, e.g., Niederle, 2017). In contrast to this, in *GenderInfo*, we find that principals send female and male agents to competition at indistinguishable rates ($\chi^2(1)$, $p = 0.729$).

Result GGC 1 *When deciding for themselves, fewer women choose to enter the tournament*

compared to men. This gender gap disappears when entry decisions are made by principals.

The next step is to identify what drives the closure of the competitiveness gap. We find that the share of women sent into competition in *GenderInfo* is higher than in *OwnDecision* (58.82% vs. 34.72%; $\chi^2(1)$, $p < 0.01$), while the share of males competing is almost identical between the two treatments (55.56% vs. 55.88%; $\chi^2(1)$, $p = 0.969$). This reveals that the elimination of the GGC in *GenderInfo* is due to women competing more. In Table SOM 4, we show the results of probit regressions for competition rates in *GenderInfo* compared to *OwnDecision*, and in Table SOM 5 respective marginal effects. The dependent variable equals one if a decision-maker or an agent competes, and zero otherwise. In line with the main conclusion of the reported non-parametric tests, joint coefficients tests of *Female + GenderInfo X Female* show no GGC in *GenderInfo* ($p > 0.713$). When principals decide on the agents' payment scheme, a significantly higher share of women is sent to the tournament than in *OwnDecision*. Joint coefficients tests of *GenderInfo + GenderInfo X Female* confirm this observation ($p < 0.062$).

Result GGC 2 *More women compete when the decision to enter the tournament is made by someone else on their behalf.*

Next, we examine whether informing the principal of the agent's gender affects their choice of payment scheme. Hence, we compare the choices of the principals in *GenderInfo* and *NoGenderInfo*. Similar to *GenderInfo*, we do not find a statistically different representation of female and male agents in the tournament in *NoGenderInfo* (Male: 39.71% vs. Female: 51.47%; $\chi^2(1)$, $p = 0.168$).[17] In the probit regressions presented in Table SOM 6, we again consider a binary dependent variable that measures whether or not the agent competes (for the marginal effects, see Table SOM 7). The regression in column (1) confirms that being informed of the agent's gender has no significant effect on the principal's choice of compensation scheme in *NoGenderInfo*. Whereas Reuben et al. (2014) find that both female and male employers are twice more likely to hire a man than a woman in an experimental market, in our setting this does not seem to be the case. As such, our results are consistent with Charness et al. (2018) who do not find any discrimination against females in hiring decision. For all regression specifications, the insignificant coefficients of *(A) Female* ($p > 0.142$) and of the joint coefficients tests of *(A) Female + GenderInfo X (A) Female* ($p > 0.729$) imply that there is no GGC in the two

[17] We also asked the principals which incentive scheme they would have chosen for themselves. We find a GGC in *NoGenderInfo* (Male: 59.09% vs. Female: 30.43%, $\chi^2(1)$, $p = 0.001$), but not in *GenderInfo* (Male: 45.59% vs. Female: 42.65%, $\chi^2(1)$ $p = 0.730$).

treatments in which principals decide for their agents. However, the positive and statistically significant coefficients of *GenderInfo* ($p < 0.067$) show that entry rates are higher for men in *GenderInfo* compared to *NoGenderInfo*.

Result GGC 3 *Informing the principal about the agent's gender does not affect their choice of compensation scheme.*

6.3 Determinants of a principal's choices

6.3.1 Principal's evaluation of agent's performance

After receiving information about their agents' performance, we asked the principal to indicate how well they believed their agents performed compared to others. Regressions in Table A.1 show that agents who are expected to perform worse under the piece rate are more likely to be sent to the tournament ($p < 0.01$) by their principal. Similarly, agents who are believed to perform worse in the tournament are more likely to be sent to the piece rate ($p < 0.01$).[18] Moreover, considering that subjects are performing a maths task that may be stereotypically associated with males, we examine in Table A.2 whether principals evaluate the performance of female agents differently to that of male agents. The joint coefficients tests of *(A) Female + (A) Female X Performance 1* and *(A) Female + (A) Female X Performance 2* are both statistically insignificant ($p > 0.107$). Thus, we find support for Determinant 1 conjecturing that perceptions of how well the agents performed will affect the principals' choices. However, we do not find any support for the hypothesis that the principals' ranking of their agents is affected by stereotypical attitudes.

Result D 1 *The better the principals believe the agents performed in Stage 2, the more likely they are to send them to the tournament. We find no gender difference in the evaluation of the agents' performance.*

6.3.2 Principals' beliefs about the agent's preferred payment scheme

As described in Section 4, we employ an incentivised question to elicit which payment scheme a principal believes his or her agent would have chosen for him or herself. If we disregard the role

[18] Given that the principals go through the task themselves in the trial stage, we are also able to examine whether a principal's performance in the trial impacts his or her decision to send an agent into competition. Columns (2) and (3) in Table A.1 show that the difference between agents' performance in the first two stages and that of a principal in the trial round is an insignificant predictor of the choice to send the agents to the tournament.

of the agent's gender, we find that 44.65% of the principals in *GenderInfo* and *NoGenderInfo* believe that their assigned agents prefer to compete. Comparing beliefs about an agent's preference with a principal's actual choice, we find that 66.18% of the principals' decisions coincide with what they believe to be their agents' preferences.

In Table A.3, we report the results of a series of probit regressions where the outcome variable takes the value one if the agent is chosen for competition, and zero otherwise. We control for principals' beliefs about the agents' preferred payment scheme and find that agents are significantly more likely to be sent to the competition when their assigned principal believes that this is what they would have chosen for themselves ($p < 0.01$). As indicated by the significant coefficient of *Tournament* in columns (3) and (4), this result persists even when we distinguish between male and female principals.

Result D 2 *Principals who believe that their agents would prefer to compete are more likely to send them to the tournament.*

In *GenderInfo*, we explore the association between a principal's beliefs about an agent's preferred payment scheme and the agent's gender, finding that 45.59% principals think that male agents prefer to compete, compared to 35.29% for female agents. While principals more accurately predict male agents' willingness to compete (45.59% vs. 44.12%), they tend to overestimate the extent to which women are willing to enter the tournament (35.29% vs. 29.41%). Although this difference is not statistically significant ($\chi^2(1)$, $p = 0.221$), it may be considered an exploratory explanation as to why we find more women in the tournament when principals decide on their behalf.

6.3.3 Principal's preferences and characteristics

We move on to examine how the principals' characteristics affect the decision to send the agents into competition. In Table A.4, we run probit regressions, controlling for the principal's risk preferences, gender, UK residency, age and political affiliation. Additionally, we control for the principal's self-reported competitiveness. The results show that risk and competitiveness are the only significant determinants of the principal's choice of payment scheme. The more risk-seeking and competitive a principal is, the more likely he or she is to send an agent to the tournament. Despite the significant differences between genders in terms of risk and competitiveness, we do not find any significant interaction effect, suggesting that the results are not mediated by

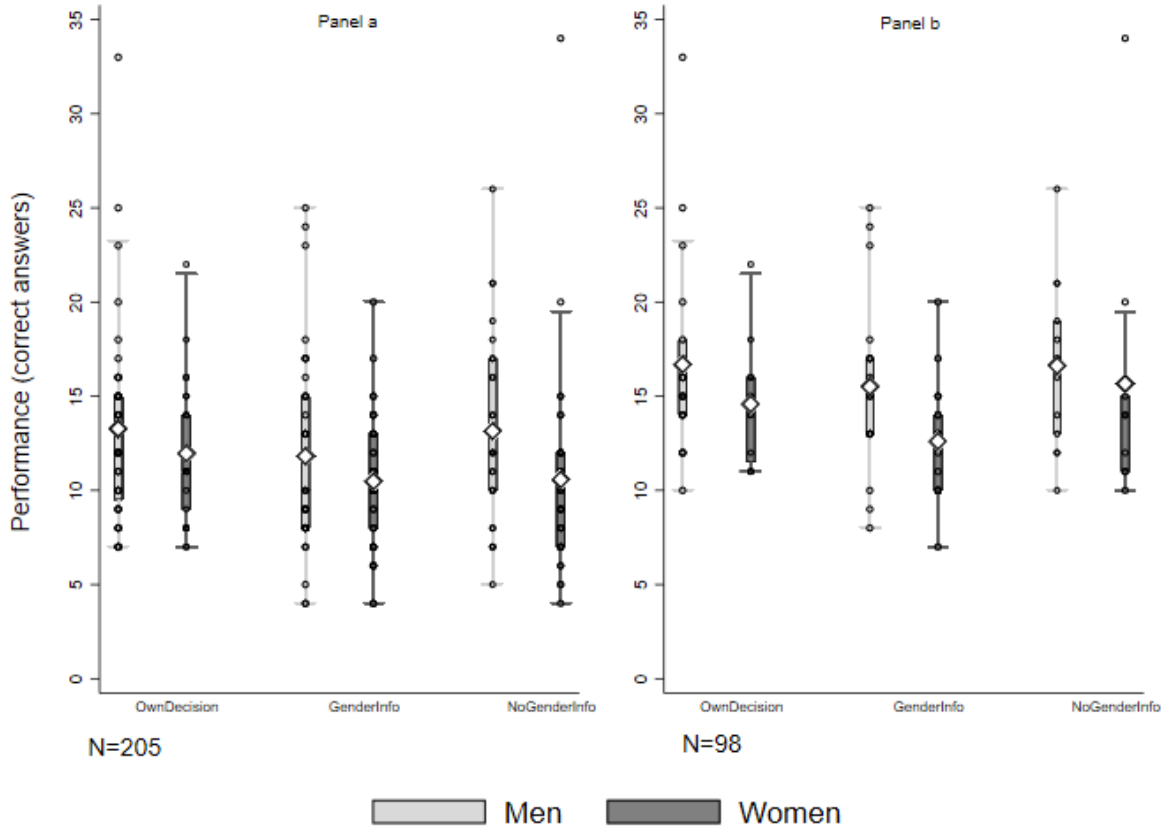
the gender of the principal. In column(3), we study the gender component in more detail by examining the interaction between the agent's and principal's gender in *GenderInfo*. We find no significant effect for the interaction between female agents and female principals ($p = 0.754$), suggesting that the decisions of male and female principals do not depend on the gender of their assigned agents.

Result D 3 *The more risk-seeking and competitive principals are, the more likely they are to send their assigned agents to the tournament.*

6.4 Efficiency

6.4.1 Performance in Stage 3 of competing subjects

Figure 2: Performance of those competing (panel a) and winning (panel b) in Stage 3 by treatment and gender.



Note: Box plots show the mean (indicated by the white diamonds), the 25th and 75th percentiles, Tukey whiskers (median ± 1.5 times interquartile range), and individual data points. Larger dots indicate a higher number of participants with the corresponding performance.

When focusing on the performances of those competing in Stage 3, our data, depicted in Figure 2, shows that agents in *OwnDecision* solved significantly more sums on average than those

is *GenderInfo* (Wilcoxon rank-sum test, $p < 0.05$), but the performances do not differ when comparing *GenderInfo* to *NoGenderInfo* (Wilcoxon rank-sum test, $p = 0.727$).[19,20] Although these results might suggest that agents' performance is lower when being sent to the competition, one has to take into account previous performance in the real effort task. In a series of regressions in Table A.5, we use Stage 3 performance as a dependent variable and include past performance in Stage 1 and Stage 2 as independent variables. When controlling for previous performance, we find that the number of sums solved in Stage 3 is not significantly affected by whether the incentive scheme was chosen by the decision-maker or by the principal ($p > 0.160$). With respect to gender, the regression results do not report any differences ($p > 0.457$).

Result E 1 *We find no efficiency loss with respect to performance when agents are made to compete.*

Next, we examine whether or not the performance differs if the principal's decision is in line with the agent's preference. Comparing *GenderInfo* and *NoGenderInfo*, out of all agents that are made to compete, about 60% would have preferred the piece rate. On average, agents whose preferences to compete coincided with the actions of the principals, solved more matrices than agents who would have preferred the piece rate but were sent to the tournament (Wilcoxon rank-sum test, $p < 0.05$). Once we control for past performance, the effect of the correspondence between the agent's preferences and the principal's choice on performance in Stage 3 becomes insignificant (see regressions in Table A.6).

With respect to the winners' performances, panel B in Figure 2 indicates that winners in *OwnDecision* perform better than the ones in *GenderInfo* (Wilcoxon rank-sum test, $p = 0.080$). The result is driven by winning females having higher performances in *OwnDecision* compared to *GenderInfo* (Wilcoxon rank-sum tests: Men, $p = 0.635$; Women, $p < 0.10$). Comparing *GenderInfo* with *NoGenderInfo*, we do not find any difference (Wilcoxon rank-sum test, $p = 0.161$), even when taking gender into account (two Wilcoxon rank-sum tests, $p > 0.323$). This outcome-related measure suggests that efficiency is higher when subjects decide on their own whether or not to enter the tournament.

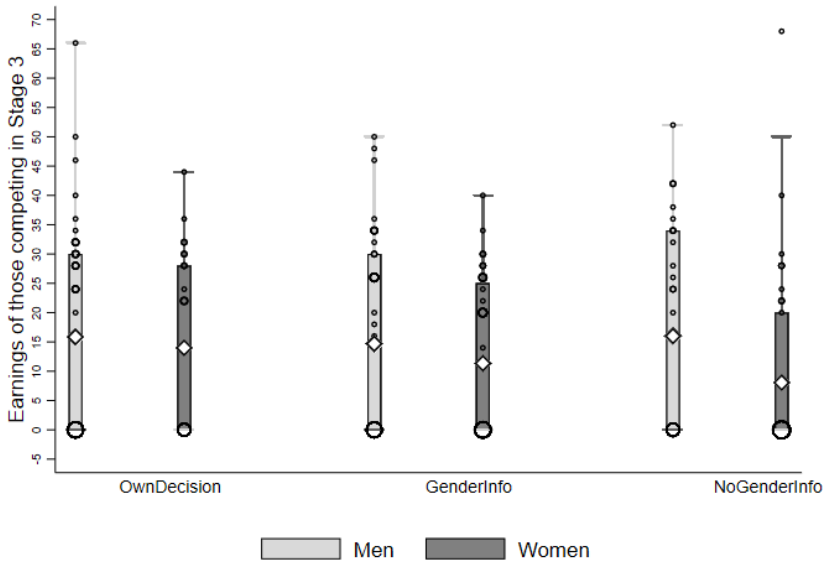
[19]This insignificant difference can also be seen as a robustness check which shows that agents behave in the same way in *GenderInfo* and *NoGenderInfo*. This is expected as the agents' task and instructions are the same for *GenderInfo* and *NoGenderInfo*.

[20]Following the analysis by Balafoutas and Sutter (2012), we define the quality profile, measured in terms of Stage 1 or Stage 2 performance, of the persons competing. We find that agents' performance is weaker when competing in *GenderInfo* and *NoGenderInfo*, compared to *OwnDecision*. Details, including the statistical analysis, are provided in the SOM.

Result E 2 *We find lower efficiency with respect to the winner's performance when agents are made to compete.*

6.4.2 Earnings in Stage 3 of competing subjects

Figure 3: Earnings of those competing in Stage 3 by treatment and gender (N = 205)



Note: Box plots show the mean (indicated by the white diamonds), the 25th and 75th percentiles, Tukey whiskers (median ± 1.5 times interquartile range), and individual data points. Larger dots indicate a higher number of participants with the corresponding performance.

Average earnings shown in Figure 3 do not differ between treatments (Kruskal Wallis test, $p = 0.737$), but do differ between genders (Wilcoxon rank-sum test, $p < 0.05$). Table A.7 reports regressions in which Stage 3 earnings are considered as the dependent variable. When the choices of principals and the preferences of the agents overlap, earnings in Stage 3 for those competing are higher ($p < 0.05$). Again, once we control for previous performance, the difference is no longer significant. Examining further whether there is an indication of a gender pay gap, we find that in *NoGenderInfo*, women's earnings in Stage 3 are almost half the size of men's (see joint coefficients tests *Female + NoGenderInfo X (A) Female*, $p < 0.01$). This may be because the average number of matrices solved in Stage 3 is higher for males than females in this particular treatment (Wilcoxon rank-sum test, $p < 0.05$).

Result E 3 *Being made to compete does not reduce efficiency measured in terms of earnings.*

7 Conclusion

In the last decade, much attention has been devoted to studying gender differences in competitiveness, particularly when the choice to compete is made by an individual themselves (for a summary, see Niederle, 2017). Even though many decisions in life are made on behalf of others, we know surprisingly little about how individuals make competitiveness decisions for someone else. To illuminate this uncharted area, this paper examines competitiveness decisions on behalf of others using an economic experiment. We offer several novel findings. First, whenever a principal decides for an agent, we find no gender difference in competing. This is mainly driven by more women being sent to competitions when someone else is deciding for them. Second, we show that the agents' gender does not influence principals' decisions to make agents compete. Additionally, we replicate existing results, documenting that when choosing for themselves, females are less likely to compete than men.

In terms of determinants of principals' decisions, we report that more risk-seeking and competitive principals are more likely to make agents compete. This effect does not depend on the principals' gender. Another factor that affects whether agents are made to compete is principals' beliefs about how well an agent performed compared to others. Efficiency, defined as average performance and earnings in Stage 3, does not suffer if one is made to compete compared to deciding for oneself. However, efficiency in terms of the Stage 3 winner's performance is higher when subjects choose to enter the tournament than when they are being made to compete.

On the basis of this, we conclude that letting others decide may be an efficient way to achieve equal gender representation in tournaments. In the context of the labour market, our results suggest that encouragements and decisions commonly made on behalf of others may contribute to increasing the representation of women in competitive situations which they themselves may initially have avoided. In turn, this may support the success of companies (Wolfers, 2006; Weber & Zulehner, 2010), and increase the number of female role models in the labour market, further contributing to narrowing the gender gap in competitiveness (Mansour, Rees, Rintala, & Wozny, 2020; Willén, Riise, & Willage, 2019).

Future studies could fruitfully extend our design by using a setting in which individuals decide if they want to delegate the tournament entry decision to another person, revealing potential gender differences in this context. Moreover, studying if and how the decision to delegate is influenced by anticipated discrimination is worthy of researcher's attention. Finally,

investigating situations in which the principal's earnings are not perfectly aligned with the agent's could offer novel insights about further determinants underlying the decision to make others compete.

8 Additional Notes

8.1 Acknowledgements

We thank Loukas Balafoutas for his support and time spent on lively discussions of the paper, Daniele Nosenzo, Martin Sefton, Matthias Dahm, Alex Possajennikov, Sigve Tjøtta and Rita Ginja for their valuable comments, Jose Guinot Saporta for his excellent programming assistance, participants of Brown Bag seminars at the University of Nottingham, the University of Bergen and the Norwegian School of Economics. We gratefully acknowledge financial support from the SFB F63 "Credence Goods, Incentives and Behavior", which is funded by the Austrian Science Fund (FWF), the Lauritz Meltzer Fund and the University of Bergen.

8.2 Further information

Authors contributions: All authors have contributed equally to this study and share the responsibility for its content. **Supplementary Online Material**: The supplementary online material for online publication is available using the following link: https://www.helenafornwagner.com/som-him-or-her **Competing interests:** The authors declare no competing interests. **Data availability:** The data that support the findings of this study are available from the corresponding author upon request. In case the publishing journal would like us to publish the data with the paper, we are happy to do this.

References

Almås, I., Cappelen, A. W., Salvanes, K. G., Sørensen, E. Ø., & Tungodden, B. (2016a). What explains the gender gap in college track dropout? Experimental and administrative evidence. *American Economic Review*, *106*(5), 296–302.

Almås, I., Cappelen, A. W., Salvanes, K. G., Sørensen, E. Ø., & Tungodden, B. (2016b). Willingness to compete: Family matters. *Management Science*, *62*(8), 2149–2162.

Ambuehl, S., Bernheim, B. D., & Ockenfels, A. (2019). *Projective paternalism* (Tech. Rep.). National Bureau of Economic Research.

Andersen, S., Ertac, S., Gneezy, U., List, J. A., & Maximiano, S. (2013). Gender, competitiveness, and socialization at a young age: Evidence from a matrilineal and a patriarchal society. *Review of Economics and Statistics*, *95*(4), 1438–1443.

Balafoutas, L., Fornwagner, H., & Sutter, M. (2018). Closing the gender gap in competitiveness through priming. *Nature Communications*, *9*(1), 1–6.

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

Balafoutas, L., & Sutter, M. (2019). How uncertainty and ambiguity in tournaments affect gender differences in competitive behavior. *European Economic Review*, *118*, 1–13.

Baldiga, N. R., & Coffman, K. B. (2018). Laboratory evidence on the effects of sponsorship on the competitive preferences of men and women. *Management Science*, *64*(2), 888–901.

Becker, G. S., et al. (1971). The economics of discrimination. *University of Chicago Press Economics Books*.

Berge, L. I. O., Bjorvatn, K., Pires, A. J. G., & Tungodden, B. (2015). Competitive in the lab, successful in the field? *Journal of Economic Behavior & Organization*, *118*, 303–317.

Bertrand, M., Chugh, D., & Mullainathan, S. (2005). Implicit discrimination. *American Economic Review*, *95*(2), 94–98.

Black, S. E., & Strahan, P. E. (2001). The division of spoils: Rent-sharing and discrimination in a regulated industry. *American Economic Review*, *91*(4), 814–831.

Bohren, J. A., Imas, A., & Rosenberg, M. (2019). The dynamics of discrimination: Theory and evidence. *American Economic Review*, *109*(10), 3395–3436.

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

Bottino, E., García-Muñoz, T., & Kujal, P. (2016). Gender biases in delegation. *ESI Working Paper 16-22*.

Brock, J. M., & De Haas, R. (2019). Gender discrimination in small business landing. Evidence from a lab in-the-field experiment in Turkey. *EBRD Working Paper*.

Buser, T., Geijtenbeek, L., & Plug, E. (2018). Sexual orientation, competitiveness and income. *Journal of Economic Behavior & Organization*, *151*, 191–198.

Buser, T., Niederle, M., & Oosterbeek, H. (2014). Gender, competitiveness, and career choices.

The Quarterly Journal of Economics, *129*(3), 1409–1447.

Buser, T., Niederle, M., & Oosterbeek, H. (2020). Can competitiveness predict education and labor market outcomes? Evidence from incentivized choice and survey measures. *SSRN Electronic Journal*.

Cadsby, C. B., Servátka, M., & Song, F. (2013). How competitive are female professionals? A tale of identity conflict. *Journal of Economic Behavior & Organization*, *92*, 284–303.

Cash, T. F., Gillen, B., & Burns, D. S. (1977). Sexism and beautyism in personnel consultant decision making. *Journal of Applied Psychology*, *62*(3), 301.

Castillo, M., & Petrie, R. (2010). Discrimination in the lab: Does information trump appearance? *Games and Economic Behavior*, *68*(1), 50–59.

Chakraborty, P. (2019). It's a match! Or is it? A lab experiment on mentorship.

Charness, G., Cobo-Reyes, R., Sanches, Á., & Meraglia, S. (2018). Anticipated discrimination, choices, and performance: Experimental evidence.

Clain, S. H. (2000). Gender differences in full-time self-employment. *Journal of Economics and Business*, *52*(6), 499–513.

Cohen-Zada, D., Krumer, A., Rosenboim, M., & Shapir, O. M. (2017). Choking under pressure and gender: Evidence from professional tennis. *Journal of Economic Psychology*, *61*, 176–190.

Croson, R., & Gneezy, U. (2009). Gender differences in preferences. *Journal of Economic Literature*, *47*(2), 448–474.

Datta Gupta, N., Poulsen, A., & Villeval, M. C. (2013). Gender matching and competitiveness: Experimental evidence. *Economic Inquiry*, *51*(1), 816–835.

Eby, L. T., Allen, T. D., Evans, S. C., Ng, T., & DuBois, D. L. (2008). Does mentoring matter? A multidisciplinary meta-analysis comparing mentored and non-mentored individuals. *Journal of Vocational Behavior*, *72*(2), 254–267.

Egan, M. L., Matvos, G., & Seru, A. (2017). *When Harry fired Sally: The double standard in punishing misconduct* (Tech. Rep.). National Bureau of Economic Research.

Erat, S. (2013). Avoiding lying: The case of delegated deception. *Journal of Economic Behavior & Organization*, *93*, 273–278.

Eriksen, K. W., Kvaløy, O., & Luzuriaga, M. (2020). Risk-taking on behalf of others. *Journal of Behavioral and Experimental Finance*, *26*, 100283.

European Commission. (2019). She figures 2018.

Exley, C. L., Niederle, M., & Vesterlund, L. (2020). Knowing when to ask: The cost of leaning in. *Journal of Political Economy*, *128*(3), 816–854.

Fallucchi, F., Nosenzo, D., & Reuben, E. (2019). Measuring preferences for competition with experimentally-validated survey questions. *CeDEx Discussion Paper Series ISSN 1749 - 3293*.

Fallucchi, F., & Quercia, S. (2018). Affirmative action and retaliation in experimental contests. *Journal of Economic Behavior & Organization*, *156*, 23–40.

Fershtman, C., & Gneezy, U. (2001). Strategic delegation: An experiment. *RAND Journal of Economics*, 352–368.

Fisk, S. R., & Overton, J. (2019). Who wants to lead? Anticipated gender discrimination reduces women's leadership ambitions. *Social Psychology Quarterly*, *82*(3), 319–332.

Friedl, A., Pondorfer, A., & Schmidt, U. (2020). Gender differences in social risk taking. *Journal of Economic Psychology*, *77*(102182).

Füllbrunn, S., Luhan, W. J., & Sanfeycd, A. (2020). Current issues in decision making for others. *Journal of Economic Psychology*, *77*(102250).

Giamattei, M., Molleman, L., Seyed Yahosseini, K., & Gächter, S. (2019). Lioness lab–a free web-based platform for conducting interactive experiments online. *Available at SSRN 3329384*.

Gneezy, U., Leonard, K. L., & List, J. A. (2009). Gender differences in competition: Evidence from a matrilineal and a patriarchal society. *Econometrica*, *77*(5), 1637–1664.

Gneezy, U., & Rustichini, A. (2004). Gender and competition at a young age. *American Economic Review*, *94*(2), 377–381.

Greiner, B. (2015). Subject pool recruitment procedures: Organizing experiments with ORSEE. *Journal of the Economic Science Association*, *1*(1), 114–125.

Hamman, J. R., Loewenstein, G., & Weber, R. A. (2010). Self-interest through delegation: An additional rationale for the principal-agent relationship. *American Economic Review*, *100*(4), 1826–46.

Holt, C. A., & Laury, S. K. (2002). Risk aversion and incentive effects. *American Economic Review*, *92*(5), 1644–1655.

Hyde, J. S., Fennema, E., & Lamon, S. J. (1990). Gender differences in mathematics performance: A meta-analysis. *Psychological bulletin*, *107*(2), 139.

Kamas, L., & Preston, A. (2015). Can social preferences explain gender differences in economic

behavior? *Journal of Economic Behavior & Organization*, *116*, 525–539.

Kessel, D., Mollerstrom, J., & van Veldhuizen, R. (2019). Can simple advice eliminate the gender gap in willingness to compete? *Working Paper*.

Leibbrandt, A., Wang, L. C., & Foo, C. (2018). Gender quotas, competitions, and peer review: Experimental evidence on the backlash against women. *Management Science*, *64*(8), 3501–3516.

Mansour, H., Rees, D. I., Rintala, B. M., & Wozny, N. N. (2020). *The effects of professor gender on the post-graduation outcomes of female students* (Tech. Rep.). National Bureau of Economic Research.

Mason, M. A., Wolfinger, N. H., & Goulden, M. (2013). *Do babies matter? gender and family in the ivory tower*. Rutgers University Press.

Niederle, M. (2017). A gender agenda: A progress report on competitiveness. *American Economic Review*, *107*(5), 115–119.

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

Reuben, E., Sapienza, P., & Zingales, L. (2014). How stereotypes impair women's careers in science. *Proceedings of the National Academy of Sciences*, *111*(12), 4403–4408.

Reuben, E., Sapienza, P., & Zingales, L. (2015). Competitiveness and the gender gap among young business professionals. *CEPR Discussion Paper No. DP10924*.

Reuben, E., Wiswall, M., & Zafar, B. (2017). Preferences and biases in educational choices and labour market expectations: Shrinking the black box of gender. *The Economic Journal*, *127*(604), 2153–2186.

Saccardo, S., Pietrasz, A., & Gneezy, U. (2018). On the size of the gender difference in competitiveness. *Management Science*, *64*(4), 1541–1554.

Sarsons, H. (2017). Recognition for group work: Gender differences in academia. *American Economic Review*, *107*(5), 141–145.

Spencer, S. J., Steele, C. M., & Quinn, D. M. (1999). Stereotype threat and women's math performance. *Journal of Experimental Social Psychology*, *35*(1), 4–28.

Sutter, M., & Glätzle-Rützler, D. (2015). Gender differences in the willingness to compete emerge early in life and persist. *Management Science*, *61*(10), 2339–2354.

Tungodden, J. (2019). When parents decide: Gender differences in competitiveness.

Weber, A., & Zulehner, C. (2010). Female hires and the success of start-up firms. *American*

Economic Review, *100*(2), 358–361.

Willén, A., Riise, J., & Willage, B. (2019). Can female doctors cure the gender STEMM gap? Evidence from randomly assigned general practitioners. *NHH Dept. of Economics Discussion Paper*(18).

Wolfers, J. (2006). Diagnosing discrimination: Stock returns and CEO gender. *Journal of the European Economic Association*, *4*(2-3), 531–541.

Wozniak, D., Harbaugh, W. T., & Mayr, U. (2016). The effect of feedback on gender differences in competitive choices. *Available at SSRN 1976073*.

A Appendix

Table A.1: Principal's evaluations of agent's performance in *GenderInfo* and *NoGenderInfo*

	(1) Compete	(2) Compete	(3) Compete
GenderInfo	0.395**	0.303*	0.408**
	(0.161)	(0.155)	(0.162)
Performance 1	0.040		
	(0.047)		
Performance 2	-0.035		
	(0.043)		
(P) Belief 1	0.417***		0.430***
	(0.122)		(0.122)
(P) Belief 2	-0.746***		-0.752***
	(0.139)		(0.138)
(A) UK resident	-0.174	-0.198	-0.154
	(0.177)	(0.168)	(0.177)
(A) Age	-0.028	-0.031	-0.025
	(0.030)	(0.026)	(0.031)
Difference 1		-0.027	0.055
		(0.040)	(0.046)
Difference 2		0.041	-0.036
		(0.038)	(0.044)
Constant	1.090	0.563	0.926
	(0.747)	(0.627)	(0.738)
Observations	272	272	272

Note: Coefficients from probit regressions. Dependent variable: Compete (0 Piece Rate in Stage 3, 1 Tournament in Stage 3). *GenderInfo* (0 *NoGenderInfo*, 1 *GenderInfo*). Performance 1: Agent's performance in Stage 1. Performance 2: Agent's performance in Stage 2. (P) Belief 1 indicates beliefs about agent's performance in the session (1=25% highest - 4=lowest 25%). (P) Belief 2 indicates beliefs about agent's performance within the group (1 = Best - 4 = Worst). (A) UK resident (0 Other, 1 UK resident) indicates agent's residency. (A) Age indicates agent's age in years. Difference 1 = Stage 1 performance (A) - Trial round performance (P). Difference 2 = Stage 2 performance (A) - Trial round performance (P). Robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.2: Principal's evaluations of agent's performance in *GenderInfo*

	(1) Compete	(2) Male (P)	(3) Male (P)
(A) Female	0.714	1.356	0.343
	(0.570)	(0.869)	(1.069)
Performance 1	0.163*	0.128	0.145
	(0.089)	(0.130)	(0.140)
Performance 2	-0.094	0.004	-0.113
	(0.080)	(0.130)	(0.111)
(A) Female X Perf 1	-0.202	-0.194	-0.168
	(0.136)	(0.197)	(0.193)
(A) Female X Perf 2	0.123	0.041	0.142
	(0.121)	(0.180)	(0.205)
(P) Belief 1	0.442***	0.287	0.600***
	(0.162)	(0.280)	(0.222)
(P) Belief 2	-0.745***	-0.574**	-0.945***
	(0.173)	(0.247)	(0.258)
(A) UK resident	-0.267	-0.006	-0.649
	(0.236)	(0.328)	(0.411)
(A) Age	-0.022	-0.040	-0.018
	(0.035)	(0.050)	(0.051)
Constant	0.739	0.327	1.292
	(0.992)	(1.502)	(1.543)
Observations	136	68	68
Female (A) + Female (A) X Perf 1	insign.	insign.	insign.
Female (A) + Female (A) X Perf 2	insign.	insign.	insign.

Note: Coefficients from probit regressions. Dependent variable: Compete (0 Piece Rate in Stage 3, 1 Tournament in Stage 3). (A) Female (0 Male, 1 Female) indicates agent's gender. Performance 1: Agent's performance in Stage 1. Performance 2: Agent's performance in Stage 2. (P) Belief 1 indicates beliefs about agent's performance in the session (1 = Highest 25% - 4 = Lowest 25%). (P) Belief 2 indicates beliefs about agent's performance within the group (1 = Best - 4 = Worst). (A) UK resident (0 Other, 1 UK resident) indicates agent's residency. (A) Age indicates agent's age in years. Robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.3: Principal's beliefs about agent's preferred payment scheme

	(1) Compete	(2) Compete	(3) Male (P)	(4) Female (P)
GenderInfo	0.405**			
	(0.161)			
Performance 1	-0.035	-0.060	0.006	-0.170*
	(0.044)	(0.067)	(0.084)	(0.099)
Performance 2	0.034	0.052	0.006	0.123
	(0.039)	(0.059)	(0.075)	(0.088)
(A) UK resident	-0.197	-0.204	-0.113	-0.461
	(0.173)	(0.251)	(0.360)	(0.388)
(A) Age	-0.028	-0.021	-0.006	-0.019
	(0.025)	(0.041)	(0.056)	(0.056)
Tournament	0.918***	1.316***	2.057***	0.939***
	(0.162)	(0.347)	(0.472)	(0.343)
(A) Female		0.330	0.212	0.398
		(0.303)	(0.367)	(0.345)
Tournament X (A) Female		-0.258		
		(0.508)		
Constant	0.145	0.203	-0.333	0.605
	(0.648)	(0.945)	(1.284)	(1.403)
Observations	271	136	68	68
(A) Female + Tournament X (A) Female		insign.		
Tournament + Tournament X (A) Female		***		

Note: Coefficients from probit regressions. Dependent variable: Compete (0 Piece Rate in Stage 3, 1 Tournament in Stage 3). *GenderInfo* (0 *NoGenderInfo*, 1 *GenderInfo*). (A) Female (0 Male, 1 Female) indicates agent's gender. Performance 1: agent's performance in Stage 1. Performance 2: agent's performance in Stage 2. (A) UK resident (0 Other, 1 UK resident) indicates agent's residency. (A) Age indicates agent's age in years. Tournament measures the principals belief about the agents preferred payment scheme (0 Piece Rate in Stage 3, 1 Tournament in Stage 3). Robust standard errors are reported in parentheses. Column (1): *GenderInfo* vs. *NoGenderInfo*. Columns (2) - (4) focus the analysis within *GenderInfo*. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.4: Principal's characteristics and choice of payment scheme

	(1) Compete	(2) Compete	(3) Compete
GenderInfo	0.304*	0.334**	
	(0.157)	(0.160)	
Performance 1	-0.041	-0.036	-0.024
	(0.043)	(0.043)	(0.062)
Performance 2	0.035	0.031	0.028
	(0.038)	(0.038)	(0.056)
(A) Female			0.033
			(0.317)
(A) Female X (P) Female			0.140
			(0.446)
(P) Female		0.462	-0.062
		(0.764)	(0.317)
(P) Age		-0.029	
		(0.023)	
(P) UK resident		-0.180	
		(0.199)	
Risk	0.120**	0.050	
	(0.050)	(0.076)	
Comp. survey	0.078**	0.164***	
	(0.036)	(0.057)	
(P) Female X Risk		0.142	
		(0.101)	
(P) Female X Comp. Survey		-0.125*	
		(0.074)	
Constant	-0.453	-0.126	0.578
	(0.748)	(1.074)	(0.884)
Observations	272	272	136

Note: Coefficients from probit regressions. Dependent variable: Compete (0 Piece Rate in Stage 3, 1 Tournament in Stage 3). Female (0 Male, 1 Female) indicates agent's (A) or principal's (P) gender. Performance 1: agent's performance in Stage 1. Performance 2: agent's performance in Stage 2. Risk (1 High risk aversion - 10 Low risk aversion) indicates principal's risk preferences. Comp.survey indicates survey measured competitiveness attitudes (0 very unlike me - 10 Very like me). UK resident (0 Other, 1 UK resident) indicates principal's (P) residency. (P) Age indicates principal's age in years. Principal's political affiliation is included as control in Column 2. Agent's age and residency are included as controls in all regressions. Robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.5: Agents' performance in Stage 3 tournament

	(1) Performance 3	(2) Performance 3	(3) Performance 3	(4) Performance 3
GenderInfo	-0.508	-0.537		
	(0.408)	(0.438)		
Performance 1	0.412***	0.412***	0.437***	0.449***
	(0.097)	(0.097)	(0.094)	(0.103)
Performance 2	0.608***	0.548***	0.718***	0.677***
	(0.089)	(0.091)	(0.078)	(0.080)
(A) Female		0.290		-0.043
		(0.390)		(0.399)
(A) Age		-0.092		-0.011
		(0.059)		(0.091)
(A) UK resident		-0.332		0.514
		(0.457)		(0.400)
(A) Math ability		0.436**		0.256
		(0.192)		(0.156)
NoGenderInfo			0.519	0.476
			(0.368)	(0.368)
Constant	1.080*	1.647	-0.858	-1.834
	(0.548)	(1.750)	(0.544)	(2.218)
Observations	143	143	140	140

Note: Coefficients from OLS regressions. Columns (1) and (2): *OwnDecision* vs. *GenderInfo*. Columns (3) and (4): *GenderInfo* vs. *NoGenderInfo*. Dependent variable: performance in Stage 3 tournament. Treatments (0 *OwnDecision*, 1 *GenderInfo*, 2 *NoGenderInfo*). (A) Female (0 Male, 1 Female) indicates agent's gender and the decision makers gender in *OwnDecision*. Performance 1: agent's performance in Stage 1. Performance 2: agent's performance in Stage 2. (A) UK resident (0 Other, 1 UK resident) indicates agent's residency. (A) Age indicates agent's age in years. (A) Maths ability (1 Very poor - 7 Excellent) indicates agent's self reported maths abilities. Robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.6: Effect of correspondence between principal's choice and agent's preference on performance in Stage 3 tournament

	(1) Performance 3	(2) Performance 3
NoGenderInfo	0.633	0.517
	(0.799)	(0.373)
(A) Female	-1.530*	-0.073
	(0.839)	(0.499)
Correspondence	2.038**	-0.539
	(0.911)	(0.648)
Performance 1		0.482***
		(0.100)
Performance 2		0.718***
		(0.080)
(A) Female X Correspondence		-0.376
		(0.757)
(A) Age		0.032
		(0.095)
(A) UK resident		0.629
		(0.410)
Constant	11.103***	-2.050
	(0.855)	(2.226)
Observations	140	140

Note: Coefficients from OLS regressions. Dependent variable: performance in Stage 3 tournament. Treatments (0 *GenderInfo*, 1 *NoGenderInfo*). (A) Female (0 Male, 1 Female) indicates agent's gender. Performance 1: agent's performance in Stage 1. Performance 2: agent's performance in Stage 2. (A) Age indicates agent's age in years. Robust standard errors are reported in parentheses. (A) UK resident (0 Other, 1 UK resident) indicates agent's residency.Robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.7: Earnings of those competing in Stage 3

	(1) Earnings	(2) Earnings	(3) Earnings
GenderInfo	-1.166	2.997	0.947
	(4.016)	(2.073)	(0.779)
NoGenderInfo	0.150	0.512	0.189
	(4.516)	(2.457)	(0.914)
(A) Female	-1.850	1.902	-0.082
	(4.247)	(2.357)	(0.739)
GenderInfo X (A) Female	-1.484	-1.411	-0.818
	(5.488)	(3.092)	(1.072)
NoGenderInfo X (A) Female	-6.093	-2.493	0.738
	(6.079)	(3.397)	(1.253)
Performance 3		2.853***	1.428***
		(0.089)	(0.126)
Win			21.928***
			(0.777)
Constant	15.850***	-22.024***	-13.523***
	(2.918)	(1.886)	(1.317)
Observations	205	205	205
Female + *GenderInfo* X (A) Female	insign.	insign.	insign.
Female + *NoGenderInfo* X (A)Female	*	insign.	insign.

Note: Coefficients from OLS regressions. Dependent variable: earnings of agent's competing in Stage 3. Treatments (0 *OwnDecision*, 1 *GenderInfo*, 2 *NoGenderInfo*). (A) Female (0 Male, 1 Female) indicates agent's gender and the decision makers gender in *OwnDecision*. Performance 3: agent's performance in Stage 3. Win (0 Lose tournament in Stage 3, 1 Win tournament in Stage 3). Robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.