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Choosing Competition on Behalf of Someone Else

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Abstract. We extend the existing literature on gender differences in competitive behavior by investigating tournament entry choices when a principal decides for an agent. In a laboratory experiment, we randomly assign subjects the role of either principal or agent. The principal decides whether the agent performs a real-effort task under piece-rate or tournament incentives. When deciding, the principal is informed about the agent's previous performance, age, and residency. Between treatments, we vary whether the principal knows the agent's gender. In a baseline treatment, we replicate the standard setting in which subjects decide for themselves whether to compete. Our main findings are, first, that there is no gender gap in tournament entry when principals decide for agents as opposed to the baseline treatment. Second, the gender gap closes because more women are made to compete by principals. Third, whereas there is no gender gap in either of the principal treatments, revealing the agent's gender is associated with higher overall tournament entry rates. Exploratory analyses of principals' choice determinants reveal a positive effect of preferences to take risks, competitiveness, and confidence in agents' performances on making agents compete. In addition, we find no difference in how principals evaluate male and female agents' performances. Finally, we test the efficiency of principals' competition choices and show that they lead to fewer payoff-maximizing outcomes than when subjects decide for themselves. Additionally, overall tournament performances and winners' performances are lower when agents are made to compete, but this effect is not robust to controlling for agents' previous performances.

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Keywords: competitiveness • gender differences • decision making for others • laboratory experiment

1. Introduction

Despite important advances over the past century, differences in labor market outcomes between women and men are persistent (see, e.g., European Commission 2019). Possible explanations include discrimination (Black and Strahan 2001); anticipated discrimination (Fisk and Overton 2019, Charness et al. 2020); gender differences in preferences regarding the type of employment, rank, or position (Clain 2000); or difficulty balancing family and career (Mason et al. 2013). Another explanation focuses on gender differences in preferences for competition, suggesting that women tend to shy away from competitive environments (see, e.g., Niederle and Vesterlund 2007). This tendency is particularly problematic if payment schemes involving competition also pay higher wages, and it may partly explain the gender pay gap (Blau and Kahn 2017). As such, understanding the causes and consequences of the gender differences in preferences to compete has attracted attention in recent years and sparked a vast follow-up literature (for a survey, see Niederle 2017).

To date, research on competitiveness examines how individuals make competitive choices when deciding for themselves. However, many important decisions are not entirely up to an individual but are made by others

(Füllbrunn et al. 2020).[1] This raises the question of whether the gender differences in choosing to compete extend to principals, either because they treat male and female agents differently or because male and female principals make different choices. Although the literature on gender and competitiveness has grown considerably over the past decade, these questions remain largely unexplored. In this paper, we ask whether there is a gender difference in tournament entry when the decision to compete is not made by an individual (i.e., an agent), but by someone else who faces the same monetary consequences of the tournament entry choice (i.e., a principal). Moreover, we examine how the entry rates of men and women differ when deciding for themselves as opposed to being made to compete, and finally, we causally investigate the role of gender information when deciding for others. In addition, we explore the role of other determinants that may underlie the choice to make others compete and, importantly, the efficiency consequences related to principals deciding for agents.

We conduct a laboratory experiment employing a modified version of the Niederle and Vesterlund (2007) design. Three treatments—*GenderInfo*, *NoGenderInfo*, and *OwnDecision*—are implemented using a between-subjects design. In *GenderInfo* and *NoGenderInfo*, we randomly assign subjects the role of either principal or agent. Each principal is matched with one agent. The agents perform a real-effort task, first under a piece-rate (stage 1) and then a tournament (stage 2) payment scheme. Then, the principal chooses which scheme to apply to the agent's future performance in the real-effort task (stage 3). In *GenderInfo*, the principals are informed of their agent's absolute performance in stages 1 and 2 as well as the agent's gender, age, and UK residency. In *NoGenderInfo*, principals receive the same information except the agent's gender. In both treatments, if stage 3 is randomly chosen for payment, the principal and agent are paid according to the agent's performance in stage 3 such that the monetary incentives of principals and agents are aligned. We compare the principals' tournament entry choices and the agents' performances to *OwnDecision*, in which subjects choose for themselves under which incentive scheme to work in stage 3.

In line with the existing literature, we find a significant gender gap in competitiveness (GGC) when subjects decide for themselves; in particular, men are 1.6 times more likely than women to compete. However, when a principal chooses on behalf of an agent, there is no GGC. Comparing choices in *GenderInfo* to *OwnDecision* suggests that the GGC closes as a consequence of significantly more women being made to compete when principals decide. Furthermore, a comparison of *GenderInfo* and *NoGenderInfo* allows us to discern the extent to which information about the agent's gender affects the principal's choice. Whereas there is no GGC in either of the principal treatments, revealing the agent's gender results in higher overall tournament entry rates in *GenderInfo* compared with *NoGenderInfo*. Although we did not hypothesize this result ex ante, we discuss some potential reasons for why this may be the case.

An exploratory analysis of the determinants behind the principal's decision shows that the principal's gender and the interaction of the principal's and the agent's genders do not affect the choice of payment scheme. However, more competitive and risk-seeking principals are more likely to choose competition for their agents; hence, the principals' preferences matter for their choices. Whereas we observe a gender gap in confidence among subjects performing the real-effort task in *OwnDecision* and *GenderInfo*, principals do not evaluate the relative performance of female agents differently from males in *GenderInfo*. Relatedly, agents who are perceived to perform better in the tournament are more likely to be made to compete by their principals, suggesting that the primary motivation of the principals is to maximize earnings by sending who they perceive to be the best agents to the tournament. Finally, in terms of efficiency, our results suggest that closing the GGC in our setting comes at the cost of principals making less payoff-maximizing decisions. Moreover, the average tournament performance and the performance of winning subjects are lower when agents are made to compete by principals. Still, this effect is not robust to controlling for subjects' general abilities in the real-effort task.

Choosing on behalf of others is an integral part of life and professional environments, and gender may be an essential factor in shaping the perceived suitability of individuals in competitive environments. Using a controlled laboratory environment, our paper makes a twofold contribution to the literature concerned with these questions: First, we show that the commonly documented GGC does not carry over to situations in which a principal decides for an agent. Second, we examine the role of the agent's gender when principals choose while controlling for factors such as performance, preferences, and beliefs that may underlie the decision to make the agent compete; indeed, in many naturally occurring situations, principals have more accurate information about agent's preferences and abilities than in our laboratory setting. However, estimating the causal impact of gender information with observational data may be challenging or even impossible because of several confounding factors. One such factor is that genders of the principal and the agent cannot be exogenously manipulated as in an experiment because these are typically known. Moreover, selection by principals and agents may cause unobservable characteristics to correlate with choices, performance, and other important outcome variables.

The rest of the paper is structured as follows: Section 2 summarizes the related literature, Section 3 outlines the experimental design, Section 4 provides the data analysis and results, and Section 5 concludes the paper.

2. Related Literature

2.1. Willingness to Compete

Over the last decades, a vast literature documenting gender differences in competitiveness has accumulated. This literature generally suggests that fewer women enter competitive environments than men when deciding for themselves (see, e.g., Niederle and Vesterlund 2007, Datta Gupta et al. 2013, Sutter and Glätzle-Rützler 2015, Almås et al. 2016b, Niederle 2017, Saccardo et al. 2018, Balafoutas and Sutter 2019). This behavioral pattern is replicated in various contexts and is robust to different specifications. Nonetheless, some exceptions include matriarchal societies in which women and men are equally competitive (Andersen et al. 2013) or women are more competitive than men (Gneezy et al. 2009) and girls' schools in which female students are more competitive compared with those enrolled in mixed-sex schools (Booth and Nolen 2012). Furthermore, the GGC disappears when women compete against themselves rather than against someone else (Apicella et al. 2017) or when they compete as part of a team (Dargnies 2012).

A person's competitiveness, as measured in the economic laboratory, is important as it correlates with various choices and characteristics relevant for education and labor market outcomes. For example, less competitive individuals are less likely to apply for jobs in which their salaries are tied to how well they perform compared with others (Flory et al. 2015). Moreover, those who are more competitive in laboratory experiments are found to be more likely to choose competitive educational programs (e.g., Buser et al. 2014, 2020; Almås et al. 2016a; Reuben et al. 2017), have a higher income (e.g., Kamas and Preston 2015, Reuben et al. 2015, Buser et al. 2018), and become entrepreneurs (Berge et al. 2015).

Given the implications of these findings, a body of research looks for ways to close the GGC. Some studies change the institutional environment to resemble different affirmative-action policies to obtain gender balance in competitive environments. Examples include quotas (Niederle et al. 2013, Baldiga and Coffman 2018, Leibbrandt et al. 2018), preferential treatment (Balafoutas and Sutter 2012), and allowing the prize to benefit one's offspring (Cassar et al. 2016). Whereas many interventions are shown to narrow the GGC, there is growing evidence that they tend to backfire on those favored (Fallucchi and Quercia 2018, Leibbrandt et al. 2018).

To circumvent these drawbacks and offer more easily implementable interventions, another stream of the literature documents that priming subjects with power (Balafoutas et al. 2018) or a professional, work-related identity (Cadsby et al. 2013) encourages women to enter competitions more often. Also, giving feedback about relative performance (Wozniak et al. 2016, Berlin and Dargnies 2016) and the earning implications related to competition avoidance (Kessel et al. 2021) successfully increases women's entry rates into tournaments. In addition, advice from more experienced people improves the entry of strong-performing women into competitions, making them more confident about their performance (Brandts et al. 2015).

2.2. Taking Decisions for Others

Whereas the majority of the existing literature on competitiveness focuses on individual decisions to enter a tournament, our paper adds to the more recent literature on making decisions on behalf of others in various domains (Füllbrunn et al. 2020). When it comes to choosing for others in competitive settings, Tungodden and Willén (2019) show that parents choose more competition for boys than for girls. Nonetheless, considering that a child's gender is always known to their parents, it becomes challenging to tease out the role of gender in choosing for others. Our experimental design allows us to causally investigate whether the GGC extends to situations in which principals decide.

The study by Ifcher and Zarghamee (2021), which was conducted independently and in parallel to ours, also examines whether the GGC persists in the context of decision making for others and leads to similar results, although building on somewhat different grounds. Our study differs in several aspects: First, whereas principals in Ifcher and Zarghamee (2021) are always informed about the agent's gender, we vary whether the gender information is provided between treatments. This allows us to causally examine the impact of gender information on making others compete. Furthermore, Ifcher and Zarghamee (2021) have subjects decide both for themselves and for someone else whether they should enter the tournament. In our case, principals decide for someone else and also report hypothetical choices for themselves. The reason why we kept these choices as hypothetical choices is to avoid anchoring and spillovers to the actual decision to make others compete, which is our main focus. Finally, Ifcher and Zarghamee (2021) vary the principals' financial incentives in the game. In one case, they have no financial incentive, and in another, they receive 10% of the gains from their agent's payment. In our experiment, principals' incentives are always entirely in line with their agent's compensation.

Despite these differences, the results are very similar; there is no GGC when deciding for others. However, in our case, the gender gap in tournament entry closes because more women are being made to compete. In their case, it closes because of fewer men being sent into the competition. The similarities of results are reassuring, especially considering the recent prominence given to replication studies in the discipline.

In the risk domain, people in positions of authority are often called upon to select courses of action involving risk to themselves and others. So far, studies show mixed results. Some papers find that subjects take on more risk when investing money on behalf of others, whereas other papers find increased risk aversion (Eriksen et al. 2020, Friedl et al. 2020). Slovic et al. (1967) show experimentally that women and men, on average, make the same risky choices for others as for themselves. Our paper engages with this strand of the literature as sending an agent into the tournament is a risk-loaded choice even if the principals do not have to compete themselves. Moreover, we can control how risk preferences shape the principal's choice for the agent with our experimental setup.

In our setting, a principal always decides on behalf of an agent, and the agent must follow the principal's decision. Thus, more broadly, our paper also adds to the literature on delegation, which explores *whom* principals appoint to represent them. For example, varying whether the agent's gender is revealed in a dictator game with compulsory delegation, Bottino et al. (2016) show that male and female principals are more likely to delegate decisions to male agents over time. For a general summary of the delegation literature, see Erat (2013), Hamman et al. (2010), and Fershtman and Gneezy (2001).

2.3. Efficiency

Finally, we contribute to the literature investigating efficiency concerns related to narrowing the GGC. On the one hand, allowing principals to choose can have efficiency-enhancing effects by making high-performing individuals enter a competition. Such results are obtained by affirmative-action policies and more "soft" interventions, such as advice from third parties (Balafoutas and Sutter 2012, Brandts et al. 2015). On the other hand, efficiency losses can occur as, for example, individuals often have a better grasp of their abilities and preferences than those choosing on their behalf. For example, Exley et al. (2020) find that, when forced to negotiate, women achieve worse outcomes than when they decide whether to negotiate on their own. This study also suggests a paternalistic demand to force more women to enter negotiations than men.[2] Given the motivations that may be at play when choosing for others, it is not clear a priori whether principals in *GenderInfo* and *NoGenderInfo* or decision makers in *OwnDecision* will make more efficient tournament entry choices.

3. Experimental Design and Procedures

Six hundred eighty-eight students (343 men and 345 women) from the University of Nottingham participated in our experiment, conducted in March 2020 at the Centre for Decision Research and Experimental Economics.[3] Subjects were recruited through ORSEE (Greiner 2015) following the laboratory's standard recruitment procedures.[4] Upon arrival, participants knew only that the session was scheduled to last one hour and that it was an experiment in economics. On average, it took 45 minutes for the participants to complete the study. The average payment was £10.40 (including a £4 show-up fee).

For comparability purposes, we build on the design by Niederle and Vesterlund (2007) and use the same real-effort task.[5] The task consists of finding the sum of a series of five randomly drawn two-digit numbers within five minutes without using a calculator.[6] Each series of numbers is shown on a computer screen together with an input box, a submit button, and a counter indicating the number of correctly and incorrectly solved addition tasks. Once the participants submit their answers, the next series of numbers appears, and the counter updates, indicating whether the submitted answer was correct or incorrect. Detailed experimental instructions can be found in the supplementary online material (SOM).

Subjects first perform the task under a piece-rate payment scheme (stage 1) and then in a tournament (stage 2) against three other subjects. In stage 3, depending on the treatment, they are either asked to choose between the piece-rate and the tournament payment or someone else—a randomly matched principal—decides on their behalf.[7] In the final stage, stage 4, all participants go through an incentivized Holt and Laury (2002) lottery task to measure their individual risk preference. A random draw decides which stage is chosen for payment; each has an equal probability of being selected. At the end, subjects answer a variety of nonincentivized survey questions. Table 1 provides a timeline of the experimental stages.

We implement a between-subjects experimental design comprised of three treatments: *OwnDecision*, *GenderInfo*, and *NoGenderInfo*. *OwnDecision* mimics the standard Niederle and Vesterlund (2007) design, in which subjects decide for themselves whether to enter the tournament in stage 3. We refer to subjects in the *OwnDecision* treatment as decision makers. This treatment serves as a benchmark against which we compare the effect of choosing a payment scheme on behalf of someone else. In *GenderInfo* and *NoGenderInfo*, subjects are randomly assigned to the role of principal or agent, and they remain within this role throughout the study. Each principal is randomly matched with an agent. The principal's task is to decide which payment scheme to apply to their agents' performance in stage 3. Before choosing, they are provided with information on their screen about their agent's age, UK residency, and absolute performance in stages 1 and 2.[8] The only difference between *GenderInfo* and *NoGenderInfo* is whether the

Table 1. Main Features of the Experimental Design

Role	Stage 1	Stage 2		Stage 3	Stage 4
Decision maker	Piece-rate Real-effort task Belief elicitation	Tournament Real-effort task Belief elicitation	Own choice	Real-effort task	Lottery
Agent (A)	Piece-rate Real-effort task Belief elicitation	Tournament Real-effort task Belief elicitation	Belief about P's choice Own preference	P's choice revealed Real-effort task	Lottery
Principal (P)	Trial	Waiting time	Choice for A Belief elicitation Own preference	Implicit association test	Lottery

principals receive information about their agent's gender in addition to the other information.[9]

Table 2 shows the number of participants by treatment and role. We obtained the same share of male and female agents and decision makers in all treatments, ensuring that we had gender-balanced groups (among those who performed in stages 2 and 3).[10] In *GenderInfo* and *NoGenderInfo*, we had 69 pairs consisting of a male principal and a male agent (MM), 66 pairs 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 we had a similar number of same- and mixed-sex pairs.

3.1. Agents/Decision Makers

Here, we describe the procedures and incentives of subjects in the role of decision makers (*OwnDecision*) or agents (*GenderInfo* and *NoGenderInfo*). These subjects go through four stages, as shown in Table 1. Under the piece-rate scheme, they are paid £0.50 for each correct answer. Under the tournament payment scheme, they are randomly matched in gender-balanced groups of four. Only the person with the highest number of correctly solved addition tasks gets paid £2 per correct answer; the rest of the group receives no payment. In the case of a tie, the winner is chosen randomly. Subjects receive information about their group's gender composition but no further details about the other participants. In each stage, subjects receive feedback on their absolute performance, but they are not informed about their relative performance until the end of the experiment.

Table 2. Number of Participants by Treatment and Role

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

In stage 3, if a principal decides to send an agent into the tournament, the agent's performance is evaluated against the performance of the agent's group members in stage 2. If the agent solves more addition tasks in stage 3 than the agent's group members did in stage 2, the agent gets paid £2 for each matrix correctly solved; otherwise, the agent earns £0 in that stage.[11] This way, the principal's choice cannot be influenced by the expectation of the other principal's decisions. Subjects assigned to *OwnDecision*, the decision makers, go through the same stages as the agents, have the same monetary incentives, and are asked to guess their relative ranks but decide themselves on the payment scheme in stage 3 (see Table 1).

Agents are asked to guess their ranking within quartiles (top (1) to bottom (4)) compared with the other participants (stage 1) or other group members (stage 2) and are paid £0.50 in addition to their final payoff if their guess is correct. Also, before they discover which payment scheme has been chosen on their behalf, they are incentivized to guess which payment their principal is going to choose and asked which one they would have chosen for themselves.[12] This process allows us to control whether the agents' hypothetical choice affects their performance after discovering which incentive type has been chosen for them. Only one of the incentivized guesses is drawn to be paid at the end of the experiment. In the Holt and Laury (2002) task of stage 4, the subjects are asked to make a series of 10 pairwise decisions between lotteries, each having an equal probability of being chosen for payment.

3.2. Principals

Principals start the experiment with a two-minute, nonincentivized trial round of the real-effort task. Similar to agents, they see a counter indicating the total of correctly and incorrectly solved addition tasks. The trial round allows principals to familiarize themselves with the real-effort task, enabling them to make a more informed decision when choosing for their agent. Notably, to avoid anchoring and a direct comparison between the principals' and their agents' performance, they have less than half of the time assigned to their agents to perform the task. After the trial stage, the principals are informed that they have been paired with a randomly chosen subject (presented to them as player A) and are asked to select a payment type on the subject's behalf. If they choose the piece-rate, both receive £0.50 for each correct answer provided by the agent. If they select the tournament, both receive £2 per correct answer if the agent's performance in stage 3 exceeds that of the other group members in stage 2. Otherwise, they receive no payment. The principal's decision screen contains information about the agent's absolute performance in stages 1 and 2 as well as the agent's age, UK residency, and in *GenderInfo*, the agent's gender.

After the principals have chosen, they guessed which incentive scheme the agents would have chosen if they had the chance to and how well they think their assigned agent performed in stage 1 (relative to the other players in the room) and stage 2 (relative to the other group members). They then complete an implicit association test (IAT) (Greenwald et al. 1998) before moving to the Holt and Laury (2002) lottery task.[13] Additionally, at the end of the experiment, the principals are asked to guess which gender solved more tasks on average, first under the piece-rate and then the tournament payment scheme. One guess is randomly chosen at the end of the experiment, paying £0.50 in addition if correct. We also ask the principals which incentive type they would have chosen for themselves.

4. Results

This section is structured as follows. First, we provide an overview of the summary statistics. Second, we focus on the main results of this paper: the tournament entry decisions and whether they differ when subjects choose for themselves in *OwnDecision* compared with when principals decide on their behalf in *GenderInfo* and *NoGenderInfo*. Third, we explore some of the determinants that may underlie the principal's choice, such as preferences for risk and competitions, other individual characteristics, and the role of confidence in the agent's relative performance. We conclude the analysis by investigating both ex ante and ex post efficiency measures across experimental treatments.

4.1. Summary Statistics

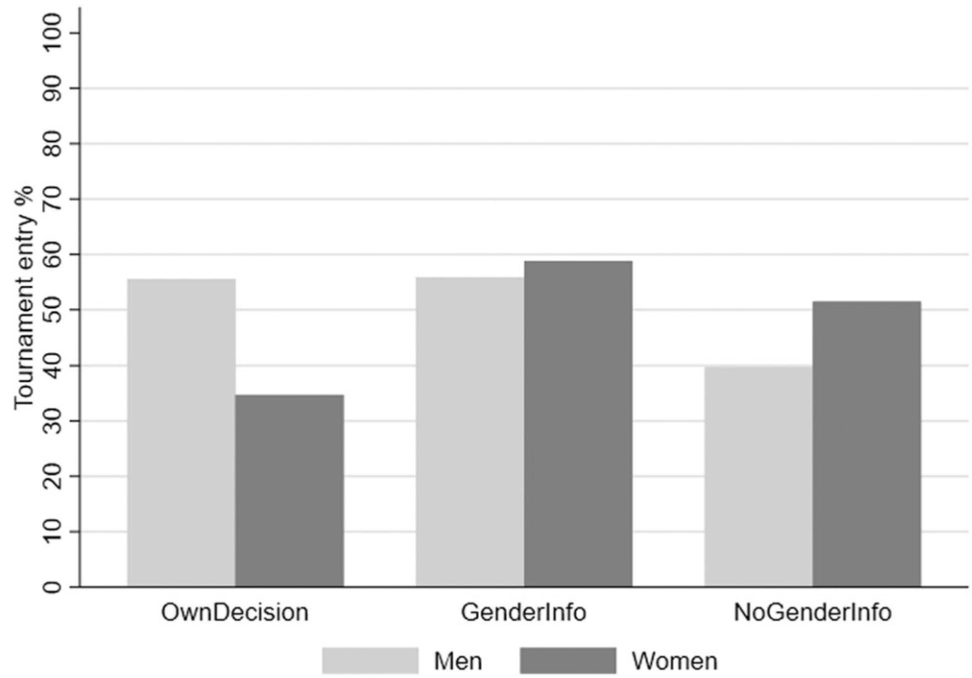
Online Table SOM 1 summarizes our subjects' demographics, which we also include as control variables in our analysis. Of the 688 participants, 345 are women (50.15%), participants are 21.83 years old on average, and 65.41% are UK residents. Online Tables SOM 2–SOM 5 further show that we generally have comparable samples across treatments and between roles. For conciseness, we do not present the details of all statistical tests in what follows; instead, we focus on comparing the characteristics of principals and decision makers as they make tournament entry choices. We also compare the performance of decision makers and agents in the real-effort task. For further descriptive statistics, we refer to the SOM.

Risk preferences (see Online Figure SOM 1), as elicited with the Holt and Laury (2002) lottery task, do not differ between treatments (Kruskal–Wallis test, $p = 0.606$), nor between the decision makers in *OwnDecision* and the principals in *GenderInfo* and *NoGenderInfo* (Wilcoxon rank-sum test, $p = 0.462$). In line with, for example, Charness and Gneezy (2012), women are, on average, more risk-averse than men across all treatments (Wilcoxon rank-sum test, $p < 0.05$). Female decision makers and principals do not differ in their risk preferences (Wilcoxon rank-sum test, $p = 0.489$). The same applies to male decision makers and principals (Wilcoxon rank-sum test, $p = 0.750$).

In *OwnDecision*, we elicit preferences for competition through subjects' actual choice of payment scheme. In *GenderInfo* and *NoGenderInfo*, we elicit principals' and agents' stated choices for themselves: what they would have chosen if they were the ones deciding and performing. No differences between treatments are found in the choice to compete ($\chi^2(2)$, $p = 0.627$). Furthermore, what decision makers choose does not differ from principals' hypothetical choices for themselves ($\chi^2(1)$, $p = 0.867$). Despite the random assignment of subjects to roles and treatments, male principals state, on average, a higher willingness to compete for themselves compared with female principals in *NoGenderInfo* ($\chi^2(1)$, $p < 0.01$) but not in *GenderInfo* ($\chi^2(1)$, $p = 0.730$). The potential implications of this difference for our main results are explored in Section 4.3.

Online Figure SOM 2 depicts the cumulative distributions of the agents' and decision makers' performance in stages 1 and 2. In stage 1, men perform better than women in *OwnDecision* (Wilcoxon rank-sum test, $p < 0.05$) and *GenderInfo* (Wilcoxon rank-sum test, $p < 0.10$). We do not find any gender difference in terms of stage 2 performance within each treatment (Wilcoxon rank-sum tests, $p > 0.134$).[14] Agents' performance increases between stages 1 and 2 in every treatment (signed-rank tests, $p < 0.01$ for each treatment, respectively), possibly because of learning effects or because subjects become more motivated to exert effort when competing. However, the increase in performance does not differ between men and women (Wilcoxon rank-sum test, $p = 0.905$) or between treatments (Kruskal–Wallis test, $p = 0.936$).

Figure 1. Tournament Entry by Gender and Treatment ($n = 416$)



4.2. Gender Gap in Competitiveness

Figure 1 shows the tournament entry of male and female decision makers and agents by treatment. In *OwnDecision*, 34.72% of women choose to enter the tournament compared with 55.56% of men. The difference is statistically significant ($\chi^2(1)$, $p < 0.01$). Thus, in line with the existing literature showing that women shy away from competitions, we find that men are 1.6 times more likely than women to enter the competition when deciding for themselves. In contrast, principals send male and female agents to the tournament at similar rates in *GenderInfo* (55.88% versus 58.82%; $\chi^2(1)$, $p = 0.729$). Also, no GGC is found in *NoGenderInfo* (39.71% versus 51.47%; $\chi^2(1)$, $p = 0.168$).

The baseline regressions by treatments (columns (1), (3), and (5)) contained in Table A.1 confirm the conclusions of the nonparametric tests: the negative and significant coefficient of *Female* (column (1)) represents the GGC when subjects decide for themselves, whereas the GGC is absent when principals decide (see columns (3) and (5)).[15] We proceed by expanding the basic regressions in columns (2), (4), and (6). In *OwnDecision*, we add the decision maker's characteristics and the belief about the stage 2 rank (*Belief 2*). For *GenderInfo* and *NoGenderInfo*, we add the information the principal had about the agent when choosing on the agent's behalf and the beliefs about the agent's stage 2 rank. Again, we observe a GGC in *OwnDecision* but not in the other two treatments. In line with much of the previous literature, *Female* (capturing the GGC) in *OwnDecision* decreases once beliefs and risk preferences are accounted for, and its statistical significance drops to the 7% level. Additionally, the data suggest that the beliefs about the relative stage 2 performance are a strong predictor of higher tournament entry rates. We discuss the role of confidence in the agent's tournament performance further in Section 4.3. Our first main finding can be summarized as follows:

Result 1. *When deciding for themselves, fewer women than men choose to enter the tournament. However, we find no gender gap when principals make the tournament entry decisions on behalf of agents.*

Next, we examine the gender composition in the stage 3 tournament and whether it differs between treatments. We find that the share of women competing in *GenderInfo* is greater than in *OwnDecision* (58.82% versus 34.72%; $\chi^2(1)$, $p < 0.01$), whereas the share of males competing is the same (55.88% versus 55.56%; $\chi^2(1)$, $p = 0.969$). To further explore these results, we run regressions that compare the outcomes across treatments, shown in Table A.2 (columns (1) and (2)), including controls for performance, risk, beliefs, and socio-demographics. The joint coefficient tests stated in row II of Table A.2 on the restriction *GenderInfo* + *Female* × *GenderInfo* = 0 ($p < 0.05$) reveal a significantly greater share of women competing. In contrast, the insignificant coefficients of *GenderInfo* show no difference for men competing in *GenderInfo* relative to *OwnDecision*. The interaction term *Female* × *GenderInfo* captures the difference in the GGC between treatments

OwnDecision and *GenderInfo*. This term is sizeable, but at the threshold for statistical significance. In column (1), the gender gap appears to be significantly different between the two treatments ($p = 0.053$), but this is no longer the case when we include the full set of controls in column (2) ($p = 0.173$).

Result 2. *More women compete when the decision to enter the tournament is made on their behalf. However, no difference is found for men.*

To analyze how information about the agent's gender affects tournament entry rates, we compare *GenderInfo* to *NoGenderInfo* and observe that the overall frequency of those competing in *NoGenderInfo* is lower compared with *GenderInfo* (45.59% versus 57.35%; $\chi^2(1)$, $p < 0.05$). This difference remains significant in the regressions in Table A.2, column (5) (see the coefficient of *NoGenderInfo*). This increase is mostly a result of the share of males competing in *GenderInfo* being greater than in *NoGenderInfo* as indicated by a nonparametric test (55.88% versus 39.71%; $\chi^2(1)$, $p < 0.10$). For women, we do not find support for an increase (58.82% versus 51.47%; $\chi^2(1)$, $p = 0.389$). The results from the nonparametric tests are in line with the coefficients of *NoGenderInfo* and the insignificant joint coefficient tests IV in Table A.2, columns (3) and (4). Nevertheless, inspecting Figure 1 suggests that this does not necessarily mean that principals in *GenderInfo* treat men and women differently. Rather, this may be due to the slightly, but insignificantly, varying tournament entry rates of women and men in *NoGenderInfo*, which is possibly the result of chance.

Result 3. *Informing the principal about the agent's gender leads to higher overall tournament entry rates.*

Whereas we did not hypothesize Result 3 ex ante, it may be worth taking a closer look at other reasons that may explain it. First, disregarding the principal's gender, we can rule out that the overall higher tournament entry rate in *GenderInfo* is caused by principals being, on average, more competitive than their counterparts in *NoGenderInfo*. When comparing the principals' competitiveness, measured by the incentive scheme they stated they would have chosen for themselves, we find no difference between treatments ($\chi^2(1)$, $p = 0.957$). Moreover, the tournament entry rate is higher in *GenderInfo* even after we control for the principal's own competitiveness (see Table A.2, column (5)). Second, one possible explanation may be that information about the agent's gender changes the focus of the principals' decision. Comparing regressions 4 and 6 in Table A.1 shows some support for this argument: all coefficients are comparable except for *Self-comp.* and *Risk*. It seems, that the principal's competitiveness (see *Self-comp.*) influences the decision when the principal knows the agent's gender. However, *Risk* is a significant driver for the principal's decision only in *NoGenderInfo*.[16]

4.3. Determinants of the Principal's Choice

4.3.1. Principal's Characteristics. To better understand the driving forces behind the principal's choices, we start by examining the role of age, UK residency, and gender. For simplicity, we split the analyses in this section by treatments (see Table A.3 for *GenderInfo* and Table A.4 for *NoGenderInfo*). The first insights gained from the regression tables are that the GGC remains insignificant when controlling for a variety of principal characteristics (for the GGC in the respective treatments, see the coefficient of *(A) Female* in columns (1) and (2)). For example, the principals' gender, age, and UK residency do not affect their tournament decisions for the agents. We find no indication that either male or female principals choose the tournament compensation scheme at different rates (see Online Table SOM 6; 51.11% versus 51.82%; $\chi^2(1)$, $p = 0.906$, and insignificant coefficients *(P) Female*). These results persist when we distinguish between principals' and agents' gender (see Figure A.1): principals in *GenderInfo* do not condition their choice on the agent's gender (male principals: 57.14% versus 57.58%; $\chi^2(1)$, $p = 0.971$; female principals: 54.55% versus 60.00%; $\chi^2(1)$, $p = 0.649$ and insignificant coefficients *(A) Female* in Table A.3, columns (1) and (2)).

We continue by testing whether the principals' risk preferences predict their choice of payment scheme. According to the existing literature, risk-averse subjects are less likely to compete, and females tend to be more risk-averse than men (see, e.g., Croson and Gneezy 2009). Still, in terms of gender differences in choosing risk for others, Slovic et al. (1967) suggest no differences. We find only an effect of risk preferences in *NoGenderInfo*. Table A.4 shows that risk-seeking principals are more likely to choose the tournament for their agent (see *(P) Risk* in column (1)). Our male principals are generally less risk-averse than their female counterparts in *NoGenderInfo* (Wilcoxon rank-sum test, $p < 0.05$) but not in *GenderInfo* (Wilcoxon rank-sum test; $p = 0.401$). These differences translate into a heterogeneous effect on making agents compete in *NoGenderInfo*. For male principals, see the coefficients of *(P) Risk*, and for female principals, see the joint coefficient tests I in column (2) of Tables A.3 and A.4, respectively.

Moving on, we turn to the effect of the principals' stated competitiveness (i.e., what they would have chosen for themselves) on their choice for the agent. Competitive principals are, on average, more likely to choose the tournament for their agent compared with

Table 3. Principals' Beliefs About Agents' Relative Performance in Stage 2 in *GenderInfo*

	Pooled			Female principal			Male principal		
	Agent			Agent			Agent		
Rank	Male	Female	Total	Male	Female	Total	Male	Female	Total
1	24	32	56	15	14	29	9	18	27
2	30	24	54	13	14	27	17	10	27
3	10	10	20	4	6	10	6	4	10
4	4	2	6	1	1	2	3	1	4
Total	68	68	136	33	35	68	35	33	68

Notes. The belief in stage 2 is the principal's belief about how the agent's performance in stage 2 ranks within the group (1 = best to 4 = worst). Online Table SOM 8 depicts the principals' beliefs about the agent's performance in stages 1 and 2.

noncompetitive principals in *GenderInfo* (71.67% versus 46.05%; $\chi^2(1)$, $p < 0.01$) but not in *NoGenderInfo* (53.33% versus 40.00%; $\chi^2(1)$, $p = 0.122$). These observations are corroborated by the regressions 1 contained in Tables A.3 and A.4 (see *(P) Self-comp.*).[17]

We also investigate whether gender differences in the principals' competitiveness affects their choice for the agent. Although a vast literature finds that women dislike performing in competitive environments, they do not necessarily mind choosing tournaments if they do not have to perform themselves as shown by Niederle and Vesterlund (2007). Thus, it is not clear a priori in which direction the interaction between the principal's gender and competitiveness will pull our results. Recall that male principals are on average more likely than female principals to choose the tournament for themselves in *NoGenderInfo* (59.00% versus 30.43%; $\chi^2(1)$, $p < 0.01$) but not in *GenderInfo* (45.59% versus 42.65%; $\chi^2(1)$, $p = 0.730$). This raises further questions about whether and how these differences influence the tournament entry rates. Therefore, in column (2) of Tables A.3 and A.4, we control for gender differences in the principal's competitiveness by including the interaction term *(P) Female* × *(P) Self-comp.*, observing no significant interaction effects.[18] Hence, this analysis shows that, even after controlling for principals' characteristics, their willingness to take risk, or how competitive principals are, we still observe no GGC.

4.3.2. Principal's Evaluation of the Agent's Relative Performance. Another factor that may influence the principals' choice of payment scheme is their evaluation of the agents' performance. Previous research suggests that performance in a stereotypically male task tends to be evaluated differently between men and women (Spencer et al. 1999, Reuben et al. 2014, Egan et al. 2017, Sarsons 2017). To reiterate, principals receive information about the total number of sums correctly solved by the agent in stages 1 and 2. To determine the importance of confidence in an agent's *relative* performance, we incentivize them to guess how well their agent's performance ranked compared with others in their session (stage 1) and group (stage 2) on a scale from top (1) to bottom (4) quartile.[19]

First, we analyze whether the male and female agent's relative tournament performance is evaluated differently. Hence, we focus on *GenderInfo* as this is the treatment in which principals are informed of the agent's gender. In Table 3, we report the principals' guessed rankings, broken down by the agent's and the principal's gender. At the aggregate level, we find no evidence that male and female agents' relative tournament performance is evaluated differently by the principals ($\chi^2(3)$, $p = 0.480$). In particular, principals guessed that 35% of male agents were the best in their group compared with 47% of female agents. Further, we analyze the interplay between the principal's and agent's gender. The evaluations of male and female agents do not differ for male ($\chi^2(3)$, $p = 0.104$) or female ($\chi^2(3)$, $p = 0.938$) principals. We employ the regression in column (5) of Table A.3, which includes an interaction between the agent's gender and the principal's belief about the stage 2 performance. *Belief 2* remains a significant predictor for the principal's tournament decision for male and female agents (see the joint coefficient test III). The insignificant interaction term confirms that principals do not evaluate the performance differently depending on the agent's gender. Thus, principals do not have different beliefs about the rank of male and female agents. However, when evaluating their own stage 2 tournament performance in *GenderInfo* and *OwnDecision*, 44% of males guessed that they were the best ones in the group compared with 24% of women ($\chi^2(3)$, $p < 0.01$), which is in line with the existing literature on the GGC.

Second, we assess how the principals' confidence in the agents' relative stage 2 performances, independent of the agent's gender, affects tournament entry decisions. In *GenderInfo* and *NoGenderInfo*, the better an agent is perceived to have performed in the tournament compared with other group members ceteris paribus, the more likely the agent is to compete ($\chi^2(1)$ tests, $p < 0.01$). The regressions in Tables A.3 and A.4 support these findings (see coefficient *Belief 2*), confirming that the principals' beliefs about the agent's performance are a strong and significant predictor for the decision to make the agent compete. Columns (3) and (4) distinguish between competitive and not competitive principals and show that the coefficients of *Belief 2* remain negative, but it turns insignificant only for not competitive principals in *GenderInfo*. The main result relating to the closure of the GGC is robust to controlling for the principals' guessed ranking of the agent's relative performance. The regression results underline the robustness of no GGC in *GenderInfo* and *NoGenderInfo* when principals decide.

4.4. Efficiency

We proceed to examine whether tournament entry decisions are more efficient (i.e., better in terms of, e.g., expected payoffs, foregone earnings, or the performance of those in the tournament) when made by principals or decision makers. We divide the efficiency analysis into ex ante measures (those based on stage 2 performances) and ex post measures (those based on the stage 3 performances). For simplicity, we abstract all measures from gender differences and focus on treatment differences.[20]

4.4.1. Ex Ante Efficiency. We start by assessing ex ante efficiency, which is calculated based on stage 2 performance.[21] First, inspired by the approach of Niederle and Vesterlund (2007), we compute the expected earnings under the piece-rate and tournament scheme using the subjects' stage 2 performance to predict their future performance.[22] In our context, earnings are maximized if a subject competes when the expected earnings are higher in the tournament and stays out of the tournament when the expected earnings are higher under the piece-rate scheme. Table 4 reports the number of decision makers and principals whose choices maximize expected earnings. The frequency of total maximized earnings differs significantly between treatments ($\chi^2(2)$, $p < 0.01$). Overall, decision makers are better than principals at making earning-maximizing choices. For completeness, Table 4 also includes the number of nonmaximizing choices, capturing those who either under- or over-compete. A person under-competes when it would be optimal to enter the tournament but the person does not compete; a person over-competes when it would be payoff-maximizing to stay out of the tournament but the person still enters. The number of subjects who either under- or over-compete is lowest in *OwnDecision* and highest in *GenderInfo*.

Table 4. Number of Decision Makers and Principals Who Do or Do Not Maximize Expected Earnings by Treatment

	Maximizing		Not maximizing		Total
	Tournament	Piece-rate	Tournament	Piece-rate	
OwnDecision	28	69	37	10	144
GenderInfo	24	44	54	14	136
NoGenderInfo	21	55	41	19	136
Total	73	168	132	43	416

Second, we calculate the expected forgone earnings resulting from decision makers and principals' payoff-inferior decisions across treatments. We compute the expected average forgone earnings as the difference between the expected earnings under the optimal decision and the earnings resulting from the principals' or decision makers' actual decision. The average forgone earnings are lowest in *OwnDecision* (2.67; $SD = 5.56$), followed by *NoGenderInfo* (4.33; $SD = 7.33$), and *GenderInfo* (4.35; $SD = 8.83$; Jonckheere–Terpstra test, $p < 0.05$). To interpret this result, recall that we generally observe higher tournament entry rates in the principal treatments. This may partially explain why we also find higher expected forgone earnings when principals decide compared with when subjects choose to compete themselves.

Third, we investigate more closely how the decisions made by principals and decision makers affect the performance profiles of competing subjects in stage 3 (i.e., their expected performance quality). A similar approach was used by Brandts et al. (2015) and Balafoutas and Sutter (2012). We use aggregate performance quartiles from stage 2 to classify subjects into one of three performance profiles as follows: *weak* (fewer than nine correct answers, first quartile), *intermediate* (9–13 correct answers, second and third quartiles), and *strong* (more than 13 correct answers, fourth quartile) performers. Table 5 indicates that there is a difference in the competitors' profiles between treatments ($\chi^2(2)$, $p < 0.10$). In particular, the number of strong-performing subjects is cut by nearly half when one is made to compete in *GenderInfo* and *NoGenderInfo* compared with when subjects choose to enter the stage 3 tournament themselves (33.85% versus 15.38%

Table 5. Performance Profiles of Subjects Competing in Stage 3 by Treatment

	Weak	Intermediate	Strong	Total
OwnDecision	15	28	22	65
GenderInfo	22	44	12	78
NoGenderInfo	15	36	11	62
Total	52	108	45	205

Table 6. Stage 3 Performance of Those Competing and Winning by Treatment

	Competing	Competing and winning
OwnDecision	12.77 (4.76)	15.05 (3.86)
GenderInfo	11.13 (4.40)	13.96 (4.96)
NoGenderInfo	11.69 (5.30)	15.65 (4.65)

Note. The average number of correctly solved addition tasks in each treatment is shown with standard deviation in parentheses.

versus 17.74%, $\chi^2(2)$, $p < 0.05$). Comparing performance profiles of agents competing in *GenderInfo* and *NoGenderInfo*, we find no significant difference ($\chi^2(2)$, $p = 0.842$).

To summarize, all three ex ante measures point in the same direction: decision makers make more efficient tournament entry decisions than principals.

4.4.2. Ex Post Efficiency. In this section, we study efficiency from an ex post perspective by evaluating whether being made to compete by someone else harms or improves the performance in stage 3. In this respect, it is useful to distinguish between the performance of those competing and the performance of those winning as suggested by Balafoutas and Sutter (2012).[23] Relatedly, Brandts et al. (2015) use the job market as an example to explain that one can evaluate efficiency concerns among the "applicant pool," consisting of those who apply for a high-ranking job, and the "winner pool," consisting of those who successfully obtain the job and win the tournament.

Specifically, we first compare the performances in *OwnDecision* to the treatments in which the principals choose. Table 6 shows that competing agents in *OwnDecision* solved, on average, more correct sums than agents being made to compete in *GenderInfo* and *NoGenderInfo* (Wilcoxon rank-sum tests, $p < 0.10$). Although these preliminary results suggest that the agents' performance is lower when being made to compete, we must consider the previous performance in stages 1 and 2 to measure ability. In the regressions presented in Table A.5, we use stage 3 performance as the dependent variable and control for past performance and decision makers' or agents' characteristics (columns (1) and (2)). Those who performed better in stages 1 and 2 also performed better when competing in stage 3. We find that the negative effect of being made to compete is not robust to controlling for previous performance (see the coefficients of *GenderInfo* and *NoGenderInfo*).

Restricting the analysis to the winner's performance (see Table 6), our results suggest that winners in *OwnDecision* and *NoGenderInfo* perform significantly better than in *GenderInfo* (Wilcoxon rank-sum tests, $p < 0.05$). However, once we run the regressions reported in Table A.5 and control for, among other things, past performance (see columns (3) and (4)), we again observe that this effect is not robust (see coefficients of *GenderInfo* and *NoGenderInfo*).

Finally, we focus on *GenderInfo* and *NoGenderInfo*. We ask whether stage 3 performance is higher when the agent's stated choice coincides with the choice made by the principal. We pool *GenderInfo* and *NoGenderInfo* and observe that, out of all agents competing, only 40% stated they would have chosen to compete if given a choice. Those 40% of agents made to compete have, on average, a higher performance in the stage 3 tournament than the remaining 60% of agents, whose choice would have been the piece-rate (12.77 versus 10.45; Wilcoxon rank-sum test, $p < 0.05$). Moreover, according to the nonparametric tests, they were more likely to win the tournament ($\chi^2(1)$, $p < 0.10$). We check the sensitivity of our results using regressions in Online Table SOM 7 with the stage 3 tournament performance as the dependent variable. Whenever the principal's choice coincides with the agent's stated choice (see *Coincide*), we detect an effect significant at the 10% level in column (2). Controlling for past performances, we again observe that better performers in stages 1 and 2 also perform better in the stage 3 tournament. Overall, past performance matters more for stage 3 performance than if the principal's choice and the agent's stated choice coincide. Taken together, our ex post efficiency analysis does not suggest a negative effect of being made to compete on performance in contrast to the ex ante efficiency measures.

5. Conclusions

Over the last decades, much attention has been devoted to studying gender differences in competitiveness (for a summary, see Niederle 2017). In response to these gender differences, there is a widespread sentiment from third parties that women should compete more, and some individuals are even willing to pay for women to enter competitive environments more often (Exley et al. 2020). Although most decisions in life are made by individuals themselves, many may be influenced by third parties, be they principals, managers, parents, superiors, or societies. Despite this, surprisingly little is known about how individuals would make competitive decisions for others if given the opportunity. To investigate this uncharted area, this paper studies experimentally how competitive decisions are made on behalf of others.

Our paper offers three main results: First, whenever a principal decides for an agent, we find no gender difference in tournament entry as opposed to when individuals choose for themselves. In other words, our results indicate that, in situations when a principal decides for an agent, the gender difference in the willingness to compete does not translate to the decisions of principals. Second, this result is mainly driven by more women being made to compete when someone else decides for them. Third, comparing only two environments in which principals decide, we observe more agents being made to compete when the agent's gender is known than when it is unknown.

In terms of determinants that may underlie the principals' decision, we document that risk-seeking and competitive principals are more likely to make their agent compete; however, this effect does not depend on the principal's or the agent's gender. Another factor that affects whether agents are made to compete are the principals' beliefs about their agent's relative tournament performance. Interestingly, whereas we document a gender gap in confidence among those performing in the competition, there is no difference in the principals' performance evaluation between female and male agents. We finalize our analysis by exploring ex ante and ex post efficiency to investigate whether principals or decision makers make "better" choices as judged by different measures. Concerning ex ante efficiency, principals' competition choices lead to fewer payoff-maximizing outcomes than when subjects decide for themselves. For ex post efficiency, the overall tournament performance and winners' performances are lower when someone is made to compete; however, this effect is not robust to controlling for agents' previous performance.

Considering the accumulated evidence on the GGC, it is important to know whether these gender differences in tournament entry extend to environments in which the decision to compete is not made by individuals, but by others who face the same monetary consequences from tournament entries. Moreover, there is an increasing interest among researchers and policy makers to understand the determinants of gender-specific preferences. We contribute to this conversation by investigating the causal role of gender information when choosing for others in the competitiveness domain. Our design allows us to observe how men and women make decisions for others, informing us about the generalizability of preferences for competition.

Future studies could fruitfully extend our experimental design to a variety of settings. For instance, in our experiment, principals do not know what the agent prefers. An interesting question would be whether the GGC would reappear if principals are informed about the agents' preferences. In general, the preferences of agents can be very important in contexts in which decisions are made on their behalf. It is likely that at least some individuals would experience a disutility when being forced to compete (or to take the piece-rate scheme) against their will. Our experiment is not equipped to quantify this kind of nonmonetary disutility, but it may be important to consider in practice along with potential ethical concerns of imposing a certain kind of choice on individuals.[24] In addition, considering a situation in which individuals decide if they want to delegate the tournament entry decision to another person may reveal potential gender differences in delegation decisions. Finally, investigating settings in which the principal's earnings are not perfectly aligned with the agent's could offer insights about further determinants and the role of incentives underlying the decision to make others compete.

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Appendix

A.1. Gender Gap in Competitiveness

Table A.1. Tournament Entry by Treatment

	OwnDecision		*GenderInfo*		*NoGenderInfo*	
	(1) Compete	(2) Compete	(3) Compete	(4) Compete	(5) Compete	(6) Compete
Female	−0.168**	−0.143*	0.030	0.041	0.126	0.087
	(0.081)	(0.077)	(0.087)	(0.081)	(0.086)	(0.084)
Perf. 2 − Perf. 1	−0.001	−0.024	0.005	−0.008	0.017	0.013
	(0.019)	(0.020)	(0.023)	(0.024)	(0.021)	(0.021)
Perf. 2	0.036***	0.024**	0.004	0.006	−0.001	−0.011
	(0.010)	(0.010)	(0.011)	(0.011)	(0.013)	(0.011)
UK resident		−0.198**		−0.046		−0.029
		(0.090)		(0.087)		(0.090)
Age		0.020*		−0.010		−0.007
		(0.011)		(0.014)		(0.012)
Risk		0.027		0.022		0.055**
		(0.020)		(0.028)		(0.023)
Belief 2		−0.100**		−0.171***		−0.209***
		(0.045)		(0.056)		(0.055)
Self-comp.				0.218***		0.128
				(0.083)		(0.080)
Constant	0.154	0.045	0.517***	0.853**	0.394**	0.759**
	(0.123)	(0.365)	(0.131)	(0.392)	(0.151)	(0.367)
Observations	144	143	136	136	136	135

Notes. Coefficients from ordinary least squares regressions. Dependent variable: *Compete* (0 piece-rate in stage 3, 1 tournament in stage 3). *Female* (0 male, 1, female) indicates the agent's gender for *GenderInfo* and *NoGenderInfo* and the decision maker's gender for *OwnDecision*. *Perf. 2 − Perf. 1*: agent's/decision maker's performance in stage 2 minus the performance in stage 1. *Perf. 2*: agent's/decision maker's performance in stage 2. *UK resident*: the agent's/decision maker's residency (0 other, 1 UK resident). *Age*: the agent's/decision maker's age in years. *Risk*: principal's/decision maker's willingness to take risk measured with a lottery. The higher *Risk*, the more risk-loving is the person. *Belief 2*: principal's/decision maker's belief about how *Perf. 2* ranks within the group (1 = best to 4 = worst). *Self-comp.*: principals' stated choice for themselves in stage 3 (0 piece-rate, 1 tournament). Because of a technical problem, one subject in *OwnDecision* did not state a belief about the subject's stage 2 performance. Robust standard errors are reported in parentheses.

$^{*}p < 0.10$; $^{**}p < 0.05$; $^{***}p < 0.01$.

Table A.2. Tournament Entry Between Treatments

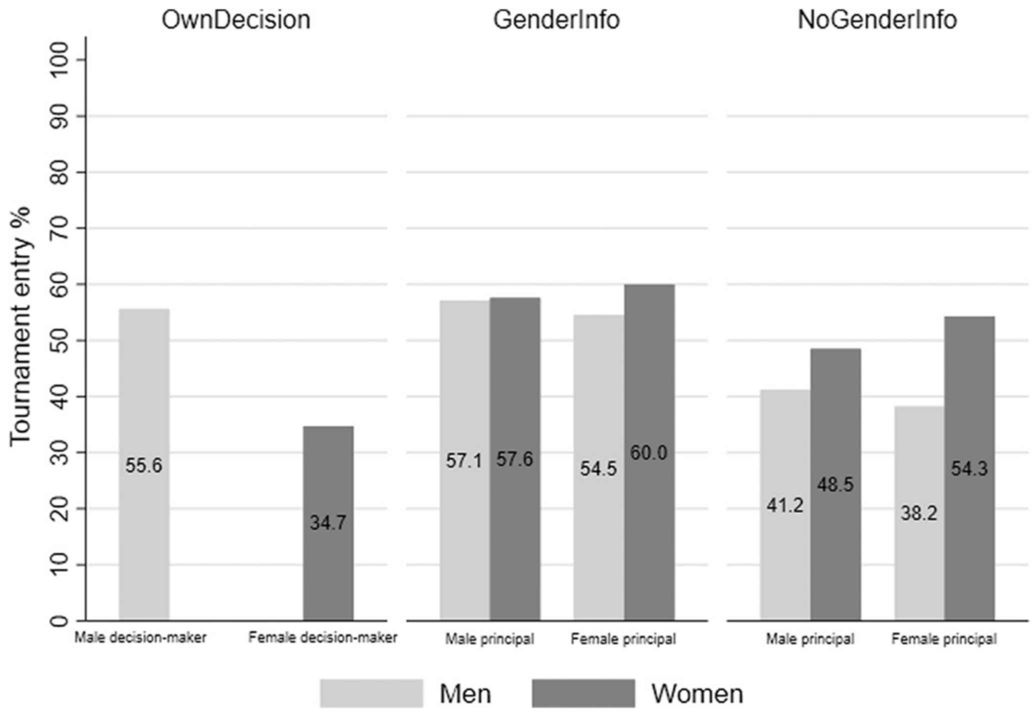
	OwnDecision versus *GenderInfo*		*GenderInfo* versus *NoGenderInfo*		
	(1) Compete	(2) Compete	(3) Compete	(4) Compete	(5) Compete
Female	−0.193**	−0.140*	0.029	0.034	
	(0.081)	(0.077)	(0.086)	(0.080)	
GenderInfo	0.009	0.008			
	(0.084)	(0.083)			
Female × *GenderInfo*	0.228*	0.158			
	(0.117)	(0.115)			
NoGenderInfo			−0.165*	−0.146*	−0.117**
			(0.085)	(0.082)	(0.056)
Female × *NoGenderInfo*			0.097	0.058	
			(0.121)	(0.114)	
Perf. 2 − Perf. 1	0.003	−0.015	0.012	0.004	0.003
	(0.015)	(0.015)	(0.016)	(0.016)	(0.016)
Perf. 2	0.015	0.009	0.002	0.000	−0.000
	(0.011)	(0.008)	(0.008)	(0.007)	(0.007)
UK resident		−0.144**		−0.047	−0.054
		(0.062)		(0.063)	(0.062)
Age		0.008		−0.008	−0.008
		(0.009)		(0.010)	(0.009)
Risk		0.028*		0.038**	0.038**
		(0.016)		(0.018)	(0.018)
Belief 2		−0.149***		−0.185***	−0.189***
		(0.033)		(0.040)	(0.040)
Self-comp.				0.170***	0.169***
				(0.056)	(0.056)
Constant	0.387***	0.538*	0.533***	0.848***	0.886***
	(0.131)	(0.284)	(0.107)	(0.269)	(0.263)
Observations	280	279	272	271	271
I	0.688	0.834			
II	0.004	0.045			
III			0.144	0.261	
IV			0.432	0.266	

Notes. Coefficients from ordinary least squares regressions. Dependent variable: *Compete* (0 piece-rate in stage 3, 1 tournament in stage 3). *Female* (0 male, 1, female) indicates the agent's (*GenderInfo* and *NoGenderInfo*) and the decision maker's gender (*OwnDecision*). Columns (1) and (2) compare *GenderInfo* with *OwnDecision*, the latter being the reference category for the dummy variable *GenderInfo*. Columns (3)–(5) compare *NoGenderInfo* with *GenderInfo*, the latter being the reference category for the dummy variable *NoGenderInfo*. *Perf. 2 − Perf. 1*: agent's/decision maker's performance in stage 2 minus the performance in stage 1. *Perf. 2*: agent's/decision maker's performance in stage 2. *UK resident*: the agent's/decision maker's residency (0 other, 1 UK resident). *Age*: the agent's/decision maker's age in years. *Risk*: principal's/decision maker's willingness to take risk measured with a lottery. The higher *Risk*, the more risk-loving is the person. *Belief 2*: the principal's/decision maker's belief about how *Perf. 2* ranks within the group (1 = best to 4 = worst). *Self-comp.*: principals' stated choice for themselves in stage 3 (0 piece-rate, 1 tournament). Because of a technical problem, one subject in *OwnDecision* did not state a belief about the subject's stage 2 performance. Robust standard errors are reported in parentheses. p-values are shown for the following joint coefficient tests: I *Female* + *Female* × *GenderInfo*, II *GenderInfo* + *Female* × *GenderInfo*, III *Female* + *Female* × *NoGenderInfo*, and IV *NoGenderInfo* + *Female* × *NoGenderInfo*.

*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

A.2. Determinants

Figure A.1. Tournament Entry by Gender and Treatment ($n = 416$)



Note. Stage 3 tournament entry of men and women separated by male/female decision makers in (*OwnDecision*) and male/female principals in (*GenderInfo* and *NoGenderInfo*).

Table A.3. The Influence of Principal Characteristics and Preferences on the Principal's Tournament Choice in *GenderInfo*

	(1) Compete	(2) Compete	*(P) Not comp.* (3) Compete	*(P) Comp.* (4) Compete	(5) Compete
(A) Female	0.056	0.058	0.025	0.166	0.071
	(0.086)	(0.087)	(0.138)	(0.121)	(0.204)
(A) Perf. 2 − Perf. 1	−0.005	−0.006	0.016	−0.030	−0.005
	(0.025)	(0.025)	(0.036)	(0.032)	(0.026)
(A) Perf. 2	0.006	0.005	−0.003	0.014	0.006
	(0.011)	(0.011)	(0.011)	(0.016)	(0.011)
(A) UK resident	−0.061	−0.060	−0.182	0.024	−0.060
	(0.090)	(0.090)	(0.145)	(0.113)	(0.090)
(A) Age	−0.010	−0.012	−0.012	−0.018	−0.010
	(0.014)	(0.015)	(0.022)	(0.022)	(0.014)
(P) Belief 2	−0.173***	−0.167***	−0.125	−0.242***	−0.169**
	(0.056)	(0.056)	(0.076)	(0.071)	(0.079)
(P) Risk	0.023	0.000	0.027	−0.005	0.022
	(0.027)	(0.041)	(0.038)	(0.043)	(0.027)
(P) Self-comp.	0.225***	0.191			0.225***
	(0.085)	(0.122)			(0.084)
(P) Female	0.010	−0.223	−0.003	0.037	0.011
	(0.082)	(0.261)	(0.123)	(0.109)	(0.084)
(P) Age	−0.001	−0.001	0.001	−0.012	−0.001
	(0.010)	(0.010)	(0.013)	(0.019)	(0.010)
(P) UK resident	0.064	0.063	0.243	−0.159	0.065
	(0.098)	(0.099)	(0.171)	(0.105)	(0.099)
(P) Female × (P) Risk		0.043			
		(0.053)			
(P) Female × (P) Self-comp.		0.078			
		(0.168)			
(P) Female × (P) Belief 2					−0.008
					(0.114)
Constant	0.831*	0.973**	0.775	1.685**	0.820*
	(0.442)	(0.468)	(0.577)	(0.671)	(0.450)
Observations	136	136	76	60	136
I		0.191			
II		0.024			
III					0.032

Notes. Coefficients from ordinary least squares regressions. Column (3) reports the regressions for principals who would choose the piece-rate themselves, that is, *Self-comp.* = 0. Column (4) reports the regressions for principals who would choose the tournament themselves, that is, *Self-comp.* = 1. Dependent variable: *Compete* (0 piece-rate in stage 3, 1 tournament in stage 3). *Female* (0 male, 1, female) indicates the agent's (A) or the principal's (P) gender. *(A) Perf. 2 − Perf. 1*: difference between the agent's performance in stages 1 and 2. *(A) Perf. 2*: agent's performance in stage 2. *UK resident*: the agent's (A) or the principal's (P) residency (0 other, 1 UK resident). *Age*: the agent's (A) or the principal's (P) age in years. *(P) Risk*: the principal's willingness to take risk measured with a lottery. The higher *Risk*, the more risk-loving is the person. *(P) Belief 2*: the principal's belief about how *Perf.* 2 ranks within the group (1 = best to 4 = worst). *(P) Self-comp.*: principals' stated choice for themselves in stage 3 (0 piece-rate, 1 tournament). Robust standard errors are reported in parentheses. p-values are shown for the following joint coefficient tests: I *(P) Risk* + *(P) Female* × *Risk*, II *(P) Self-comp.* + *(P) Female* × *(P) Self-comp.*, and III *(P) Belief 2* + *(A) Female* × *(P) Belief 2*.

*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

Table A.4. The Influence of Principal Characteristics and Preferences on the Principal's Tournament in *NoGenderInfo*

	(1) Compete	(2) Compete	*(P) Not comp.* (3) Compete	*(P) Comp.* (4) Compete
(A) Female	0.069	0.056	0.033	0.111
	(0.088)	(0.088)	(0.131)	(0.141)
(A) Perf. 2 − Perf. 1	0.011	0.009	0.002	0.020
	(0.021)	(0.022)	(0.032)	(0.034)
(A) Perf. 2	−0.012	−0.014	−0.003	−0.022
	(0.011)	(0.012)	(0.016)	(0.017)
(A) UK resident	−0.055	−0.074	0.065	−0.262*
	(0.093)	(0.093)	(0.126)	(0.153)
(A) Age	−0.008	−0.010	−0.010	−0.003
	(0.013)	(0.013)	(0.012)	(0.025)
(P) Belief 2	−0.213***	−0.220***	−0.208**	−0.201**
	(0.059)	(0.058)	(0.085)	(0.097)
(P) Risk	0.054**	0.005	0.057*	0.043
	(0.023)	(0.036)	(0.034)	(0.034)
(P) Self.-comp.	0.112	0.151		
	(0.086)	(0.119)		
(P) Female	0.003	−0.341	0.008	−0.063
	(0.090)	(0.257)	(0.130)	(0.133)
(P) Age	−0.010	−0.010	−0.016	0.000
	(0.011)	(0.011)	(0.012)	(0.021)
(P) UK resident	−0.162	−0.170	−0.185	−0.191
	(0.106)	(0.108)	(0.174)	(0.169)
(P) Female × (P) Risk		0.080*		
		(0.046)		
(P) Female × (P) Self.-comp.		−0.084		
		(0.166)		
Constant	1.173**	1.497**	1.203*	1.247
	(0.556)	(0.579)	(0.719)	(0.901)
Observations	135	135	75	60
I		0.006		
II		0.577		

Notes. Coefficients from ordinary least squares regressions. Column (3) reports the regressions for principals who would choose the piece-rate themselves, that is, *Self-comp.* = 0. Column (4) reports the regressions for principals who would choose the tournament themselves, that is, *Self-comp.* = 1. Dependent variable: *Compete* (0 piece-rate in stage 3, 1 tournament in stage 3). *Female* (0 male, 1, female) indicates the agent's (A) or the principal's (P) gender. *(A) Perf. 2 – Perf. 1*: Difference between the agent's performance in stages 1 and 2. *(A) Perf. 2*: Agent's performance in stage 2. *UK resident*: the agent's (A) or the principal's (P) residency (0 other, 1 UK resident). *Age*: the agent's (A) or the principal's (P) age in years. *(P) Belief 2*: the principal's belief about how *Perf. 2* ranks within the group (1 = best to 4 = worst). *(P) Risk*: the principal's willingness to take risk measured with a lottery. The higher *Risk*, the more risk-loving is the person. *(P) Self-comp.*: principals' stated choice for themselves in stage 3 (0 piece-rate, 1 tournament). Robust standard errors are reported in parentheses. *p*-values are shown for the following joint coefficient tests: I *(P) Risk* + *(P) Female* x *(P) Risk* and II *(P) Self-comp.* + *(P) Female* x *(P) Self-comp.*

$^{*}p < 0.10$; $^{**}p < 0.05$; $^{***}p < 0.01$.

A.3. Efficiency

Table A.5. Ex Post Efficiency

	(1) *Perf. 3*	(2) *Perf. 3*	(3) *Perf. 3*	(4) *Perf. 3*
GenderInfo	−0.425	−0.444	−0.390	−0.423
	(0.411)	(0.433)	(0.522)	(0.530)
NoGenderInfo	0.095	0.069	0.339	0.146
	(0.442)	(0.477)	(0.605)	(0.657)
Perf. 2 − *Perf. 1*	−0.445***	−0.439***	−0.405***	−0.403***
	(0.083)	(0.085)	(0.112)	(0.117)
Perf. 2	1.094***	1.088***	1.074***	1.061***
	(0.043)	(0.045)	(0.053)	(0.064)
Female		−0.111		−0.443
		(0.337)		(0.473)
UK resident		−0.048		0.151
		(0.363)		(0.535)
Age		−0.023		−0.085
		(0.065)		(0.091)
Constant	0.223	0.889	1.213	3.403
	(0.551)	(1.698)	(0.822)	(2.548)
Observations	205	205	91	91

Notes. Coefficients from ordinary least squares regressions. Dependent variable: Performance in stage 3 of those competing (columns (1) and (2)) and competing and winning (columns (3) and (4)). The reference category in all regressions is *OwnDecision* for the dummy variables *GenderInfo* and *NoGenderInfo*, respectively. *Perf. 2* −*Perf. 1*: Difference between the agent's performance in stages 1 and 2. *Perf. 2*: Agent's performance in stage 2. *Female*: the agent's (*GenderInfo* and *NoGenderInfo*) and the decision maker's gender (*OwnDecision*) (0 male, 1 female). *UK resident*: the agent's/decision maker's residency (0 other, 1 UK resident). *Age*: the agent's/decision maker's age in years. Robust standard errors are reported in parentheses.

$^*p < 0.10$; $^{**}p < 0.05$; $^{***}p < 0.01$.

Endnotes

[1] Examples of such situations in Füllbrunn et al. (2020) include parents deciding for children, CEOs deciding in the interests of companies, or more generally, trustees deciding for beneficiaries.

[2] Related insights are offered by Tungodden and Willén (2019), who find that paternalistic parents are more likely to enroll a daughter than a son into a tournament. For a more general discussion on paternalistic decision making, see Ambuehl et al. (2021).

[3] The study received ethical approval from the ethics committee of the University of Nottingham on January 27, 2020.

[4] All data were collected before UK universities were affected by the COVID-19 pandemic in 2020.

[5] Our experiment was preregistered on aspredicted.org. The title for the preregistration is "Her or him? Choosing on behalf of someone else" (https://aspredicted.org/blind.php?x=pi2ku4, Number #33924).

[6] The experiment was programmed using the online platform LIONESS (Giamattei et al. 2020).

[7] We used neutral language in the experiment, calling the subjects in *GenderInfo* and *NoGenderInfo* "player A" and "player B," respectively, instead of "principal" and "agent".

[8] To make sure we convey information correctly, we collected individual characteristics of all subjects independently from their role at the beginning of the experiment. The screenshots reporting how information was conveyed to the principals are available in the SOM.

[9] Previous studies convey gender in different ways, for instance, with the use of avatars (Bohren et al. 2019, Charness et al. 2020), names (Brock and De Haas 2019), or photographs (Castillo and Petrie 2010) signaling a subject's gender. In the delegation setting of Bottino et al. (2016), gender is revealed by showing principals the ID and gender of an agent on the screen. To avoid making gender too salient, we were inspired by the approach of Bornhorst et al. (2010), who hid the emphasis on their main variable of interest by providing several individual characteristics in addition to gender.

[10] When seating the subjects, we first made sure to have gender balance in the agents' groups. Then, we filled the remaining seats on the principal's side of the room. Importantly, we alternated the gender-matching between agents and principals across sessions; for some sessions, principals and agents had the same gender, and for others, the opposite. For a detailed session overview, see Online Table SOM 9.

[11] In the case of a tie, the winner is randomly determined.

[12] Agents do not know anything about their principal except that there is a randomly drawn participant in the room who will choose a compensation scheme on their behalf.

[13] The implicit association test consists of rapidly associating concepts with an attribute (in our case, it was family/career as associated with male or female names), which is meant to capture subconscious bias. We do not include this measure in the main analyses because of technical issues causing missing IAT scores for approximately 4.5% of the principals and making it impossible to match the IAT scores to the individual choices.

[14] Men are sometimes found to perform better than women under both the piece-rate (Charness et al. 2020) and competitive payment schemes (Gneezy et al. 2003).

[15] To ease the interpretation of coefficients, we conduct ordinary least squares regressions throughout the analysis although the dependent variable is binary. Probit regressions lead to qualitatively the same results.

[16] Investigating the causes of Result 3 in more detail is beyond the focus of this paper, but we consider it an interesting question to be answered by future research.

[17] We thank an anonymous referee for the suggestion to run, for each treatment, separate regressions for competitive and noncompetitive principals. These regressions can be found in Tables A.3 and A.4, columns (3) and (4). We do not have strong evidence that the tournament entry rates differ significantly by the agent's gender in either treatment.

[18] We thank an anonymous referee for pointing out that it would also be interesting to report whether our results change when breaking down our previous analysis between competitive and noncompetitive principals. Therefore, we also added columns (3) and (4) to Tables A.3 and A.4, which develop this aspect further. We find no evidence of a GGC for competitive and not competitive principals (see coefficients of *(A) Female*).

[19] Confidence may be an important component of competitiveness as suggested by van Veldhuizen (2021) and Gillen et al. (2019).

[20] The results from the efficiency analysis split by treatment, role, and gender are available on request. Please note that, generally, gender does not play a role in the efficiency analysis.

[21] Stage 2 performance is employed as the predictor for future performances in stage 3. We could have used stage 3 performance to calculate expected earnings; however, some subjects compete in stage 3, whereas others do not. Thus, stage 3 performance is not strictly comparable as it may vary with the underlying compensation scheme as shown by Gneezy et al. (2003).

[22] The expected earnings under the piece-rate compensation scheme are calculated by multiplying the performance in stage 2 by £0.5. We apply the following strategy when calculating the expected earnings under the tournament incentive: Within each group, we rank the subjects according to their stage 2 performance from 1 (best) to 4 (worst). If a subject is ranked first or shares the first rank with another subject, the subject's performance in stage 2 is multiplied with £2. If a subject is not ranked first, the expected tournament earnings are zero.

[23] Subjects win the tournament if their performance is higher than the stage 2 performance of all other group members. This implies that, for the ex post efficiency analysis, similar to the ex ante efficiency analysis, the mechanism of randomly choosing one winner if two subjects have the same performance does not apply.

[24] Such considerations echo discussions on the ethical dimensions of nudging and paternalism; see, for instance, Thaler and Sunstein (2003).

References

Almås I, Cappelen AW, Salvanes KG, Sørensen EØ, Tungodden B (2016a) What explains the gender gap in college track dropout? Experimental and administrative evidence. *Amer. Econom. Rev.* 106(5):296–302.

Almås I, Cappelen AW, Salvanes KG, Sørensen EØ, Tungodden B (2016b) Willingness to compete: Family matters. *Management Sci.* 62(8):2149–2162.

Ambuehl S, Bernheim BD, Ockenfels A (2021) What motivates paternalism? An experimental study. *Amer. Econom. Rev.* 111(3):787–830.

Andersen S, Ertac S, Gneezy U, List JA, Maximiano S (2013) Gender, competitiveness, and socialization at a young age: Evidence from a matrilineal and a patriarchal society. *Rev. Econom. Statist.* 95(4):1438–1443.

Apicella CL, Demiral EE, Mollerstrom J (2017) No gender difference in willingness to compete when competing against self. *Amer. Econom. Rev.* 107(5):136–140.

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

Balafoutas L, Sutter M (2019) How uncertainty and ambiguity in tournaments affect gender differences in competitive behavior. *Eur. Econom. Rev.* 118(2):1–13.

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

Baldiga NR, Coffman KB (2018) Laboratory evidence on the effects of sponsorship on the competitive preferences of men and women. *Management Sci.* 64(2):888–901.

Berge LIO, Bjorvatn K, Pires AJG, Tungodden B (2015) Competitive in the laboratory, successful in the field? *J. Econom. Behav. Organ.* 118:303–317.

Berlin N, Dargnies M-P (2016) Gender differences in reactions to feedback and willingness to compete. *J. Econom. Behav. Organ.* 130:320–336.

Black SE, Strahan PE (2001) The division of spoils: Rent-sharing and discrimination in a regulated industry. *Amer. Econom. Rev.* 91(4): 814–831.

Blau FD, Kahn LM (2017) The gender wage gap: Extent, trends, and explanations. *J. Econom. Literature* 55(3):789–865.

Bohren JA, Imas A, Rosenberg M (2019) The dynamics of discrimination: Theory and evidence. *Amer. Econom. Rev.* 109(10): 3395–3436.

Booth A, Nolen P (2012) Choosing to compete: How different are girls and boys? *J. Econom. Behav. Organ.* 81(2):542–555.

Bornhorst F, Ichino A, Kirchkamp O, Schlag KH, Winter E (2010) Similarities and differences when building trust: The role of cultures. *Experiment. Econom.* 13(3):260–283.

Bottino E, García-Muñoz T, Kujal P (2016) Gender biases in delegation. ESI Working Paper 16-22, Economic Science Institute, Orange, CA. Accessed April 7, 2022, https://digitalcommons.chapman.edu/esi_working_papers/200/.

Brandts J, Groenert V, Rott C (2015) The impact of advice on women's and men's selection into competition. *Management Sci.* 61(5):1018–1035.

Brock JM, De Haas R (2019) Gender discrimination in small business landing. Evidence from a laboratory in-the-field experiment in Turkey (European Bank for Reconstruction and Development). Accessed April 7, 2022, https://bg.uek.krakow.pl/e-zasoby/siec_lokalna/Ebor/w232.pdf.

Buser T, Geijtenbeek L, Plug E (2018) Sexual orientation, competitiveness and income. *J. Econom. Behav. Organ.* 151:191–198.

Buser T, Niederle M, Oosterbeek H (2014) Gender, competitiveness, and career choices. *Quart. J. Econom.* 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. Preprint, submitted March 31, https://dx.doi.org/10.2139/ssrn.3549354.

Cadsby CB, Servátka M, Song F (2013) How competitive are female professionals? A tale of identity conflict. *J. Econom. Behav. Organ.* 92:284–303.

Cassar A, Wordofa F, Zhang YJ (2016) Competing for the benefit of offspring eliminates the gender gap in competitiveness. *Proc. Natl. Acad. Sci. USA* 113(19):5201–5205.

Castillo M, Petrie R (2010) Discrimination in the laboratory: Does information trump appearance? *Games Econom. Behav.* 68(1):50–59.

Charness G, Gneezy U (2012) Strong evidence for gender differences in risk taking. *J. Econom. Behav. Organ.* 83(1):50–58.

Charness G, Cobo-Reyes R, Meraglia S, Sánchez Á (2020) Anticipated discrimination, choices, and performance: Experimental evidence. *Eur. Econom. Rev.* 127:103473.

Clain SH (2000) Gender differences in full-time self-employment. *J. Econom. Bus.* 52(6):499–513.

Croson R, Gneezy U (2009) Gender differences in preferences. *J. Econom. Literature* 47(2):448–474.

Dargnies M-P (2012) Men too sometimes shy away from competition: The case of team competition. *Management Sci.* 58(11): 1982–2000.

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

Egan ML, Matvos G, Seru A (2017) *When Harry Fired Sally: The Double Standard in Punishing Misconduct* (National Bureau of Economic Research, Cambridge, MA).

Erat S (2013) Avoiding lying: The case of delegated deception. *J. Econom. Behav. Organ.* 93(C):273–278.

Eriksen KW, Kvaløy O, Luzuriaga M (2020) Risk-taking on behalf of others. *J. Behav. Experiment. Finance* 26:100283.

European Commission (2019) *She Figures 2018. Directorate-General for Research and Innovation* (European Commission, Brussels).

Exley CL, Niederle M, Vesterlund L (2020) Knowing when to ask: The cost of leaning in. *J. Political Econom.* 128(3):816–854.

Fallucchi F, Quercia S (2018) Affirmative action and retaliation in experimental contests. *J. Econom. Behav. Organ.* 156:23–40.

Fershtman C, Gneezy U (2001) Strategic delegation: An experiment. *RAND J. Econom.* 32(2):352–368.

Fisk SR, Overton J (2019) Who wants to lead? Anticipated gender discrimination reduces women's leadership ambitions. *Soc. Psych. Quart.* 82(3):319–332.

Flory JA, Leibbrandt A, List JA (2015) Do competitive workplaces deter female workers? A large-scale natural field experiment on job entry decisions. *Rev. Econom. Stud.* 82(1):122–155.

Friedl A, Pondorfer A, Schmidt U (2020) Gender differences in social risk taking. *J. Econom. Psych.* 77:1–17.

Füllbrunn S, Luhan WJ, Sanfeycd A (2020) Current issues in decision making for others. *J. Econom. Psych.* 77:1–8.

Giamattei M, Yahosseini KS, Gächter S, Molleman L (2020) Lioness laboratory: A free web-based platform for conducting interactive experiments online. *J. Econom. Sci. Assoc.* 6(1): 95–111.

Gillen B, Snowberg E, Yariv L (2019) Experimenting with measurement error: Techniques with applications to the Caltech cohort study. *J. Political Econom.* 127(4):1826–1863.

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

Gneezy U, Niederle M, Rustichini A (2003) Performance in competitive environments: Gender differences. *Quart. J. Econom.* 118(3): 1049–1074.

Greenwald AG, McGhee DE, Schwartz JL (1998) Measuring individual differences in implicit cognition: The implicit association test. *J. Personality Soc. Psych.* 74(6):1464–1480.

Greiner B (2015) Subject pool recruitment procedures: Organizing experiments with ORSEE. *J. Econom. Sci. Assoc.* 1(1): 114–125.

Hamman JR, Loewenstein G, Weber RA (2010) Self-interest through delegation: An additional rationale for the principal-agent relationship. *Amer. Econom. Rev.* 100(4):1826–1846.

Holt CA, Laury SK (2002) Risk aversion and incentive effects. *Amer. Econom. Rev.* 92(5):1644–1655.

Ifcher J, Zarghamee H (2021) Do nominations close the gender gap in competition? IZA Discussion Paper No. 13852. Accessed December 10, 2021, https://docs.iza.org/dp13852.pdf.

Kamas L, Preston A (2015) Can social preferences explain gender differences in economic behavior? *J. Econom. Behav. Organ.* 116: 525–539.

Kessel D, Mollerstrom J, van Veldhuizen R (2021) Can simple advice eliminate the gender gap in willingness to compete? *Eur. Econom. Rev.* 138:1–14.

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

Mason MA, Wolfinger NH, Goulden M (2013) *Do Babies Matter? Gender and Family in the Ivory Tower* (Rutgers University Press, New Brunswick, NJ).

Niederle M (2017) A gender agenda: A progress report on competitiveness. *Amer. Econom. Rev.* 107(5):115–119.

Niederle M, Vesterlund L (2007) Do women shy away from competition? Do men compete too much? *Quart. J. Econom.* 122(3): 1067–1101.

Niederle M, Segal C, Vesterlund L (2013) How costly is diversity? Affirmative action in light of gender differences in competitiveness. *Management Sci.* 59(1):1–16.

Reuben E, Sapienza P, Zingales L (2014) How stereotypes impair women's careers in science. *Proc. Natl. Acad. Sci. USA* 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, Centre for Economic Policy Research, Washington, DC. Accessed April 7, 2022, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2689146.

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

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

Sarsons H (2017) Recognition for group work: Gender differences in academia. *Amer. Econom. Rev.* 107(5):141–145.

Slovic P, Weinstein MS, Lichtenstein S (1967) Sex differences in the risks a person selects for himself and the risks he selects for someone else. *Res. Bull.* 7(10):1–15.

Spencer SJ, Steele CM, Quinn DM (1999) Stereotype threat and women's math performance. *J. Experiment. Soc. Psych.* 35(1):4–28.

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

Thaler RH, Sunstein CR (2003) Libertarian paternalism. *Amer. Econom. Rev.* 93(2):175–179.

Tungodden J, Willén A (2019) When parents decide: Gender differences in competitiveness. Accessed December 3, 2021, https://www.google.com/url?q=https%3A%2F%2Fwww.dropbox.com%2Fs%2F0nxpga553on04ik%2FWhenParentsDecide_Paper_1101.pdf%3Fdl%3D0&sa=D&sntz=1&usg=AFQjCNEymayBSf2rZCLxK9HT59Po952a7A.

van Veldhuizen R (2021) Gender differences in tournament choices: Risk preferences, overconfidence or competitiveness? Accessed December 3, 2021, https://drive.google.com/file/d/0B75hoVU_9nz1bkptaERaTVF1Y28/view.

Wozniak D, Harbaugh WT, Mayr U (2016) The effect of feedback on gender differences in competitive choices. Preprint, submitted December 11, https://dx.doi.org/10.2139/ssrn.1976073.