ABSTRACT

Title of Dissertation:	COMPETITION AND PROSOCIAL INCENTIVES: ESSAYS ON THE ROLE OF GENDER WHEN CHOOSING TO COMPETE FOR OTHERS
	Benjamin C. King, Doctor of Philosophy, 2021
Dissertation directed by:	Professor Rajshree Agarwal, Management & Organization Department Associate Professor Evan Starr, Management & Organization Department

My dissertation examines how prosocial and selfish incentives affect individuals' willingness to compete as a critical behavioral choice, and the role of gender in this relationship. Understanding more about this connection is key, as men are more competitive than women, on average, and higher levels of competitiveness are correlated with positive career outcomes. Using insights from economics and psychology, I test and expand theory that individuals become more willing to compete when the rewards benefit a charity or another individual. I suggest practical implications for organizational designers who seek to reduce gender gaps in wages and achievement.

COMPETITION AND PROSOCIAL INCENTIVES: ESSAYS ON THE ROLE OF GENDER WHEN CHOOSING TO COMPETE FOR OTHERS

by

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Foreword

The dissertation examination committee has determined that Benjamin King made substantial contributions to the second essay of his dissertation, “Gender and Competitiveness When Earning for Others: Experimental Evidence and Implications for Sponsorship” which is jointly authored with Nathan Barrymore and Cristian Dezso. This substantial contribution merits inclusions of the second essay in this dissertation.

Table of Contents

Dissertation Introduction

My dissertation examines how prosocial and selfish incentives affect individuals' willingness to compete as a critical behavioral choice, and the role of gender in this relationship. Understanding more about this connection is key, as men are more competitive than women, on average, and higher levels of competitiveness are correlated with positive career outcomes. In this dissertation executive summary, I provide the definitions and literature streams related to my core concepts, situate the two dissertation chapters within existing literature to examine the hypothesized relationships, and discuss the importance of doing so.

Properly designing and implementing incentives for individuals at work is critical for organizational performance. Both monetary and non-monetary incentives matter, and a growing literature has begun to focus attention on prosocial incentives--defined as monetary incentives where the beneficiary is *another rather than oneself* (Imas, 2014). This has been examined primarily in terms of charitable contributions—exemplified by the rising prevalence of corporate matching gift programs[1]. A smaller literature has also examined prosocial incentives in the context of laboratory and field settings where the beneficiary may be peers, coworkers, or a leader's protégé (Goette, Huffman, Meier, & Sutter, 2012; Ibarra, 2012).

Understanding gender differences in prosocial and self-benefiting or standard incentive schemes is vital as it is one factor that has been linked to gender gaps in wages and achievement (Gneezy, Niederle, & Rustichini, 2003; Niederle & Vesterlund, 2007). A recent line of research finds robust evidence of gender differences in willingness to compete (hence WTC) for oneself, and that these differences have profound socio-economic consequences (Buser, Niederle, &

[1] 90% of firms participating in the PWC 19th Annual Global CEO survey reported matching employee contributions to charitable causes

Oosterbeek, 2014; Preece & Stoddard, 2015). Men, on average, are more competitive than women and more competitive individuals select into more prestigious academic tracks, higher paying professions, and are more likely to get higher wages and promotions within their selected job track (Flory, Leibbrandt, & List, 2015; Niederle, 2017). Both scholars and practitioners have devised incentives schemes and interventions to foster competitiveness among those that would benefit the most, namely, high-performing women (Niederle, Segal, & Vesterlund, 2013), but this work has largely only focused upon standard incentives. Insights from theory regarding risk taking and stereotype threat suggest that women in particular might be more willing to compete if it is on behalf of a prosocial cause (like a charity) or for another individual (Amanatullah & Morris, 2010; Andersson, Holm, Tyran, & Wengström, 2014), however such insights are largely untested and boundary conditions have not been set.

The scarcity of scholarly work on the relationship between prosocial incentives and WTC is curious. Beneficial outcomes in organizations and individual careers depend not only upon an individuals' own WTC, but also upon the willingness of others to compete who are in a position to support them. Academic advisors, organizational leaders and managers advocate on behalf of or sponsor their protégés to attain competitively allocated spots at prestigious schools, or high-prestige assignments and promotions to higher-ranked organizational roles (Burbano, Mamer, & Snyder, 2018; Foust-Cummings, Dinolfo, & Kohler, 2011; Ibarra, Carter, & Silva, 2010; Lerchenmueller, Hoisl, & Schmallenbach, 2019). However, we still fail to understand the mechanisms that explain what might induce a manager or advisor to compete on behalf of a protégé.

My dissertation consists of two essays that investigate WTC and both sides of the prosocial coin: rewards for charity or for another individual. I examine the main effects of prosocial incentives upon WTC, the interaction effect of prosocial incentives and gender upon

WTC, and contribute theoretically by testing and expanding extant theory on gender differences in competitiveness (Gneezy et al., 2003).

In my first essay, titled, *Prosocial Incentives Change Willingness to Compete in Work Tasks: The Role of Gender and Performance*, I employ paid work-task experiments to explore the main effect of prosocial incentives for a charity of the workers choice upon individual WTC and the interaction effects between prosocial incentives, gender, and performance. Contrary to theoretical predictions, I find that prosocial incentives cause a 28% drop in WTC and that these effects are driven entirely by women of all levels of performance. A key theoretical contribution of this essay is that I uncover a mechanism, an aversion to getting zero-return; that affects women more strongly than men in a prosocial incentive scheme. When the returns were manipulated to eliminate zero, I find that prosocial incentives increased the WTC among top-performing women, which is an economically desirable result and I discuss implications for reducing gender gaps in achievement.

In the second essay of my dissertation, titled, "*Gender and Competitiveness When Earning for Others: Experimental Evidence and Implications for Sponsorship*" my coauthors and I explore the other side of the prosocial incentives coin, namely when a worker is asked to compete for the financial benefit of another individual, namely managers competing for their direct reports (or protégés). In particular, we ask how the competitiveness of male and female managers changes (i) when rewards accrue to another individual relative to when they accrue to oneself; and (ii) when the individual or protégé to whom the rewards accrue is a woman or a man.

We find that the gender of both the manager and direct report influence our participants' decisions to compete. In particular, we find that, in line with existing evidence, when participants are assigned the role of managers and earnings accrue to themselves, male managers compete

more often than female managers. However, when earnings accrue to the direct report, gender differences in managers' competitiveness disappear. This is driven by female managers competing more often when earnings accrue to their direct report, relative to when earnings accrue to themselves, and not by male managers competing less often. We find that male managers compete more often for male, relative to female, direct reports. By contrast, female managers do not compete at different rates based on their direct report's gender. In an additional treatment in which managers receive information about their direct reports performance and risk preferences, we find that this treatment, male managers compete for male and female direct reports at similar rates and that knowing the risk preferences is driving the effect. The practical implication of this result is that short of providing information about female direct reports' actual risk preferences, male managers may perpetuate gender disparities through their decision of who to compete for. Our findings, thus, point toward a novel strategy to improve the effectiveness of sponsorship programs in organizations and hopefully stimulate more research.

Together, my dissertation brings unique insights that are not available elsewhere. First, the two essays complement each other in a way that enhances our understanding of prosocial incentives. Building upon neoclassical economic theory, which predicts that individuals will exert more effort when performing or competing for self, this dissertation uniquely positions itself by considering both sides of the prosocial incentive coin, namely earning for another individual or for a prosocial entity. Increased understanding is vital to organizations who already employ such incentives in order to nudge employees into higher levels of performance and effort. Further examination of the effects of such incentives on WTC informs practitioners which prosocial incentives contribute to top performers stepping up or lower performers stepping back. My findings in essay #1 suggest that earnings for charity are not a straightforward way to nudge individuals to step up into competition, but minimizing the zero effect is effective at getting

lower performing individuals to opt out. A complementary finding from my second essay is that the role of performance information is not a significant explanatory variable in the WTC decision when a manager is selecting for a direct report. Overall, my findings suggest nuances to the prosocial incentive and WTC relationship that can't be understood separately.

Second, this dissertation adds to the experimental literature on the effect of prosocial incentives on labor market outcomes by investigating WTC, an important but understudied dependent variable. Presently, scholars have focused more upon the expected benefits of prosocial incentives and how they aid organizations. They have been linked to increases in effort and productivity, lower reservation wages, and higher retention rates (Burbano, 2016; Carnahan, Kryscynski, & Olson, 2017; Tonin & Vlassopoulos, 2010). All of these empirical findings support theoretical arguments that prosocial incentives are motivating to workers possessing prosocial preferences and that they care about making direct impacts upon others (e.g. charitable contributions) (L. Cassar & Meier, 2017). Less is understood about how direct and indirect benefits from prosocial incentives support theoretical arguments that prosocial incentives have only positive effects upon effort, and performance. This study indicates that implementing prosocial incentives for the direct benefit of increased performance might not always be realized, and underscores the nuanced relationship between WTC and benefits for charity or another individual. In cases where the zero returns are possible for charity, women opt out, but when competing for a direct report, women and male managers are equally willing to sponsor their protégé.

Chapter 1: Prosocial Incentives Change Willingness to Compete in Work Tasks: The Role of Gender and Performance

ABSTRACT

This paper uses two experiments to understand the effects of prosocial incentives (where charities benefit from an individual's efforts) on workers' willingness to compete in a work task. Counter to expectations and prior literature, prosocial incentives reduce a worker's willingness to compete by 28%. This result is largely driven by women across all levels of performance opting out of competition; subjective evidence suggests that women fear taking a risk and gaining zero for charity. A second experiment finds support for this mechanism—with lower payout variance and increased expected returns to competition, top performing women become as likely as men to enter competition in work tasks with prosocial incentives. Additionally, men are observed to make more optimal choices in prosocial incentive schemes via higher performing men competing more and lower performers competing less. I discuss how these insights from an experimental setting could inform the design of incentives in the field.

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1. Introduction

Prosocial incentives, where a worker's efforts directly benefit a charitable cause, are an important driver of human behavior. Total donations to charitable organizations amounted to over $410 billion[2] in the United States, and approximately 8.8 billion hours[3] of time were spent volunteering in the year 2017. As a result, researchers have examined how to design incentive schemes that appeal to prosocial preferences (Gatewood, Gowan, & Lautenschlager, 1993; Riordan, Gatewood, & Bill, 1997). Attaching prosocial incentives to work tasks has largely been seen as a boon (Ariely, Bracha, & Meier, 2009; Grant, 2008b), in which firms capture value (Bode & Singh, 2017; Burbano, 2016) by increasing the likelihood of attracting and retaining key human capital (Carnahan et al., 2017) and increasing individual level performance (Burbano, 2019; Tonin & Vlassopoulos, 2014).

An understudied issue is whether prosocial incentives affect the willingness of employees to engage in competitive behavior (e.g., tournaments or promotion horse races). Prior research suggests that individuals have heterogeneous preferences for competition (Fehr & Fischbacher, 2002)—and that women are especially unwilling to compete (Gneezy et al., 2003; Niederle & Vesterlund, 2007)—such that high performing candidates may not be willing to compete for a promotion, even if they are the best candidate for the job (Flory et al., 2015). Addressing this issue is fundamental because willingness to compete (WTC) is a key method of reducing the gender differences in achievement and wages (Niederle et al., 2013; Petrie & Segal, 2015) and has been linked to positive organizational outcomes (Haycock, 2001; Ramamurthy & Sedgley, 2015). In this paper, I investigate whether and how prosocial incentives change worker WTC—especially for women—and whether prosocial incentives induce high performing workers to be more likely to compete (Alan & Ertac, 2019).

Insights from an emergent literature stream concerning gender differences in assertiveness suggest that prosocial incentives may increase WTC. Using behavioral experiments and a formal model,

[2] Giving USA Report, 2017

[3] NCCS Report, 2018—Non-Profit Sector in Brief 2018: Public Charities, Giving and Volunteering

Yagasaki (2019) found that women were more likely to select into a competitive work task for charity vs. a noncompetitive task for self. Amanatullah and Morris (2010) found that women use more competitive tactics and obtain higher outcomes when bargaining on behalf of another rather than self. Both studies cite social image concerns as factors in women avoiding competition and show that prosocial incentives encourage an increase in competitive actions. Though the author is unaware of any study that has linked the effects of prosocial incentives upon WTC solely within an effort based on a prosocial incentive scheme,[4] theoretical insights suggest that prosocial incentives could predict more competitive behavior in women.

To examine these questions, I employed paid work-task experiments to explore the main effect of prosocial incentives upon individual WTC and the interaction effects between prosocial incentives, gender, and performance. Contrary to theoretical predictions, I found that prosocial incentives cause a 28% drop in WTC and that these effects are driven entirely by women. A key reason for this finding is aversion to zero-return; in a post-experiment survey, 80% of the women—compared to only 38% of the men—who chose not to compete listed the risk of losing and the charity receiving $0 as the main factor for not competing. Moreover, top performers who were women avoided competition at the same rate as women in the bottom; however, prosocial incentives motivated the top men to enter competition more and lower performing men to exit.

To experimentally investigate whether the fear of getting zero is driving the negative effect of prosocial incentives upon WTC, in a second experiment, I manipulate the payouts so that zero is not included by (1) lowering the variance but maintaining the same expected return (2) and increasing the expected value by 50% while holding the variance constant. In the prosocial incentive schemes of this second experiment, I observed an increase in women's WTC in both manipulations from the first study where the risk of zero was present. Additionally, in the increasing returns group, the competitive gap

[4] KPMP 2017 Survey of Corporate Social Responsibility is one of many reports that indicates extensive increases in the amount and type of prosocial activities that for-profit organizations are implementing. This includes—but is not limited to—increases in social reporting, CSR initiatives, stakeholder outreach, and corporate charitable giving.

between women and men participants closed to the point that the decision to enter competition was statistically similar for both genders. Moreover, in both the prosocial lower variance and increasing returns manipulations, top performing women entered the competition at a higher rate than lower performing women. Among the male participants, I observed very little variation in the mean WTC across all the treatments, prosocial and selfish and high or lower risk of getting zero. However, I observed that in prosocial incentive schemes, lower male performers were more likely to opt out of competitions while top male performers were more likely to enter.

Combined, these results add a more nuanced understanding of how prosocial incentives and their structure can activate different responses in WTC: prosocial incentives can have an overall *positive* or *negative* effect upon WTC in work tasks depending upon whether the task participants are male or female, their performance rank, and the levels of variance and expected returns to competition. Additionally, this study builds a theoretical framework by identifying a mechanism—the potential to get zero return—that affects women's decision to compete more than men's. In general, individuals prefer to avoid situations where zero returns are possible (Menezes, Geiss, & Tressler, 1980). When the zero returns are eliminated in the second study, high-performing women entered competition at higher rates, which is beneficial for organizations seeking to reduce achievement gaps. Prosocial incentives and manipulations of variance and expected returns to competition had no overall effect upon any of the male workers' choices to compete, although men made more optimal choices on whether to compete or not.

This research seeks to extend extant theory on Corporate Social Responsibility (CSR) as a human capital management tool (Brammer, Millington, & Rayton, 2007; Turban & Greening, 1997) by outlining how adding prosocial incentives affects WTC in work tasks and the mechanisms that can be employed to strategically increase the amount of competition taken by individuals within an organization who would benefit the most, namely high performing women. Since high performers of both genders were affected, there are implications for strategic human capital theory on how to incentivize top performers who are differentially treated and valued by firms (Oldroyd & Morris, 2012). My results also inform the literature on competitions. To date, the focus has been on competing for oneself or for a specific individual. I add

further insight into how WTC is affected when the choice is made in an entirely prosocial scheme and provide mechanisms that reduce the gender gap in WTC by incentivizing top performing women to enter competition more. Insights from my paper have implications for managers to improve firm-level human capital investments by reducing the achievement gap and incentivizing the right people into competition without using quotas or affirmative action policies.

2. Theory and Related Literature

An individual's risk aversion, confidence, and preference for competition are three underlying constructs that extant theory attributes to an individual's propensity to enter competitions (Niederle & Vesterlund, 2007). All three constructs are important to strategy and organizational outcomes in constructing incentive systems to exploit human capital. Past researchers have teased out the preference for competition by controlling for risk aversion and overconfidence via choices based upon beliefs on relative performance or by controlling for risk by eliciting risk preferences through self-report measures or tests based upon choosing among a series of gambles (Gneezy, Leonard, & List, 2009). Likewise there are broad streams of literature that have shown gender differences in confidence, finding that men are more overconfident (Deaux & Farris, 1977; Eckel & Grossman, 2008; Estes & Hosseini, 1988) and women are typically more risk-averse (Byrnes, Miller, & Schafer, 1999; Eckel & Grossman, 2008). My contribution is not to unravel the gender differences in the three underlying constructs, as others have done, but to investigate the effects of prosocial incentives on WTC as a whole. I refer to the decision to enter the tournament as WTC with the understanding that risk aversion, confidence, and preference for competition are underlying the main construct. Correspondingly, manipulations to any one of these three constructs, such as lowering risk by decreasing the variance in expected outcomes of a proposed competition, would consequently affect the WTC decision.

2.1 Prosocial Incentives

When prosocial incentives are added to a work task, this shifts the decision makers' focus so that performance benefits a specific other, namely a charitable cause. Prosocial incentives have been broadly termed by some as a type of bonus spent on others rather than on themselves (Anik, Aknin, Norton, Dunn, & Quoidbach, 2013). A more narrow definition was given by Schwartz et al. (2019), who indicate that prosocial incentives direct a worker's efforts toward a charitable cause. Imas (2014) also defines prosocial incentives as when effort is tied directly to charitable contributions. Scholars have widely studied the detrimental effects that selfish, monetary incentives have (see Gneezy et al. 2011 for a review) upon productivity and meaningfulness, and there are indicators that prosocial incentives could have similar effects if used in an instrumental way (L. Cassar & Meier, 2017). This study invokes the narrower definition of prosocial incentives as effort-based rewards for work on behalf of a charitable cause and investigates the heterogeneity in responses that employees might have. As mentioned before, organizations—continually seeking ways to maximize the efforts and productivity of human capital—have turned to non-monetary (such as prosocial) incentives to increase productivity.

Among the largest 250 companies across the globe in 2017, 93% produced and disseminated a CSR report informing shareholders and the public about the firms' social activities, whereas only 45% provided such a report in 2002.[5] Top Global 500 firms spent over $20 billion on CSR activities,[6] and median corporate giving increased by 15% between 2015 and 2017. According to an annual global CEO study[7], 9 out of 10 firms participating in the survey matched employee charitable contributions and nearly 2/3 of firms provided paid time off to do volunteer work. CEOs are increasingly acknowledging that both customers and employees are seeking relationships with organizations that address wider stake holder needs.[8]

[5] KPMP 2017 Survey of Corporate Social Responsibility
[6] KPMP 2015 survey
[7] CEPC Survey Giving in Numbers 2019
[8] PWC 19th Annual Global CEO Survey

Not only are organizations engaging in prosocial incentives at a firm level, but they are implementing and incentivizing individuals within their work tasks by attaching charitable donations directly to individual performance. This has been increasingly accomplished through prosocial incentives within the payoff structures and social initiatives within their organizations via corporate philanthropy[9] or performance bonuses to charitable donations.[10] According to the Accounting Principals Holiday Bonus and Hiring Survey from 2017, 38% of firms not giving end-of-year performance bonuses motivated their choice by offering charitable donations in lieu of bonuses, whereas only 7% of firms reported doing so in 2016.

Nascent scholarly work has begun to test the effects of prosocial incentives upon WTC in experimental settings and typically shows an overall positive effect. Some studies investigated the effects of prosocial incentives upon effort and selection *into* a prosocial work task (Yagasaki, 2019); however, no report has linked the effects of risk-taking behaviors solely within an effort-based prosocial incentive, even though such incentive structures are being increasingly implemented in workplaces that value prosocial responsibilities. Andersson et al. (2014) found that when losses are possible, individuals selecting for themselves take much less risk than those who are selecting for another. Managers acting on behalf of subordinates or the organization take on more risk than when they are deciding on behalf of themselves (March & Shapira, 1987; Shapira, 1995). Though prior work in this area is still developing, insights from initial studies suggest that prosocial incentives should have a positive effect upon WTC and that there might be a positive interaction effect between prosocial incentives and gender.

[9] Over $20 billion donated by US companies in 2017 to charitable causes, according to Giving USA Report

[10] Nine out of ten corporations surveyed in CECP 2017 reported matched charitable donations. The Accounting Principals Holiday Bonus and Hiring Survey 2017 suggests that fewer companies are paying performance bonuses and an increasing number of them are making charitable donations on behalf of employees instead.

3. Experimental Approach—Methods

3.1 Empirical Setting

The experimental settings employed to analyze the relationship between prosocial incentives and risk-taking in work tasks were conducted in a behavioral lab in the business school of a research-intensive university in the United States. As part of the curriculum for certain undergraduate classes, students were able to gain participation credit (up to 2–3% of their final grade) by taking part in two or three research sessions during the semester. Through an online portal, they were offered time slots in which they could sign up for 1-hour-long research sessions, but they were not told the specifics of the research study in which they would be involved until the day of the task.

The research questions in this paper are investigated over the course of two separate studies; the first looks at the main effect of prosocial incentives on risk-taking and the second at two possible mechanisms that might drive the effect. In the first study, the participants were randomly assigned to either the control group, which performed the study protocol for self, or to the prosocial treatment group, which performed for a charity of the participants' choice. Random assignment was performed at the session level via a coin toss. The sample pool consisted of 139 individuals (74 male and 65 female), who participated between April and September 2018. Each experiment lasted about 25–30 minutes and there were a total of 22 sessions. In addition to course credit for completing the task, before they opted into participating in the study, the workers were notified of a guaranteed payment of $1 for completing the task and a potential bonus ($0–20) that depended on their performance and would be for either themselves or another, with details to follow. Participants made an average of about $5.5 in both selfish and prosocial conditions, with no statistical difference between the groups.

3.2 Experimental Design—Prosocial Incentives and Risk-Taking

Akin to other studies that investigate risk-taking or competitive behavior in a work task, I employed a real-effort experiment—patterned after Neiderle and Vesterlund (2007), henceforth "NV

2007"—in which the participants solved real problems. The present study was divided into 3 main tasks, in which each participant solved a series of problems first under a guaranteed, piece-rate payment structure, second under a risky, competitive payoff, while in the third scenario, they were given a choice between the guaranteed or risky payoff structures. The selfish control group precisely replicated the structure and main elements of the NV 2007 design, which has been employed by a number of studies to look at gender disparities in competition and managers' choices for employees (Bertrand, Goldin, & Katz, 2010; Bossler, Mosthaf, & Schank, 2016; Dohmen et al., 2011; Gneezy et al., 2009).

<Insert Table 1 about here>

Upon entering the experiment, each individual was randomly assigned to a mixed-gender group with three other participants in that session. For sessions with the overall number of participants not divisible by four, the subjects were informed and grouped with individuals from the room as well as from a prior round (who had already completed the experiment). After receiving their group assignments, the individuals sat down at a computer terminal and were subsequently exposed to a series of addition tasks, in which the participants added up a series of five two-digit numbers without the use of a calculator, with a pen and paper provided.

Each problem-solving round lasted five minutes, and a countdown timer was provided on the screen while they solved the addition problems. Upon completion of the round, participants were told which problems they got correct and which were answered incorrectly. At no time was the relative performance of the other participants in the group or in the study overall revealed. Participants were informed that one of the rounds would be randomly selected for payment *at the end of the study*. The breakdown of the tasks by round is as follows:

Task 1 Piece-Rate—Five-minute addition task: if this round were selected, they would receive $0.50 per correct answer.

Task 2 Tournament—Five-minute addition task: if this round were selected, the participant who solved the largest number of correct problems in their group of four would receive $2 per correct answer, while

the other participants would receive no payment (in the case of a tie, they would be randomly selected among the winners).

Task 3 Choice—Before performing the five-minute addition task, the participants selected whether they wanted to be paid according to a piece-rate or tournament scheme. If the participant chose the tournament scheme, they were informed that they would receive $2 per correct answer if their score in Task 3 exceeded that of the other group members in the Task-2 tournament they had just completed, otherwise no payment would be received.

Task 4 Choice with Past Performance—No additional action was involved; rather, the participants chose which compensation scheme they would like to apply for this round, based upon their Task-1 correct answers, which were displayed to them as a reminder. If this round were randomly selected for payment, they could select either the 50 cents per correct answer piece-rate or the tournament—and receive $2 per correct answer if they won and zero otherwise.

Last, they filled out a questionnaire in which they were asked questions about their beliefs concerning their relative performance, a series of questions about preferences for risk, both self-reported preferences and preferences elicited from a series of potential gambles that they would be willing to entertain, and typical demographic information. After the end of the questionnaire, one of the four tasks was randomly selected for payment and the participant was told how much they would receive. The average returns for participation in the study amounted to a wage of about $11 per hour, not including the value of class participation; therefore, the rewards were not trivial. See *Appendix 1* and *2* for full experimental instructions and questionnaire.

3.3 Prosocial Treatment Group

For the subjects that were randomly assigned to the prosocial treatment group, the elements of the tasks were identical to the selfish control group. They were asked to solve the exact same problems and make the same decisions; the only difference was to whom the performance-based pay would be awarded. After agreeing to the study to get extra course credit and notification of a guaranteed payment for

completing the task, those in the prosocial incentive group were asked to perform the remaining tasks entirely on behalf of a charity or non-profit organization of their choice. Next, the participants had to select the charity or non-profit organization toward which they would like to direct their earnings. They were provided a list of eight well-known charities from which to pick, with a short description of the humanitarian causes the organizations support, and a ninth option labeled "your choice," wherein they could enter the name of a specific organization. *Table 2* shows a list of the charities and the frequency with which they were supported; approximately 93% of the participants selected one of the eight charities provided.

<Insert table 2 about here>

The reason for implementing the prosocial manipulation in this manner is twofold. First, by giving the participants a variety of organizations to choose from and the option to select their own favorite charity, I believe I am able to elicit a stronger prosocial treatment than if only one charity were selected (e.g., the American Red Cross), as has been done by others that replicated the NV 2007 methodology and added a prosocial element (Yagasaki, 2019). Second, by performing the entire experiment in the prosocial realm, I differentially positioned the experiment to more closely simulate workplace scenarios that implement CSR, wherein rewards conditional upon performance go to a prosocial cause and yet there is still a set benefit for self (class participation and completion reward).

After the participants selected a charity, the instructions for the tasks remained identical to the selfish control group, with the exception that the name of the organization was now swapped with selfish language as to who would receive the future payment. If, for example, a participant in the prosocial treatment group were to select St Jude's Children's Research Hospital as their charity, then the first task would now read:

"*If Task 1 is selected for payment:* ***St Jude's Children's Research Hospital*** *receives 50 cents for each correct answer…,*"

Whereas in the selfish control group, the following message would be shown: "*If Task 1 were selected for payment:* ***you*** *receive….*"

3.4 Measures

Dependent Variable: *Entry into competition* is a binary variable equal to 1 if the participant selected into the competitive tournament in Task 3 and 0 if they selected the piece rate.

Independent Variables: *Gender* was coded as 1 if the participant reported to be a woman and 0 for a man. Prosocial incentives is a dummy variable coded 1 if the participant was assigned to the prosocial treatment group and 0 otherwise. *Lower Variance* was coded as 1 if the participants were assigned to the lower variance condition. *Increased rewards* was coded as 1 if the participant was assigned into one of the increased rewards condition and 0 otherwise. *Top 50% Performer* was coded as 1 if the participant was in the top half of performance for problems solved across all tasks and 0 otherwise.

Control and Mediating Measures: These variables were constructed from the exit survey after completion of the four tasks and include questions about demographics, such as age, education, ethnicity, and college major. Risk attitudes were elicited in two self-assessed risk-taking questions on a scale from 0 to 10, adapted from Dohmen et al. (2011), which has been found to be predictive of risk-taking behavior. Overconfidence was measured on a 0–10 scale on which participants self-rated whether they are generally a person who is not at all or very confident.

3.5 Results

Before investigating the main effects of prosocial incentives upon WTC, I present *Table 4* containing the summary statistics between the selfish control group and the prosocial treatment groups. The comparison reveals no statistically significant differences (p-value > 0.1) between the participants regarding gender composition, age, and GPA. This suggests that the randomization was successful and that selection bias due to observable measures was minimal.

An examination of performance (total number of problems solved) and effort (total problems attempted) in *Table 4* reveals no significant differences between the prosocial selfish groups. This result differs from some studies that have linked prosocial incentives to increased productivity and effort (Grant, 2008a; Tonin & Vlassopoulos, 2014), although it is consistent with Imas (2014), who found that effort for a prosocial cause was moderated when payments were raised. He observed that in an effort task of

squeezing a hand dynamometer, when the levels of payment were low ($0.05 per 25 kN), there were higher levels of effort associated with prosocial incentives but no difference when incentives for self and for others were higher ($2.00 per 25 kN). As the payment amounts for this study were very similar to those in the higher incentive group in Imas' (2014) study, I similarly find no difference between performance between the prosocial and selfish groups. The average participant in both the prosocial and selfish treatment groups took 27.5 minutes to complete the study with an average take-home payment of $5.50 (about $12 an hour). The hourly rate of the top performer was just over $113 an hour (actual take-home pay $52). It is also noteworthy that we fail to observe any statistical differences in means between prosocial and selfish groups in the measures of risk taking and confidence, which have been linked to explaining WTC.

<Insert table 4 about here>

Figure 1 shows the effect of prosocial incentives upon WTC, measured by the choice to enter the risky, tournament-style payment scheme in Task 3 over the guaranteed piece-rate scheme. This figure shows that participants in the selfish control group were more likely to enter the competitive tournament than those who were randomly assigned to the prosocial treatment group (57% vs. 41%). The drop in the prosocial groups represents a decrease of about 28% in WTC compared to the selfish control group. I performed a nonparametric, Mann-Whitney two-sided comparison of means (p-value = 0.07) and find suggestive evidence that there is a difference in means. This finding is counterintuitive because initial studies in this field found that prosocial incentives increased WTC.

<Insert Figure 1 and 2 and Table 5 about here>

The bars in *Figure 2* display the heterogonous response between gender and WTC in the sample. An examination of the two leftmost bars in the figure shows no statistical difference (67% vs. 65%, p-value = 0.8) in WTC between men who were in the selfish or prosocial incentive groups. On the right-hand side of the same figure, we observe that 44% of women made the competitive choice in the selfish condition, but only 18% selected to compete within the prosocial condition (p-value = 0.025), a 59% drop in WTC. This finding runs contrary to Yagasaki's (2019) results, who found that women enter

competition more in a prosocial scheme. This finding is further shown in the first column of *Table 5*, which highlights the negative main effects of prosocial incentives and gender upon WTC. Additionally, I find that the magnitude and statistical significance of the coefficients in column 1 remain unchanged when controls for risk preferences, task performance, and confidence are included. To test the interaction effect between gender and prosocial incentives, I run a probit regression with the dependent variable, WTC, on prosocial treatment, gender, and the interaction of the two with marginal effect reported. In the second column of *Table 5*, we observe that the interaction term is significant at the $p < 0.1$ level, which is suggestive evidence that women participants' change in WTC are driving the overall negative main effect. This indicates that the overall negative main effect observed in *Figure 1* is largely driven by women who change their willingness to select the competitive tournament choice.

Figure 3 displays the effects of prosocial incentives and WTC based upon the level of performance. It plots the mean entry rate into competition in the selfish and prosocial incentive schemes based upon whether the participant was in the top or bottom 50% of total performance over the three rounds. On the left-hand side of the figure, we observe that in the selfish control condition, about 61% of the bottom performers chose to enter the tournament and 50% of the top performers elected to do so (p-value = 0.38). On the right-hand side of Figure 3, we notice a significant difference between the top and bottom performers (28% entry rate of the bottom performers, 55% of the top, p-value = 0.02). To further investigate how prosocial incentives are affecting those who are likely to win the tournament, I present a binned scatter plot in *Figure 4.* Starr and Goldfarb (2020) note that the practice of displaying binned scatterplots greatly adds to the speed and quality of research as it can display linear and non-parametric relationships between multiple subgroups with or without controls. I used the STATA command *binscatter* to plot the tournament entry choice and the participants' composite ranking scores over the Task 1 and Task 2 rounds on the y- and x-axis, respectively, with a linear trend line. As a reminder, there are four participants in each group; therefore, those who achieved the highest ranking were the winners in their groups over two rounds and would have benefited the most from entering competition. *Figure 4*

shows that across all levels of performance in the data in the selfish group, we see a somewhat flat (slightly negative) slope in the fit line. This indicates that the WTC was similar across all levels of performance in the selfish group. However, in the prosocial incentive group, we see a positively sloped line, which reaffirms what we observed in *Figure 3*: group winners remain more likely to enter the tournament, although there is a steep drop in the losers, who now enter much less frequently. The implication of the positively sloped line in *Figure 3* is that individuals in the prosocial treatment group were making more optimal choices to compete. Those in the bottom, who were unlikely to win the tournament, were more likely to select guaranteed payment, while top performers remained highly likely to enter a tournament that they could win.

Table 6 uses regression analysis to further test the interaction between performance and prosocial incentives. I run a probit regression, similar to the one in *Table 5*, to test the prosocial incentives variable with a performance indicator variable equal to 1 for those in the top half or 0 for those in the bottom overall performance. In Table 6, column 2, we observe a significant interaction effect at the $p < 0.01$ level. The interpretation of this result is that lower performers in the prosocial incentive scheme are driving the effect; when potential rewards for a charitable cause are at stake, lower-performing individuals seem to take less competitive actions, which could result in receiving no return. This is interesting because we do not observe such actions in the selfish control group; in fact, the performers in the bottom 50% have the highest likelihood of entering the tournament, although there is not a statistically significant difference compared to the top performers (as evidenced by the slightly negative trendline in *Figure 4*).

Figure 5 presents binned scatterplots to observe the relationship between prosocial incentives, gender, and performance upon the WTC decision. To better visualize the data, I generate two binned scatter plots with the tournament entry choice on the *y*-axis and the ranking score based upon the performance in Tasks 1 and 2 on the *x*-axis, although this time isolating male and female workers. In *Figure 5*, we look at the female participants' WTC decisions across all four levels of ranking and compare the selfish and prosocial incentive schemes. Note that the slope is negative across the rankings from

lowest to highest. This indicates that the women who won Tasks 1 and 2 were *less* likely to enter the competition than those who had the worst scores. However, we observe a flat fit line for the women in the prosocial incentive scheme, signifying that women across all rankings, even those that won the tournaments, entered the competition less than 20% of the time.

On the left-hand side of *Figure 5*, the binned plot of the men under the selfish incentive scheme shows a flat trend line across all ranking levels, indicating that men enter about 66% of the time regardless of their ranked performance. However, in the prosocial incentive scheme, we notice that the fit line has a positive slope, indicating that men who are winners enter at a much higher rate than those in the bottom. Although prosocial incentives were observed to have no effect upon the mean of males entering into competition (67% vs. 65% as previously noted in *Figure 2*), we observe more efficiency in the decisions; those who benefit the most are entering more (winners) and those that performed the worst are making the optimal selection to take the guaranteed payments for charity. A remarkable observation is that under the prosocial incentive scheme, the gender gap widens among the group winners. Men in the top ranks went from entering 70% of the time for self to 90% of the time for charity, whereas women winners went from entering 58% of the time for self to only 19% of the time for charity. There is not a clear indicator that prosocial incentives schemes are increasing the WTC decision for top performers.

Another takeaway from *figures 4* and *5* is the observance that, on average, the participants most likely to avoid competition in both selfish and prosocial schemes were those who were in the top 50% of performance but placed second and just missed out in winning. This is curious, as one might suppose that those who are closer to being in first place would be more likely to enter competition than those who performed in the bottom 50%, in particular since there was overlap in performance between some winners and second place finishers. In the task 3 performance, the average for a first place finisher was about 13 problems solved and 9.5 problems solved for the second place finishers. However, 33% of the winners ended up with a score of 10 problems or fewer, and 28% of the second place finishers has scores of 11 or higher, indicating that a sizeable amount of individuals who came in second place could have been winners. Rank ordering the mean score in self-reported confidence and risk preferences has the second

place finishers ranked the lowest in confidence and risk taking when compared to first, third, and fourth place finishers. When asked about their guessed rank, the first and second place finishers guessed their rank correctly 45% of the time, whereas third and fourth place finishers guessed their rank correctly only 22% and 14% of the time, respectively. Splitting the sample in even smaller subgroups makes it difficult to do a reliable comparison of means test so we can't rule out the possibility that there is no difference, but it seems that the observance of the lowest levels of WTC in the second place finishers could be correlated with the low confidence and risk preferences.

In summary, the results from this study provide evidence that runs counter to the findings of Yagasaki (2019); I find a main effect that participants were less likely to select the competitive tournament in the prosocial incentive scheme. Moreover, these results shed light on an understudied issue—the interaction effects between prosocial incentives and performance. The present work has important implications in implementing prosocial incentives that could drive top performing women away from competitions while increasing the likelihood of top performing men to enter, which would lead to a further exacerbation of the wage and achievement gaps.

4. Mechanism Discovery and Theory Building

The second study in the present paper delves deeper into identifying why this unexpected main result is happening and seeks to contribute theoretically by discovering the underlying mechanism. Using participants' feedback and insights from the first study, I identified the risk of zero return as the mechanism through which the gender differences in WTC manifest in the prosocial incentive scheme. Using insights from economic theory, I reduce the riskiness of the choice to compete by means of two manipulations to test to see whether the changes to the incentive schemes could motivate top performing women to compete more.

The participants from the first study in the prosocial incentive scheme who opted out of the competitive tournament reported the risk of getting zero for charity as the main reason for their

withdrawal. As part of the end-of-survey questionnaire in Study #1, the participants were asked to answer the question of why they made their Task 3 choices. This was an open-ended text-entry question, and about 80% of the participants responded. Aversion to risking and losing money for a charity was the main explanatory factor for women in the prosocial incentive scheme who selected out of the tournament. One individual said of her choice for the piece-rate scheme, "*It guaranteed some payout for the charity. I had no way of knowing how the other participants were doing, so I didn't want to risk it*." Another woman, who came in second place in her Task-3 group said, "*I didn't want to risk giving nothing to the charity. I felt there was a better chance for someone else to win*." The answers from the women tournament winners were similar to those who didn't win. "*To avoid the risk of Doctors Without Borders receiving nothing, I preferred to win less (guaranteed) than risk winning nothing for the hope of winning $2 per correct answer*" was the response of a woman who came first in her Task-3 group and finished in the top quartile in overall performance. Men who selected the piece-rate scheme over the tournament also reported similar reasons for wanting to ensure the charity received something, although this response was not as common. I reviewed the text of all responses in the prosocial group and tracked how many included the name of their selected charity or the words "charity," "guarantee," "donation," "risk," or otherwise expressed that the fear of losing money drove their decision. Of those that left a response, 79% of the women expressed that fear of losing and the charity receiving $0 was the main reason for selecting piece-rate, while only 38% of men expressed similar sentiments (see *Appendix 3* for the full table of responses).

This pattern suggests not only that the risk of getting zero is a reported mechanism behind the behavioral change, but also that women are more likely to report this fear as the reason for their change in behavior. In general, individuals prefer to avoid situations where losses are possible or the chance of getting zero exists, even if the potential rewards are large (Menezes et al., 1980). Some scholars have shown that an aversion to receiving zero rather than the appeal of certainty is the driving force of systemic violations of the expected utility theorem (Incekara-Hafalir & Stecher, 2016), a descriptive theory of choice under risk, although there is much work to be done in this area.

Scholars have noted that social gender roles can strongly affect the decision to compete, in particular the notion that women who compete aggressively are breaking cultural norms of expected behavior (Fiske, Cuddy, Glick, & Xu, 2002). Yet reasoning and actions vary within individuals as a function of personal and contextual factors. Using the Niederle Vesterlund (2007) methodology, we are able to remove the contextual factors in the lab. Since no information about group membership or individual choices are shared and individuals are put into cubicles, I feel that the observed zero effect in this study is an expression of personal preferences.

One explanation for the observed difference in personal preferences could be that women in the sample, on average, seem to hold more fear of loss and of sense of care than men (Gilligan & Attanucci, 1988). This line of reasoning flows from scholarly works concerning multiple views of prosociality; as either a theory of equity or one of attachment. Femininity and the care perspective have been linked to a type of prosocial reasoning (Tronto, 1987) that values connectedness. Men, on average, are viewed as hold ideals of reciprocal rights and equal respect, whereas women hold to an ideal of attention and response to need (Eisenberg, Fabes, & Spinrad, 2007). Theory suggests that those more likely to hold to the ideal of care (i.e. women) would shun activities, such as a competition with the possibility of zero return, that could break the sense of connectedness or cause harm.

The riskiness of competitive activities is key to internal calculations on whether or not to compete. Individuals encounter risk within the course of regular business activities, whether abnormal events—such as trying to secure venture capital or managing organizational change—or within the context of everyday tasks. Risk, according to classical decision theory, concerns the variation in the distribution of possible outcomes while considering the likelihood and values of such (March & Shapira, 1987). When comparing two alternatives with the same expected outcome, the riskier one has the larger variance, *ceteris paribus*. Risk is jointly considered with expected returns as attributes when evaluating alternative decisions, such as whether to take on a certain project at work that is higher risk but higher reward or a decision as to what type of compensation scheme would lead to the optimal amount of payment.

As prosocial incentives are reported to change the willingness to take risks, one of the three underlying constructs of WTC, I move on to investigate if reducing risk affects the decision to compete in a prosocial context. Thus far, most of the theories and predictions in the extant literature stream on WTC (Croson & Gneezy, 2009) have held constant the expected values and variance of the potential choices in the prosocial and selfish incentives. This is in line with classical decision theory (Arrow, 1965) and current behavioral studies that have looked at the willingness to enter competition (Niederle & Vesterlund, 2007). However, risk is also conceived as a reflection of change in subjective values and a risky alternative is one for which the variance is larger than for other choices, *ceteris paribus*. Virtually all theories of choice assume that decision makers prefer larger rewards rather than smaller ones if other factors are held constant (March & Shapira, 1987). To test the mechanism of prosocial incentives stimulating additional risk-aversion, I intend to reduce the riskiness of the WTC decision.

For the first manipulation, I lowered the variance in expected outcomes while keeping the expected value of the competitive and noncompetitive choice the same ($0.5 per correct solution). Instead of the range of values to entering the competition being $0 if you lost or $2 if you won, the values were set to $0.25 if you lost and $1.25 if you won. In the second manipulation, the variance in expected outcomes remained the same, but I increased the expected returns when choosing competition ($0.75 per correct solution) vs. the noncompetitive choice ($0.5 per correct solution). The range of expected values was the same as in Study #1, but the distribution was shifted to the right. Under both new incentive schemes, selecting the tournament did no longer result in a chance of getting zero.

4.1 Experimental Approach—Study #2 Manipulations of Lower Variance and Increasing Expected Returns

The second study builds upon the first by adding two treatment groups, in which the variance is lowered and the expected return to competition is increased. The NV 2007 methodology is now slightly modified as follows: for both the lower variance and increased returns treatment groups, participants now begin the tasks after being randomly assigned into either (1) a control group competing for self or (2) a treatment group competing for a charity they select (refer to *Table 3*, rows 2–3). The sample pool

consisted of 400 individuals (211 male and 189 female) who participated in October 2018 and was pulled from the same student population. Individuals who participated in Study #1 were flagged and excluded from participating in Study #2. Each experiment lasted about 25–30 minutes, and there were a total of 61 sessions.

<Insert Table 3 about here>

For the lower variance treatment, the Task-3 choice remained the same, at \$0.5 for each correct question in the piece-rate, but the competitive choice was set to \$1.25 if you won the group challenge and \$0.25 otherwise. In a group of four participants, a person with a 25% chance of winning and a 75% chance of losing would be indifferent to selecting the piece-rate or tournament since the average return is the same, \$0.5 per correct question: \$0.5 = (\$0.25 × 75%) + (\$1.25 × 25%). This new manipulation maintains the expected return (\$0.5) at the same level as in the first round of the study (row 1 of *Table 3*); however, the variance in potential outcomes is reduced. If the participant selected the competitive choice and lost, they or the charity of their choice would get a payout minimum of \$0.25 per question solved, rather than \$0 as in Study #1.

For the higher expected-value group (row 3 of *Table 3*), I hold constant the variance in possible outcomes but increased the expected value of selecting the competition tournament. The Task-3 choice to compete was \$2.25 per correct answer if you won and \$0.25 otherwise. The same group with four individuals equally likely to win would now average \$0.75 per correct answer if entering the tournament (\$0.75 = [\$0.25 × 75%] + [\$2.25 × 25%]) and the piece rate remained at \$0.5 for each correct answer. As in the lower variance condition, there is no chance of getting \$0 and the minimum payout was \$0.25. Therefore, the expected return to selecting to compete (\$0.75) is 50% higher than the expected return of the risk-free choice (\$0.5). All other aspects of the study were kept the same as in Study #1; the participants have to answer the exact same addition problems and fill out the same exit survey.

4.2 Results—Study #2

Figure 6 illustrates the men's and women's responses in the original control group and the new selfish control group with lowered variance and higher returns. The left-hand side of the figure displays

the WTC results of the first study with the higher level of variance. In Study #1, men and women selected to compete 67% and 44% of the time, respectively, a difference that is statistically significant (p-value = 0.047) and replicates the NV 2007 methodology and result. Examining the outcomes of the lower variance condition for self (the two central bars of *Figure 6*), we fail to observe a gender difference (p-value = 0.81); men and women chose to compete, on average, at the same rate (52% and 54%). Similarly, we do not notice a difference in WTC between men and women in the higher returns manipulation for self (57% and 59%, p-value = 0.82). This finding shows that when competing for self, manipulating the incentive scheme to avoid zero returns closes the gender gap in WTC.

Figure 7 is set up to observe the reactions to lower variance and higher expected returns in the prosocial incentive group. The two central bars of *Figure 7* show a gender gap in WTC within the lower variance prosocial incentive scheme; men enter the tournament 62% of the time and women 38% (p-value = 0.029). However, the gap was 63% and 18% in the high variance group from Study #1 as observed in the two left-hand bars (p-value = 0.00). It is worth noting that the increase in WTC between the women in Study #1 and the lower variance condition (18% to 38%) is statistically significant (p-value = 0.04). This pattern suggests that more women enter the competition with prosocial incentives and lower variance, although only in the selfish condition is the gender gap in risk-taking closed thus far.

The final treatment condition tests the higher expected returns to competition manipulation. In *Figure 7*, the two right-hand bars indicate that when there are higher expected returns, 66% of men and 57% of women participants select the risky choice (p-value = 0.3). This result suggests a failure to reject the null that there is no gender difference in WTC when the expected returns to competition are higher and represents the largest amount of entry into competition by women participants. Overall, this study observes that when the risk of loss is reduced via lower variance or higher expected returns, the gender gap in WTC is greatly reduced and is statistically dissimilar to men in the case of higher returns to competition.

<Insert Figures 7-10 about here>

Figure 8 illustrates the effects of the lower variance and higher expected return manipulations upon those who were the top performers. The bar graph displays only those who were in the top 50% of performance overall and looks at how the rate of WTC changes from Study #1. The condition in which the best workers entered the most was the higher returns to competition, as shown by the right-hand side bars of *Figure 8*. Therefore, increasing the returns to competition in both the selfish and prosocial treatments led the people most likely to win to enter at higher rates.

Figures 9 and *10* are binned scatter plots similar to *Figure 5*; the WTC is plotted on the *y*-axis and group ranking on the *x*-axis. The graphs reveal the effects of the two manipulations based on group ranking and gender; hence, I investigate the competitive decision in view of each group member's ranking after the first two tasks. In *Figure 9*, note very similar trends between men (left-hand side) and women (right-hand side) participants in the selfish conditions. Each graph has a positively sloped trend line for lower variance and higher expected value. This finding is intriguing, as it suggests that women who are winners or first runners up are entering competition for self at a higher rate than in Study #1, when the possibility of zero returns was present. However, when compared to the overall result, the highest performing competitors still remain relatively unchanged between Study #1 and #2 in the Selfish condition, indicating that we observe a stepping back of the lower performing individuals rather than a stepping forward by the top.

Figure 10 graphs WTC and ranking in the prosocial incentive schemes. Here, we observe increases in WTC among women across all ranking levels. In both manipulations, the women winners entered the competition around 50% of the time, whereas they did so less than 20% of the time in the first study. Lowering the variance in the prosocial scheme for men led to a negative trend line and is the only treatment in which we observe top-ranked men entering below 60% of the time. In the higher returns case, men who were the winners entered the competition 77% of the time. This is consistent with participants' responses that the zero-effect mechanism was affecting the WTC, and it implies that of the two risk-reducing manipulations, increasing returns to competition is the incentive scheme in which women and men winners are most likely to enter the competition.

5. Discussion

Given that human capital is of great importance to firm value (Coff, 1997), it is vital to understand not only the intensity of effort workers express in work tasks, but also the types of effort, such as WTC. Prosocial incentives are becoming more central to firms' strategies for motivating heterogeneous employees, yet little is understood about how it affects WTC in paid work tasks. This paper provides causal, empirical evidence from in-person experiments that prosocial incentives had a *negative* main effect upon WTC overall in the work task, contrary to expectations. Further examinations show that the negative effect is driven by women of all performance levels failing to compete. Additionally, I find that the relationship between women's WTC and prosocial incentives is directionally sensitive. In instances of lower variance and higher expected value to competition, prosocial incentives *positively* impacted the decision to compete among women. Male participants' average level of competition never greatly varied in any of the treatment conditions, even when the variance was lowered or the greater expected value treatments were implemented. However, prosocial incentives led to more optimal choices among the male participants in the study. The workers who would benefit the most—the top performers—were more likely to opt into competition, while lower performers were more likely to opt out. This trend also held for the women, but mostly in the lower variance and higher expected return conditions. Overall, this paper reveals that fear of losing money for charity affected women's WTC more than men's. However, when manipulations that lowered the risk of the choice were activated, prosocial incentives were able to help eliminate the gender gap in WTC, an effect commonly observed in economics (Croson & Gneezy, 2009). Prosocial incentives led to more optimal choices being made across gender and performance—i.e., the right type of people choosing to enter or avoid competitions.

This study's main findings have implications for organizations and managers. Women's unwillingness to take risks or compete is one of the factors that leads to the income and achievement gaps

found in the workplace (Blau & Kahn, 1994; Gneezy et al., 2003). This paper demonstrates that prosocial incentives, with the proper mechanisms activated, can reduce this gap so that women workers' risk-taking is not significantly different than men's in a work task. Conversely, when the variance is high and the potential to get zero returns is present (as is the case in NV 2007 and many similar behavioral studies), prosocial incentives exacerbate the gender gap in WTC. Managers and incentive designers can glean from this paper that prosocial incentives do affect WTC among men and women wage earners as they consider implementing such policies. Organizations seeking to promote and encourage WTC among all workers should also consider the gender makeup of their work force. I find that although women across all levels of performance increased their WTC in the prosocial incentive scheme, the largest increases were seen among the top performing women. Moreover, scholars have shown that increasing the number of top-performing women in competitions leads to overall higher wages and is a tool to reduce or eliminate the achievement and wage gaps (Niederle et al., 2013). The implications of this study are that prosocial incentives can be a tool to encourage top-performing women to self-select into taking more risks in work tasks, which could lead to reducing wage and achievement gaps, although future research is warranted to test these findings within an organizational context.

Prosocial incentives are considered a subset of CSR to the extent that prosocial incentives can be added to a work task that contributes to social welfare outside of the direct benefits to the firm. Scholars that have investigated the effects of CSR upon firm performance via a link to human capital may find the present work significant. As CSR has become more central to business strategy, researchers have sought to understand the factors that reveal the underlying variation seen with CSR implementation (Godfrey, 2009). Among the chief factors are human capital and how CSR affects the attraction and development of talent within an organization (Bidwell, 2011; Campbell, Coff, & Kryscynski, 2012). This study builds on previous research that recognizes the individual worker as an important factor through which CSR can positively influence firm value (Burbano et al., 2018). CSR exercises have been linked to positive outcomes in the ability of firms to attract and retain talent (Backhaus, Stone, & Heiner, 2002; Gatewood et al., 1993), cause employees to accept lower wages (Burbano, 2016), and reduce negative behaviors,

such as shirking and dishonesty in the workplace (Flammer & Luo, 2017; Tonin & Vlassopoulos, 2014). As other scholars have noted, the literature has primarily focused upon the value of prosocial impact and meaningfulness from CSR activity as the driving force of positive behavioral outcomes. This paper contributes to a more nascent stream of literature that indicates that CSR can be used as a strategic lever orthogonal to deriving meaningfulness (Burbano et al., 2018).

As others have previously indicated (Burbano, 2016), macro studies regarding CSR and firm performance have greatly informed theory on human capital but also faced challenges of measurement bias, reverse causality, and endogeneity along with the lack of understanding as to which underlying mechanisms are at play. My study's methodology complements many field-based studies in the area of CSR by testing the theory within a controlled setting and using random assignment into treatment groups. This experimental method allows for causal claims; however, I acknowledge the limits to the external validity outside of the experimental setting. In the future, by extending CSR to experimental contexts, wherein individuals enter situations where paid work results in real money going towards a prosocial cause, scholars will be empowered to more precisely identify and test extant theory, delve deeper into various motivational mechanisms, and consider potential predictions provided by theory.

Figures

Figure 1—Prosocial incentives have an overall negative effect upon WTC

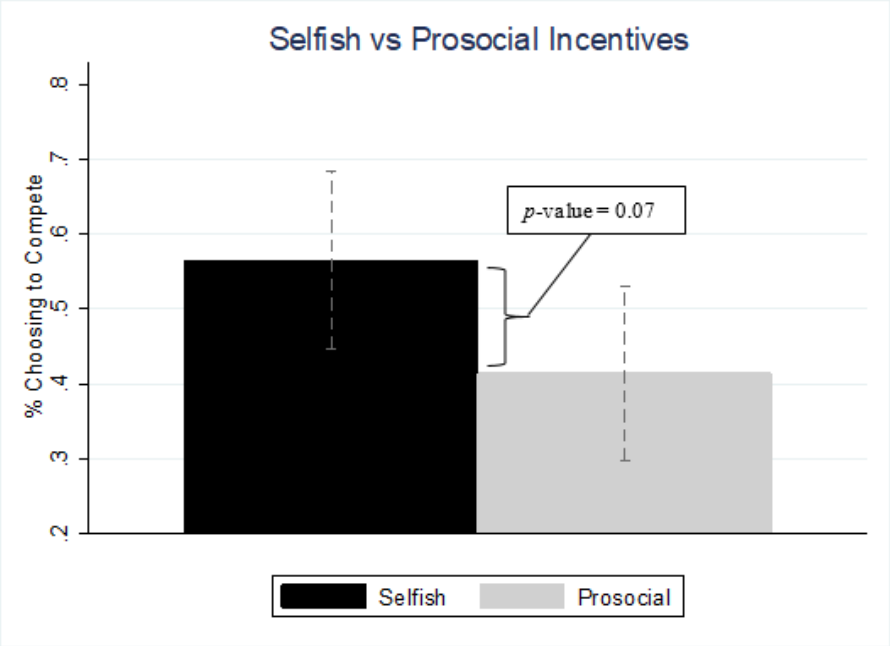


Figure 2—The women, not men, compete less when there are prosocial incentives.

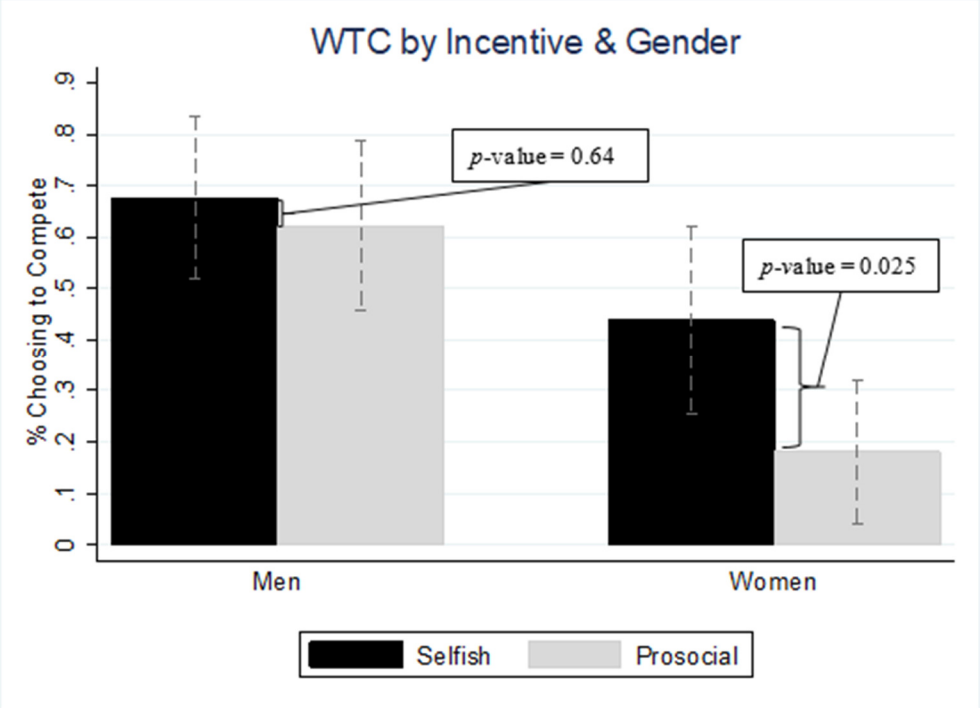


Figure 3—The bottom 50% of performers avoid competing in prosocial treatment

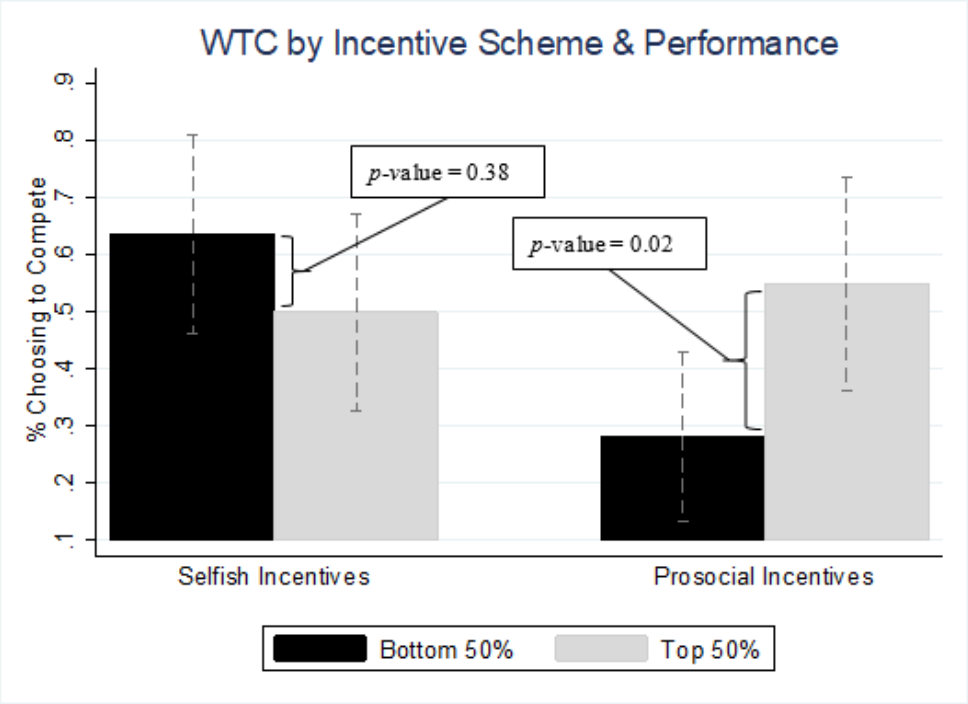


Figure 4—Binned scatter plot of WTC and ranking—losers in prosocial opt out, while winners compete at the same rate in selfish and prosocial conditions.

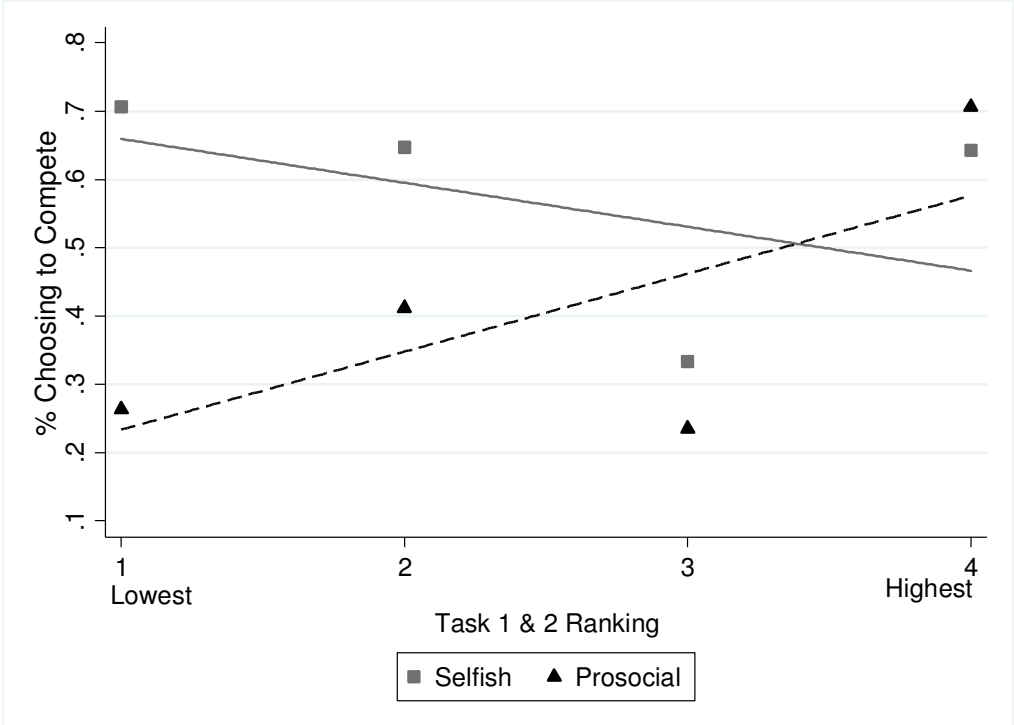


Figure 5—Binned scatter plot of WTC and ranking by gender—women winners compete less, while male losers opt out more and winners opt in more in prosocial conditions.

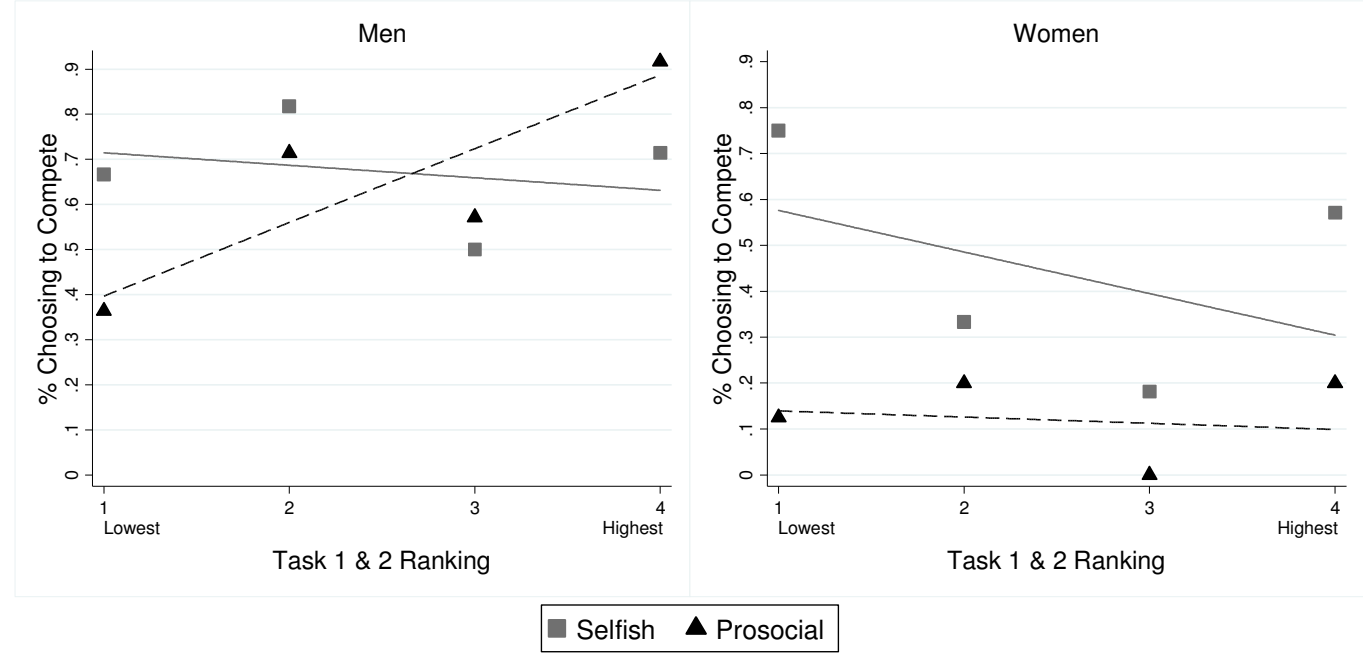


Figure 6—The gender gap in WTC disappears in both low variance and higher return manipulations.

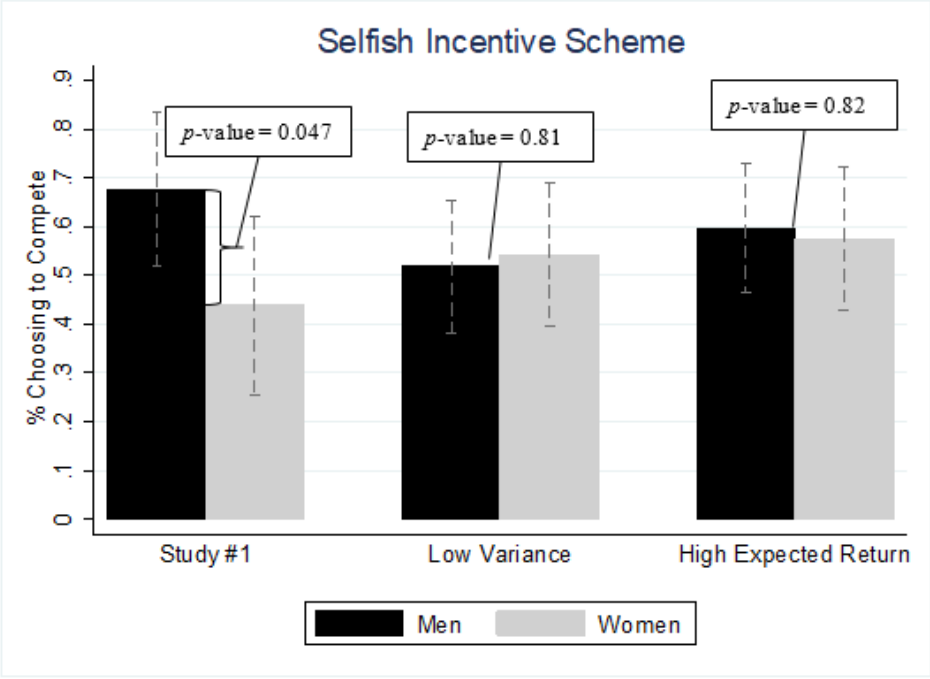


Figure 7—Lower variance and higher returns increases WTC for women in prosocial schemes.

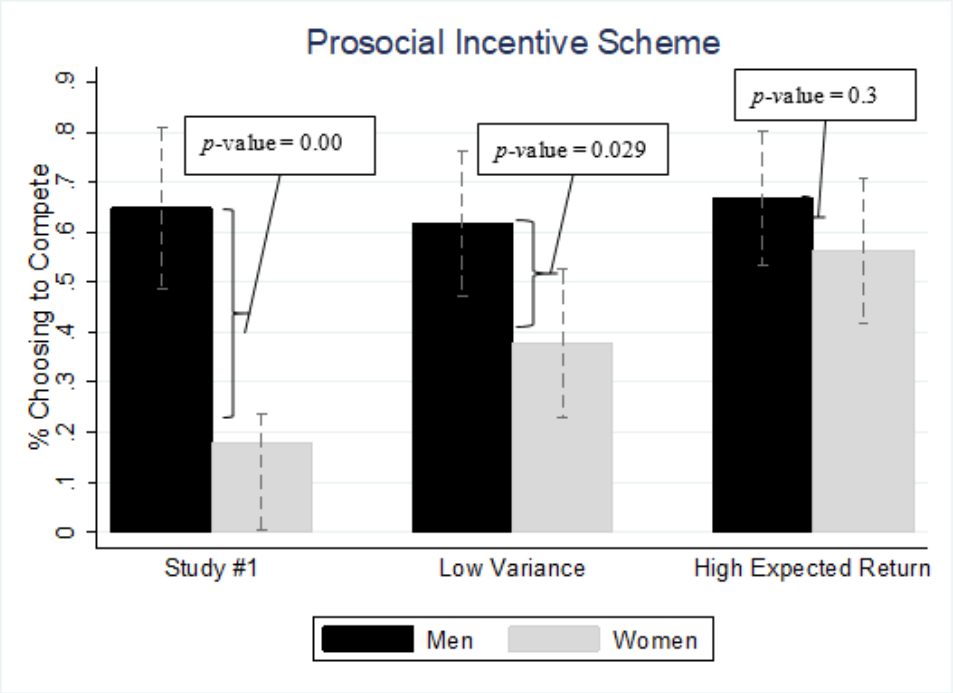


Figure 8—Top performers enter more often in Study #2 manipulations.

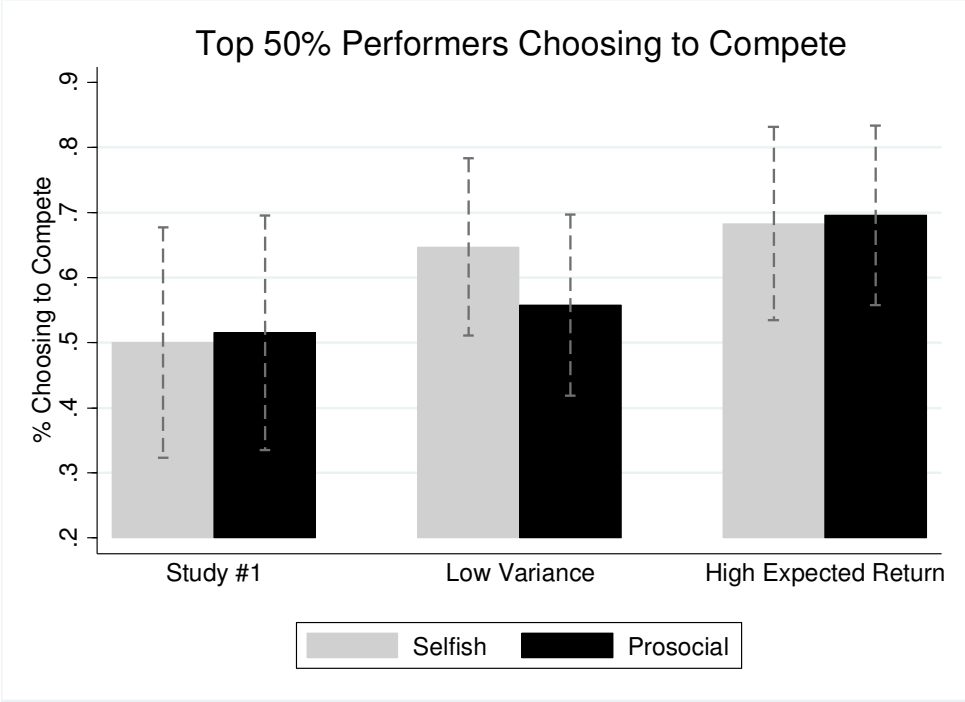


Figure 9—Binned scatter plot WTC and ranking—lower variance and higher returns induce more competition in men and women in the case of selfish incentives.

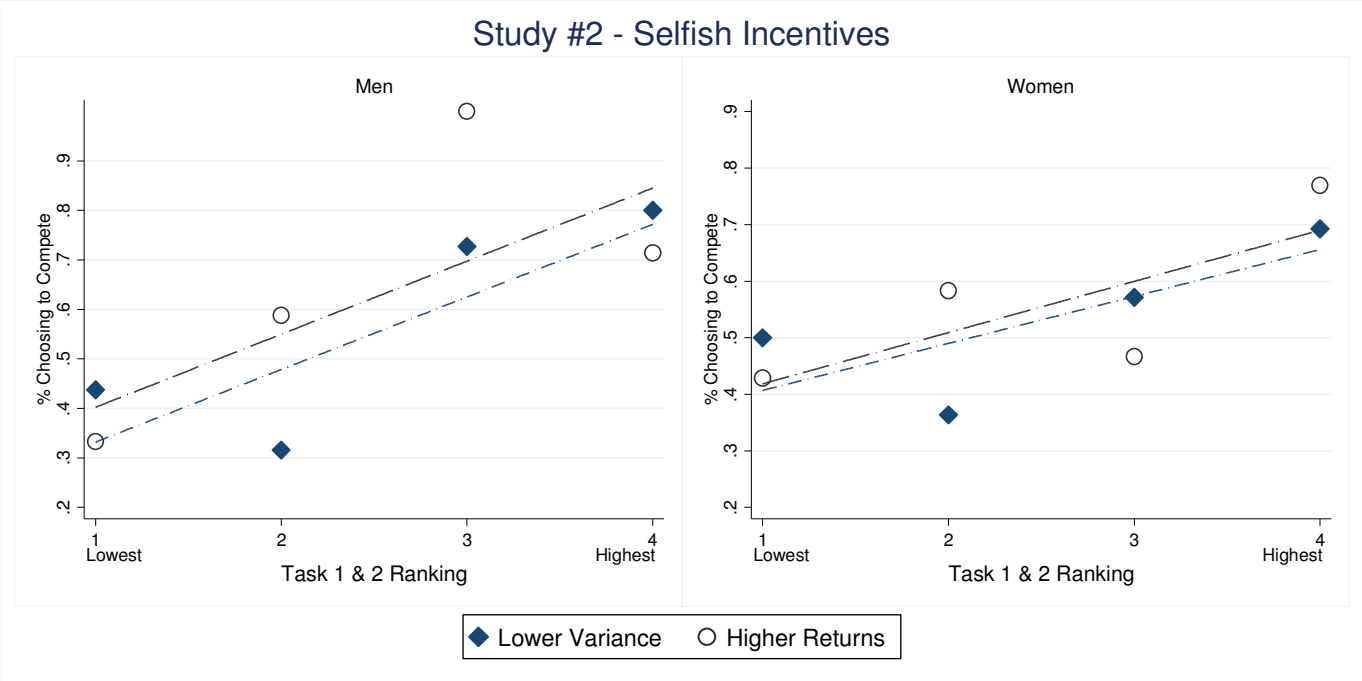
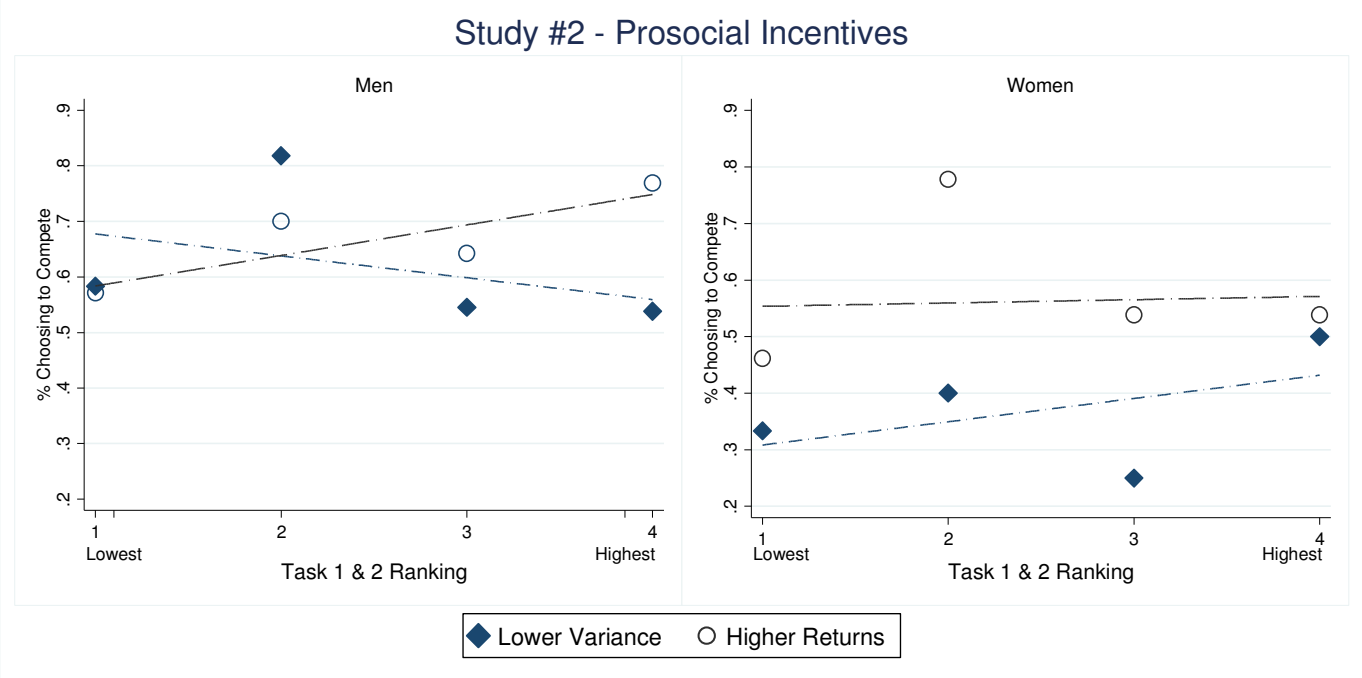


Figure 10—WTC and rank in Study #2 prosocial—higher returns is the manipulation that most induces more competition.



Tables

Table 1—Experiment Design

	Task Context	
	Selfish	**Prosocial**
NV 2007 Work Task	Men / Women (n=69)	Men / Women (n=70)

Table 2—Charitable Organizations Selected by Participants

Charity	Description	Frequency Selected
United Way Worldwide	Community change, education, poverty elimination	6%
St. Jude Children's Research Hospital	Cure and prevention of children's diseases	19%
American Cancer Society	Cancer research	23%
American National Red Cross	Emergency assistance and disaster relief	7%
Humane Society of the United States	Animal Welfare	7%
Wounded Warrior Project	Services, programs, and events for wounded veterans	11%
Doctors Without Borders USA	Medical aid to war-torn regions and developing countries	1%
Wildlife Conservation Network	Protects endangered species and habitats	7%
Your Choice	Please type in the name of the charity or non-profit	9%

Table 3—Experimental Design Study #2

	Task Context	
	Selfish	**Prosocial**
NV 2007 Work Task	Men / Women (n=69)	Men / Women (n=70)
Lower Variance	Men / Women (n=104)	Men / Women (n=93)
Higher Expected Value	Men / Women (n=104)	Men / Women (n=99)

Demographic Characteristics	Self	Prosocial	*P-value* 2-sided t-test
Gender (Female =1, Male = 0)	0.46	0.47	0.92
	[.06]	[.06]	
Age	20.5	20.5	0.92
	[.3]	[.17]	
Tournament Selection Explanatory Variables			
Performance (Total Problems solved over 3 rounds)	26.3	27	0.68
	[1.03]	[1.3]	
Effort (Total Problems Attempted over 3 rounds)	31.2	31	0.92
	[1.1]	[1.27]	
GPA (Grade Point Average)	3.41	3.31	0.36
	[.07]	[.09]	
Risk Preferences (Index of self-assessed risk preference questions)	24.8	25.2	0.79
	[1.07]	[.98]	
Confidence (self-assessed, 0-10 Scale)	6.58	6.89	0.32
	[.23]	[.2]	
Prosocial Measures			
Work Motivation Prosocial (Index of 4 prosocial questions about work)	22.6	22.4	0.76
	[.53]	[.50]	
Self versus Others Do Good (1-7 Likert)	4.35	4.93	0.02
	[.21]	[.15]	

Note- Means are reported with standard errors in parentheses in the second and third columns. In the fourth column are independent sample t-test results are reported. For Selfish Control group N=69, for Prosocial Incentives N=70.

Table 4—WTC Prosocial Incentives and Gender

	(1)	(2)
Prosocial	-0.154*	-0.0740
	(0.0801)	(0.302)
Female	-0.374***	-0.613**
	(0.0794)	(0.310)
Prosocial × *Female*		-0.799*
		(0.461)
Observations	139	139

Dependent Variable: tournament selection. Probit regression: dependent variable is 1 if risky, tournament is selected for Task 3, 0 if risk-free piece rate is selected. Prosocial is 1 for assignment to prosocial incentive scheme, 0 for selfish. Female is 1 if participant is female, 0 for male. Marginal effects reported, robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table 5—WTC Prosocial Incentives and Performance

	(1)	(2)
Prosocial	-0.160*	-0.354***
	(0.0838)	(0.110)
Top 50% Performer	0.0663	-0.136
	(0.0848)	(0.119)
Prosocial × *Top 50%*		0.282***
		(0.0916)
Observations	139	139

Dependent Variable: tournament selection. Probit regression: dependent variable is 1 if risky, tournament is selected for Task 3, 0 if risk-free piece rate is selected. Prosocial is 1 for assignment to prosocial incentive scheme, 0 for selfish. Top 50% is 1 if participant was in the top 50% of overall performance, 0 for being in the bottom 50%. Marginal effects reported, robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Chapter 2: Gender and Competitiveness When Earning for Others: Experimental Evidence and Implications for Sponsorship

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Abstract: Men tend to be more competitive than women, with profound career consequences. However, career paths also depend on the competitiveness of individuals that advocate on their behalf. In this paper we study competitiveness when rewards accrue to another individual. In particular, we ask how female and male managers' competitiveness changes when rewards from competition accrue to their protégés relative to when they accrue to themselves, and when the protégé is a woman or a man. Using an experimental approach, we find that when rewards accrue to protégés, female managers increase their competitiveness. However, male managers compete more for male rather than female protégés. This gap disappears when male managers know their protégés' risk preferences suggesting a novel intervention to ensure equity in the sponsorship process.

Keywords: Gender, competitiveness, preferences for competition, hierarchy, other-regarding preferences, homophily, experimental methods

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1. Introduction

A recent line of research, rooted in psychology, finds robust evidence of gender differences in competitiveness and that these differences have profound socio-economic consequences (Berge, Bjorvatn, Pires, & Tungodden, 2015; Niederle & Vesterlund, 2007). Competitiveness shapes education paths, career trajectories and outcomes, and political aspirations (Buser et al., 2014; Kanthak & Woon, 2015; Preece & Stoddard, 2015; Reuben, Sapienza, & Zingales, 2015). In all cases, men are, on average, more competitive than women and more competitive individuals select into more prestigious academic tracks, higher paying professions and positions, and have more interest in pursuing elected office. This results in a suboptimal allocation of talent, affecting the performance of both firms and society (Buser et al., 2014; Flory et al., 2015; Niederle et al., 2013).

But education and career paths depend not only on individuals' own competitiveness; they also depend on the competitiveness of other individuals in a position to support them, such as academic advisors or managers who can advocate on behalf of, or sponsor, their protégés to attain competitively allocated spots at prestigious schools, or high-promotability assignments and promotions to higher-rank organizational positions (Burbano et al., 2018; Foust-Cummings et al., 2011; García-Suaza, Otero, & Winkelmann, 2020; Ibarra, 2019; Lerchenmueller et al., 2019). In this paper, we study competitiveness when the rewards from competition accrue to another individual in a simulated organizational setting with online workers. In particular, we ask how the competitiveness of women and men changes (i) when rewards accrue to another individual relative to when they accrue to oneself; and (ii) when the individual to whom the rewards accrue is a woman or a man.

Our research is motivated in part by the practicality of these questions: in light of existing evidence, one might be inclined to solicit the support of male advocates because men, relative to women, might be more willing to compete for the benefit of their protégés. At the same time, we draw on research suggesting that women tend to be more prosocial than men in dyadic relations (Eagly, 2009), implying that women's competitiveness could increase when competing on behalf of another individual. In addition, we draw on homophily and discrimination research (Bertrand & Mullainathan, 2004; Castilla, 2011; Gorman, 2005; Ibarra, 1992; McPherson, Smith-Lovin, & Cook, 2001; Neumark, Bank, & Van Nort, 1996; Nunley, Pugh, Romero, & Seals, 2015), which suggests that men might be more competitive when advocating for male, relative to female, protégés, reinforcing, and even causing, gender disparities in organizations and society at large; but also that the biases generating these disparities can be identified and attenuated.

We address these questions using a series of experiments. In our study, participants – online workers recruited from Amazon's Turkprime platform – are randomly assigned to be managers, direct reports (we use direct report, subordinate, and protégé interchangeably), or in a control group with no role. Participants are then randomly assigned to a scenario where the payment they earn from performing a simple, real-effort, task accrues to either themselves or the other participant they are paired with (e.g., managers may earn for themselves or their assigned direct report). Finally, participants elect either a piece-rate or a competitive payment scheme for their task performance (how many problems they solve). In the piece-rate payment scheme, participants receive a fixed pay rate for each problem they solve; in the competitive payment scheme participants earn double the piece-rate payment, if they solve more problems than a participant they are assigned to compete with, and nothing otherwise. We are interested whether

participants in a manager role elect a competitive payment scheme[11] at different rates when the payment accrues to their direct reports compared to when the payment accrues to themselves.

We find that the gender of both the manager and direct report influence our participants' decisions to compete. In particular, we find that, in line with existing evidence, when participants are assigned the role of managers and earnings accrue to themselves, male managers compete more often than female managers. However, when earnings accrue to the direct report, gender differences in managers' competitiveness disappear. This is driven by female managers competing more often when earnings accrue to their direct report, relative to when earnings accrue to themselves, and not by male managers competing less often. We find a similar result in our control group where participants do not have a hierarchical role, suggesting that the increase in female managers' competitiveness is driven primarily by who earnings accrue to, and not by the hierarchical role. In addition, we find that, while female and male managers compete at similar rates when earnings accrue to the direct report, this similarity obscures differences based on the gender of the direct report. We find that male managers compete more often for male, relative to female, direct reports. By contrast, female managers do not compete at different rates based on their direct report's gender. Interestingly, in our control group, where participants do not have a hierarchical role, we find no such discriminatory behavior from male participants.

Finally, to examine why male participants in the role of managers compete differentially for male and female direct reports, we run an additional treatment in which managers receive information about their direct reports' task performance and risk preferences. We find that in this treatment, male managers compete for male and female direct reports at similar rates. Moreover,

[11] In the literature, the terms competitiveness and willingness to compete are used interchangeably and capture the proportion of individuals who choose the competitive/tournament, as opposed to the piece-rate, payment scheme.

male managers' decision to compete on behalf of female direct reports is influenced by their direct report's risk preference, but not their direct report's performance. These results are consistent with statistical discrimination based on biased beliefs, and not with taste-based discrimination. While there are small differences in average risk preference across gender in our sample, male managers behave as if they believe, incorrectly, that these differences are large. The practical implication of this result is that short of providing information about female direct reports' actual risk preferences, male managers may perpetuate gender disparities through their decision of who to compete for. Our findings, thus, point toward a novel strategy to improve the effectiveness of sponsorship programs in organizations and hopefully stimulate more research.

We contribute to the literature on gender and competitiveness by examining how the competitiveness of women and men is influenced by who receives the payment from competing and the gender of the recipient. The majority of this work has focused on gender differences in willingness to compete for oneself (Niederle, 2017), including the work closest to ours which uses a similar setup to study the effect of sponsorship on the competitiveness of direct reports (Baldiga & Coffman, 2018). A few studies have examined competitiveness when competing on behalf of either a team, which includes selfish motives, or a prosocial cause, which is collectively oriented rather than dyadic (Dargnies, 2012; King, 2019). To our knowledge, our study is the first to examine individuals' competitiveness when earnings accrue to a specific other individual.

More broadly, we contribute to the literature on women's underrepresentation in high-paying fields and positions (Barbulescu & Bidwell, 2013; Bertrand, 2018; Blau & Kahn, 1994, 2000; Botelho & Abraham, 2017; Helfat, Harris, & Wolfson, 2006). Explanations based on individual characteristics like education and experience now have less significant explanatory power because women have surpassed men in most measures of educational achievement and enter most professional fields at the same rate (Goldin, 2014). Recent work has pointed to the

role of gender differences in competitiveness as a cause for underrepresentation (Niederle, 2017). We present evidence suggesting that competitiveness may also underlie organizational rather than individual causes of female underrepresentation, consistent with recent research (Fernandez-Mateo & Kaplan, 2018). Specifically, it may also be male managers' willingness to compete on behalf of male direct reports, particularly because of biased expectations about women's risk preferences, which drives female underrepresentation, rather than just women's reticence for competing on behalf of themselves. This insight has important implications for organizational efforts, such as mentorship and sponsorship, to address the lack of women in leadership roles.

2. Theoretical Background

Gender Differences in Willingness to Compete and Their Economic Consequences

Recent research, rooted in psychology, focuses on gender differences in competitiveness as important determinants of the career trajectories of men and women. In the seminal study that started this line of work, Niederle & Vesterlund (2007) conducted an incentivized experiment in which individuals choose to be paid either in a winner-take-all tournament or by piece-rate and find that men select into the tournament more often than women. They propose that the gender gap in leadership positions is, in part, due to women opting out of, and men opting into, competitions too often relative to value-maximizing actions in the experiments.

This simple, yet profound, work generated a large stream of research (see Niederle, 2017{, #2458@@hidden}, for a review) showing that gender differences competitiveness have significant economic consequences. Competitiveness predicts educational paths, explaining 20% of the gender gap in selection into math and science academic tracks in the Netherlands (Buser et al., 2014). In the labor market, women are less likely to apply for competitive workplaces, where

a larger portion of wages depends on relative performance (Flory et al., 2015); and competitive MBA graduates have 9% higher salaries at graduation due to receiving higher guaranteed bonuses (Reuben et al., 2015). In a large-scale representative sample study in the Netherlands, more competitive individuals, on average, earned higher wages and were more likely to hold high level managerial or professional positions. Overall, competitiveness explained 5 to 10% of the gender wage gap in the study (Buser, Niederle, & Oosterbeek, 2021). In all of these cases men select into competition more than women and thus enter into higher paying fields and attain higher-rank and better paid positions.

Several mechanisms could explain gender differences in competitiveness. For instance, men are found to be more overconfident (Bordalo, Coffman, Gennaioli, & Shleifer, 2019), and thus believe more strongly that they can win competitions, and select into competition more often than women. Niederle and Vesterlund (2007), however, find that overconfidence only explains 27% of gender differences in competitiveness. Similarly, Saccardo, Pietrasz, and Gneezy (2017) find that the gender gap in competitiveness shrinks by a quarter, when controlling for confidence. Risk preferences may also explain the gender gap in competitiveness. In western societies, studies find men to be more risk loving (Croson & Gneezy, 2009) and because competition involves a certain degree of risk, more risk-loving individuals may be more likely to select into competition. Yet, neither Niederle and Vesterlund (2007) nor Saccardo, Pietrasz, and Gneezy (2017) find risk attitudes to have an effect on willingness to compete. Furthermore, in a large survey sample, risk preferences and competitiveness predict different outcomes, suggesting they are separate constructs (Buser et al., 2021). Finally, while less studied, feedback aversion, like risk preferences, does not appear to explain competitiveness ((Niederle & Vesterlund, 2007)).

In addition, both performance and age influence, but do not explain the gender gap in, competitiveness. While better performing individuals are more willing to compete, in both the original experiment and a variety of replications, there are no meaningful task performance differences between women and men (Niederle, 2017; Niederle & Vesterlund, 2007). And although individuals in their fifties compete most often (Mayr, Wozniak, Davidson, Kuhns, & Harbaugh, 2012), the gender gap in competitiveness emerges in children as young as 3 years old (Sutter & Glätzle-Rützler, 2014) and exists within all age groups (Mayr et al., 2012).

Overall, male overconfidence explains a portion of the gender gap in competitiveness, while risk preferences, feedback aversion, age, and performance explain little to none of the gap. Importantly, after controlling for all of these potential causes, gender remains an important determinant of when individuals choose to enter competition and the remaining gap has been attributed to a gender gap in preferences for competition.[12]

Competitiveness when Earning for Others

Because of the established, robust, and persistent gender difference in competitiveness when rewards accrue to oneself, one could assume that the same difference would emerge when the rewards from competing accrue to another individual. At the same time, and consistent with social role theory (Eagly & Johannesen-Schmidt, 2001), gender differences in competitiveness appear to be dependent on the social context, and in particular contexts they disappear or reverse. For instance, girls educated in single-gender high schools select into competition at similar rates to boys (Booth & Nolen, 2012); women from Beijing who grew up under a communist regime enter into competition more than their male and female peers who grew up under a market

[12] In the literature, the terms "preference for competition" and "taste for competition" are used to describe the effect of gender on the decision to compete after controlling for alternative explanations like age, performance, confidence, and risk preferences.

regime (Booth, Fan, Meng, & Zhang, 2019); and in matrilineal societies women enter into competition more than men (Croson & Gneezy, 2009). In fact, when earning rewards for their child, women and men compete at similar rates (A. Cassar, Wordofa, & Zhang, 2016), suggesting the possibility that competitiveness may also change when the rewards from competing accrue to another individual.

One reason for this could be that, according to the social role theory of sex differences (Eagly, 2009; Eagly & Johannesen-Schmidt, 2001), while women and men both exhibit other-regarding preferences, or prosocial behavior, on average, these behaviors differ in type. In particular, this theory suggests that, as a result of stereotypical roles in society, women are more relational and communal, while men are more agentic; and that women are more prosocial in dyadic relationships, while men's prosocial behavior is more collectively oriented (Eagly, 2009). For example, in a meta-analysis of dictator games (a dyadic relationship), Engel (2011) finds that women give more money than men. This, then, suggests that in dyadic relationships where rewards accrue to another individual, prosocial tendencies could represent a countervailing force to women's lower preference for competition.

It is, thus, natural to ask whether, in a (simulated) organizational setting, when rewards accrue to a direct report, female and male managers enter into competition at rates meaningfully different than when rewards accrue to themselves. And if so, are gender differences in entry into competition reduced, or even eliminated, and do women or men drive this change? Furthermore, are any changes in entry into competition driven by who the individual is competing on behalf of (themselves or another), the hierarchical role, or both conditions jointly?

Competitiveness when Earning for Others and the Gender of Others

While past research on competitiveness has focused on the gender of the focal participant (Niederle et al., 2013; Niederle & Vesterlund, 2011), when the rewards from competing accrue

to another individual, the question of whether the gender of that other individual influences competitiveness naturally arises. McPherson et al. (2001) identify homophily, or individuals' affinity toward demographically similar others, as an essential driving force in almost every type of network tie, including in work relationships. Gender is one of the most salient demographic characteristics, and a long line of research has documented the impact of gender homophily on workplace outcomes. Corporations display homophilic (same-gender) hiring and promotion in all ranks. Cohen *et al.* (1998) and Huffman *et al.* (2010) find that women are more likely to be hired for a job when there is a more substantial minority of women in the position at, or directly above, the focal job. Moreover, women's wages increase, and the gender wage gap decreases, as the proportion of female managers in a firm increases (Cardoso & Winter-Ebmer, 2010; P. N. Cohen & Huffman, 2007; Hultin & Szulkin, 1999, 2003).

Gender homophily also affects hierarchical relations in organizations where willingness to compete for others may influence career outcomes. Managers favor like-demographic employees (Castilla, 2011) and survey research suggests mentorship and sponsorship relations tend to develop between same-sex sponsors and protégés (Hewlett, Marshall, & Sherbin, 2011; Ibarra, 1992; Thomas, 1990). Furthermore, same-sex relationships are seen as providing more career support than cross-sex relationships (Thomas, 1990). Dezső *et al.* (2016) find that the presence of a female top manager is associated with a lower probability of appointing another woman to that top management team, akin to an implicit quota imposed by the male majority, but this negative effect is smaller when the woman on the top management team is a CEO, suggesting that female CEOs help other women to accede to top management. It is important to note that if gender homophily in hierarchical relationships exists, it is particularly beneficial for men, because the managerial ranks of organizations are male dominated. Thus, if managers compete more for direct reports of the same gender, this would simply propagate women's

underrepresentation in leadership positions in organizations and society at large (Bertrand et al., 2010; Goldin, 2014). In fact, Elliott & Smith (2004) find that while most groups attain power through homosocial reproduction, white men have more access to individuals who match their race and gender in an organization, and are thus able to climb the corporate ladder more effectively.

We are thus interested in whether, in a (simulated) organizational and hierarchical setting there is evidence of homophilic behavior in entry into competition by male and female managers. However, gender homophily also affects social (non-organizational) relations. Children select into largely gender-segregated social groups at a young age, and adults maintaining gender-homogenous relationships in many domains of life (McPherson et al., 2001). As such, we are also interested in how gender affects competition in our non-hierarchical control setting.

Finally, we are interested in the mechanisms underlying managers' decision to compete based on their protégés' gender. In particular, homophily in competing for others may be the result of gender differences in culture (sports preferences, etc.) that are orthogonal to individual performance (Rivera, 2012), akin to taste-based discrimination (Becker, 2010). Alternatively, male homophily may be the result of statistical discrimination, whereby male managers believe (inaccurately) that female protégés' perform, on average, worse than male protégés (Aigner & Cain, 1977; Bordalo, Coffman, Gennaioli, & Shleifer, 2016). Statistical discrimination may also be based on the stereotype (Heilman, 2012) that female protégés are more risk averse than male protégés (Pondorfer, Barsbai, & Schmidt, 2017). Each of these mechanisms have different implications about how organizations may want to respond to any discrimination, and we explore these possibilities after describing our experimental design and results from our first two sets of question.

3. Experimental Design

Our goal is to understand if competitiveness changes based on whether rewards from competing accrue to the participant or their partner, both in a simulated organizational setting and a control setting. Secondly, we want to examine how the gender of the participant and that of their partner affect competitiveness. To do so, we design and conduct an experiment using online workers on Amazon's Turkprime platform.[13] Naturally, we face a tradeoff between designing an experiment which replicates all aspects of the relationship between managers and direct reports (or between non-hierarchical partners) and designing an experiment which precisely isolates specific mechanisms driving gendered outcomes. We choose the latter and extend prior literature on competitiveness which has not considered competing on behalf of others in non-family settings.

Our experimental design[14] consists of five rounds and mirrors the design of Niederle & Vesterlund (2007). In each round, participants have 90 seconds to solve as many problems as possible. Each problem consists of counting the number of zeros in a table of zeroes and ones. While in Niederle & Vesterlund (2007) subjects sum a series of two-digit numbers, we use the counting task employed by Apicella et al. (2017) which better suits our study because online workers could use calculators to add numbers. Figure 11 shows an example of such a table.

[Insert Figure 11 around here]

After each round, participants are told how many problems they answered correctly, and are given instructions about the next round. The payment scheme varies by round and treatment conditions vary by individual. The payments from each round, if chosen, are described below:

Round 1: Control. In round 1, participants earn \$0.15 for each table they solve correctly.

[13] Recent work has used this population to investigate competitiveness when competing against one's own prior performance (Apicella, Demiral, and Mollerstrom, 2017); and studies have shown that online workers and in-person lab participants behave similarly (Horton, Rand, and Zeckhauser, 2011; Snowberg and Yariv, 2018).
[14] The complete experimental procedure as seen by participants is in the appendix.

Round 2: Piece-rate payment. Subjects are now assigned their treatment role, maintained for the rest of the experiment. They again earn $0.15 per problem answered correctly.

Round 3: Tournament payment. Subjects compete against another participant in the experiment (their opponent). Subjects earn $0.30 per problem answered correctly if they answer more problems than their opponent and $0 otherwise. Earnings from ties are split evenly.[15]

Round 4: Choice of payment scheme. Subjects are asked, before performing the task, whether they want this round of payment to be based on a piece-rate scheme ($0.15 per question, same as round 2) or tournament scheme ($0.30 or $0 per question, same as round 3). Their decision of whether to enter a tournament is our dependent variable of interest.[16]

Incentivized Questions and Survey: After completing the tasks, participants are asked to make an incentivized guess about their relative performance in rounds 3 and 4, and then complete a survey with demographic questions.

Treatment

Our treatment begins between rounds 1 and 2. To achieve random assignment, we used a random number generator within the survey software. Thus, before round 2, each participant is assigned a random number that corresponds to one of the following treatment conditions:[17]

- Treatment 1: Participants are told they have been partnered with another participant, and all earnings from subsequent rounds will accrue to themselves.

[15] Following Niederle & Vesterlund (2007), the participant's performance is compared to that of their opponent's in round 2. This ensures that winning the competition cannot reduce the payments others receive in this round and eliminates other-regarding preferences (with regard to their opponent) from affecting the decision to compete.

[16] Like Niederle & Vesterlund (2007), we include a fifth round in which participants choose to submit their round 2 performance for piece-rate or tournament payment, but do not solve any additional problems. Following recent work however (e.g. Baldiga & Coffman, 2018; Apicella et al., 2017), we examine only the decision to compete in round 4.

[17] To avoid deception, we also assigned some participants to be direct reports and paired them with managers. We do not analyze direct reports' behavior in this paper and exclude them from the description in this section for simplicity.

- Treatment 2: Participants are told they have been partnered with another participant, and all earnings from subsequent rounds will accrue to their partner.
- Treatment 3: Participants are told they have been assigned the role of manager and have been paired with another participant assigned the role of their direct report. All earnings from subsequent rounds will accrue to themselves.
- Treatment 4: Participants are told they have been assigned the role of manager and have been paired with another participant assigned the role of their direct report. All earnings from subsequent rounds will accrue to their direct report.

The treatment conditions are outlined in the following table:

		Earnings Accrue To	
		Self	Other
Role	No Role	**(1)** No role, earning for self	**(2)** No role, earning for other
	Manager	**(3)** Manager earning for self	**(4)** Manager earning for direct report

For all treatment conditions, participants are randomly assigned to either a male or female partner or direct report (depending on whether the participant has no role or is assigned the manager role, respectively). For example, if a participant is assigned the role of manager and their earnings will accrue to their female direct report, they see the following text before beginning the second round of solving tables:

> *"You have now been paired with another MTurker for the next two tasks. You are her manager and she is your direct report. She has also been given this information, and neither of you have received any other information about each other.*
>
> *Same procedure as Task 1. You will be given 90 seconds to count the zeros in a series of tables with ones and zeros. If task 2 is selected for payment your direct report will receive 15 cents for each table you solve correctly"*

Participants must answer a detailed attention check question after being assigned to their treatment condition. Participants who failed the attention check were paid the show-up fee and

dropped from the study. In all treatment settings we truthfully paired participants based on the role and gender stated in the experiment, and awarded payments based on their or their partner's performance. We did not use deception.

Sample and Payment

Our sample of experimental subjects consists of online workers recruited on Amazon's Turkprime platform (now Cloud Research). Turkprime's panels allows researchers to target workers with certain demographic characteristics and we sought a balanced sample of US-based male and female workers. Our subject pool consisted of 2,427 participants (1,204 male; 1,223 female). Demographic statistics are described in Table 6 (by gender) and Table 7 (by earnings recipient).

[Insert Table 6 and Table 7 around here]

Subjects were paid $1 for completing the experiment, and earnings from one randomly chosen round were paid out to either the participant or their partner/direct report (depending on their treatment group). The average total payment for each participant was $2.75. Participants took an average of 16 minutes to complete the survey, for an average hourly wage of $10.57.

4. Results

For each set of results, we examine the proportion of participants who choose the tournament payment scheme (as opposed to the piece-rate scheme) in Task 4. To follow the language of the previous literature, we use the terms "enter competition" or "compete" for the rest of the paper to indicate this choice of the tournament payment scheme. We begin with individuals with no role earning for themselves, and introduce treatments sequentially leading to participants assigned the role of managers earning on behalf of their direct report. For the last treatment, we examine how

participants respond to the gender of their direct report and provide an additional mechanism test. While the results are discussed in order below, they are summarized in the following tables:

[Insert Table 8 and Table 9 here]

Baseline Preference for Competition

We first test for gender differences in preferences for competition in our control treatment, where participants are not assigned any role and earnings accrue to themselves. Under this control condition, we replicate past experimental results finding a gender gap in competitiveness. We find that men choose to enter the tournament 44% of the time, while women choose to enter the tournament 30% of the time (see also Figure 12). A difference of means tests produces a Mann-Whitney test p-value of 0.0114.[18] The proportion of individuals entering into competition (for both men and women) is lower than in Niederle & Vesterlund (2007) who utilized in-person lab participants, but is within a few percentage points of other studies using online workers (e.g. Apicella et al., 2017, find that women compete 28% of the time and men 40% of the time in their online sample). We conclude that our subjects understand our experimental setup and that our participants are behaving similarly to those in past studies within this research stream.

[Insert Figure 12 here]

We next test whether these differences are due to characteristics that vary with gender. While randomization eliminates our main concerns about unobserved variables within gender groups, as confirmed by our balance tests, there are some differences between men and women in our samples. For example, on average in the US, men and women differ in terms of relevant characteristics such as risk preferences (Croson & Gneezy, 2009), and those differences appear in our sample. To test whether this difference in entry into competition is driven by personal characteristics correlated with gender, we regress the choice to compete on gender, performance

[18] All p-values from comparisons of means tests are from Mann-Whitney tests unless otherwise stated.

in task 3,[19] elicited risk preferences, confidence, and age – variables that prior work has suggested to impact individuals' competitiveness. Table 10 shows the regression results for our control treatment group – those participants assigned no role.[20] We first examine only the sample of participants with no role earning for themselves. We regress the decision to compete on gender in column (1) and add controls in column (2). The coefficient on the "Male" dummy is 0.143 (t-stat of 2.55) and 0.115 (t-stat of 2.04) without and with controls, respectively. This indicates that, when earning for themselves with no role assigned, men are 14 percentage points more likely to enter competition than women and 11 percentage points more likely to enter competition than women who are similar in terms of age, risk preferences, confidence, and performance.

[Insert Table 10 here]

Competing on Behalf of Others

We next test whether earning for another individual rather than for themselves changes the proportion of participants choosing to compete, and if this varies by gender. In this treatment, participants are not assigned any role, and are told that their earnings will go to another online worker completing the same task. We make no mention of whether any other individual is earning for the focal participant, and, as these are online workers, they have no expectation of meeting the other individual. As such, we interpret this result as being driven by other-regarding preferences rather than reciprocity expectation. When earnings accrue to another participant, the proportion of women competing increases from 30% (in the control condition) to 40% (p-value of 0.0297). By contrast, the proportion of men competing changes minimally (from 44% to 48%,

[19] We follow prior research and use task 3 performance to control for ability because participants, on average, perform better under the tournament payment scheme. Our results are robust to using other rounds' performance.

[20] We use linear probability models throughout our analysis. All our results are robust to using probit models.

p-value of 0.464), as seen in Figure 12. The gap in entry into competition between men and women when earning for themselves produces a p-value of 0.01, while the gap between men and women's entry into competition when earning for another individual produces a p-value of 0.08.

Regression analysis presented in columns 3 and 4 of Table 10 confirms that the gap in competition is less evident when our participants are earning for others. When we regress the decision to compete on gender for the no-role group earning for others, we find the coefficient on a Male dummy is 0.0738 (t-stat of 1.74) and 0.0581 (t-stat of 1.34) without and with controls, respectively. The point-estimate of the coefficient on gender is approximately halved in the earning for others group compared to the group earning for themselves, though the confidence intervals of these coefficients overlap.

To test what drives this change in the gender coefficient between our earning for self and earning for other treatments, we run a single regression covering the samples from both treatments (see Table 10, columns 5 and 6). To examine the different effect of our treatments, we include our gender variable (Male), a variable indicating the participant is earning for their partner (Earn for Other), and their interaction. The coefficient on "Earning for Other" is 0.11 with and without controls (t-stat of 2.4 with controls). This indicates that women are 11 percentage points more likely to enter competition when earning for others. To test whether men increase their competition when earning for others, we must sum the coefficients of Earn for Other and Male * Earn for Other. Their sum is 0.039, and a test of whether the sum of the coefficients is different from zero produces a p-value of 0.51, providing no evidence that men change their behavior when earning for others. Thus, we find that the reduction in the difference between men and women's competitiveness when earning for others, relative to when earning for themselves, is driven by women increasing their competitiveness when earning for others. This result is consistent with other-regarding preferences providing a countervailing force to women's

lower preference for competition, as the only thing that changes in this treatment is that the earnings go to another individual rather than themselves.

Managers Earning for Themselves and Earning for Others

As our end-goal is to investigate this issue in a (simulated) organizational setting, we repeat this analysis with individuals assigned the roles of managers. When assigned the role of manager and earning for themselves, women compete 28% of the time and men compete 42% of the time. When assigned the role of manager and earning for their direct reports, women compete 37% of the time and men compete 41% of the time. These results are shown in Figure 13.

[Insert Figure 13 here]

Table 11 mirrors the regressions in the previous section, but with participants assigned the role of managers. Columns (1) and (2) examine participants assigned the manager role earning for themselves, columns (3) and (4) examine participants assigned the manager role earning for their direct reports, and columns (5) and (6) examine all participants assigned the manager role.

[Insert Table 11 here]

We find that all of the results outlined in the previous "no role" section are replicated with experimental subjects assigned the role of manager. When earning for themselves, male managers enter into competition at higher rates than female managers. The coefficient on Male for managers earning for themselves is 0.138 without controls (t-stat of 3.6) and 0.108 with controls (t-stat of 2.8), indicating that men assigned the role of manager are 11 percentage points more likely to enter competition than women assigned the role of manager who are similar in risk preferences, confidence, age and performance. While the gender gap in competition lessened in the no role treatment, it disappears when individuals are assigned the manager role. In column

(4) the coefficient on Male is -0.0164 (t-stat of -0.41), indicating that male and female managers earning for direct reports compete at around the same rate.

Like in the no role treatment, this change is driven by women increasing their entry into competition when earning for others. We again introduce an Earn for Other variable and its interaction with gender in column (6), and the coefficient on Earn for Other is 0.0937 (t-stat of 2.58), indicating that women assigned the role of manager are around 9 percentage points more likely to enter competition when earning for a direct report than when earning for themselves.[21]

Discrimination

We have shown that when competing for others, women enter into competition at rates similar to men's, regardless of whether they are assigned a managerial role or not. Next, we investigate whether the gender of the partner/direct report influences these entry rates. We show that, when assigned a managerial role, but not when assigned no such role, men enter into competition at significantly higher rates for male rather than female direct reports. By contrast, women do not discrimninate, regardless of whether they have a managerial role assigned or not.

The main result is visible in Figure 14. When earning for their direct reports, male managers enter competition 48% of the time when their direct report is male, but only 33% of the time when their direct report is female (the difference of which has a p-value of 0.0061). Female managers earning for direct reports, on the other hand, enter competition 36% and 38% (p-value of .687) of the time for female and male direct reports, respectively.

[Insert Figure 14 here]

To assess whether this difference is robust to the inclusion of controls, we regress the decision to compete on our treatment groups of interest and the same set of control variables

[21] We also find that the managerial role alone does not have a large influence on rates of entry into competition for any treatment group – men or women, earning for self or other. These results are visible in Table 8.

from the previous section in Table 12. Columns (1) through (3) display the results of the regressions for participants assigned no role earning for their partners. Columns (4) through (6) display the results for participants assigned the role of manager. Each of these regressions fix the role (no role or manager) and who the participant is earning for (their partner or their direct report). We now examine treatment groups based on the gender of the participant and the gender of the direct report. We include a gender dummy for both the participant and the partner (Female Participant/Manager and Female Partner/Direct Report), and a variable for the interaction between the two (Female Participant/Manager * Female Partner/Direct Report).[22]

[Insert Table 12 here]

We examine the coefficient on "Female Partner/Direct Report" to test whether male participants (assigned either no role or the manager role) discriminate. We first turn to managers' decision to compete by looking at column (4) of Table 12. The "Female Partner/Direct Report" coefficient is -0.157, indicating that male managers are 16 percentage points less likely to compete when they are earning for a female direct report, relative to when they are earning for a male direct report. This coefficient barely changes (-0.157 vs -0.155) when our main controls are included in column (5), indicating that male mangers are 16 percentage points less likely to compete for female (relative to male) direct reports than similar male managers. This consistency is expected, given that men are randomly assigned to a male or female direct report.

A distinct possibility exists that some other managerial characteristic rather than gender drives male mangers' discrimination. For example, one could imagine that older, more risk-loving, or less confident managers discriminate, and the gender of the manager incorrectly picks

[22] We note that the omitted category in this analysis/table is Male rather than Female in order to make our main discrimination result visible in a single coefficient. All point estimates and standard errors are necessarily identical regardless of whether the gender variables are "Male" or "Female."

up that managerial characteristic in our previous models.[23] To check this possibility, we run an additional set of regressions with three managerial characteristics (age, confidence, and risk preferences) each interacted with the gender of the direct report.[24] Column (6) of Table 12 outlines the results for managers when we include these additional controls. Again, we see the main coefficient of interest, "Female Partner/Direct Report" is unchanged at -0.155. This suggests that it is not managers' age, risk preferences or confidence driving discrimination in our sample.

Interestingly, we do not find discrimination from male participants assigned no role or from any female participants. Examining participants assigned no role, the coefficient on "Female Partner/Direct Report" in columns (1) through (3) is between 0.059 and 0.075, with t-stats of 1.24 or smaller. To test whether female participants discriminate, we must sum the coefficients on "Female Partner/Direct Report" and "Female Participant/Manager * Female Partner/Direct Report." Across all specifications this sum always small, (-0.026 to 0.031), and with p-values of at least 0.56.[25] We thus have no indication that female participants compete more or less depending on the gender of their partner or direct report.

Why Do Male Managers Compete More for Male Direct Reports?

After finding that male, but not female managers, exhibit homophilic behavior, we turn to theories of discrimination and conduct an additional test to investigate whether male mangers exhibit taste-based (Becker, 2010) or statistical discrimination in their decision to compete for their direct report (Aigner & Cain, 1977; Bordalo et al., 2016). If male managers statistically discriminate against women based on the assumption that, for instance, on average, women are

[23] We thank a reviewer for the insightful suggestion to check this alternative explanation.
[24] For these models we mean-center age, risk-loving, and confidence, so that our coefficients of interest are estimated for the average manager (e.g., a 40-year-old manager rather than a zero-year-old manager).
[25] We do not present these p-values in any tables, but the reader can see these tests without controls in Table 8.

lower performing or more risk averse than men, then the provision of this information should change their behavior. If male managers discriminate based on taste, this additional information should not affect their willingness to compete for male and female direct reports.

To test what drives male manager's gap in willingness to compete for male vs. female direct reports, we recruited an additional sample of participants and assigned them the role of either manager or direct report.[26] We recruit only male participants for the role of managers, as we are interested in whether the provision of additional information changes male managers' behavior. We run the experiment using the same procedure but provide additional information to the managers just before the managers make their decision to compete or not in the fourth task. Managers are now given information on their direct report's actual performance and stated risk preferences, relative to all direct reports, on a 0-100 percentile scale, reported graphically, as in the figure below.[27] We are interested in whether male mangers compete differently based on the gender of their direct report when presented with this additional information, and if either of these two pieces of information causes managers to compete more often.

[Insert Figure 15 here]

In this information treatment we find that risk preferences, and not performance or gender, affect the propensity of male managers to compete. The regression on the no-information sample (Table 13, column 1) shows our earlier discrimination result – male managers are 16 percentage points less likely to compete for female direct reports. This discrimination disappears in our information sample (Table 13, column 2). The coefficients on gender and performance are

[26] As in the earlier sections, we do not analyze the direct reports' behavior, as it is outside the scope of this paper.
[27] One piece of information we decided not to provide, despite its intuitive appeal, was the subordinate's decision of whether or not they would compete for themselves. The reason is that preferences to compete for oneself includes concerns about performing under a competitive environment and relative performance feedback, neither of which are present when another individual competes on one's behalf (Niederle and Vesterlund, 2007). Therefore, risk preferences more appropriately capture a direct report's preference for their manager's decision to compete in our experimental setting.

small, with confidence intervals overlapping with zero. The coefficient on Direct Report's Risk Preference in column 3 is 0.00179 with a t-stat of 2.02. This indicates that an individual moving from the 25th percentile (more risk averse than average) to the 75th percentile (more risk loving than average) in risk preferences would correlate with male managers entering competition at a rate 9 percentage points higher. This result is consistent with statistical discrimination based on incorrect beliefs, rather than taste-based discrimination.

[Insert Table 13 around here]

While we find evidence that, as hypothesized, male managers compete more often for male subordinates, there are multiple literatures providing explanations as to why women do not display gender homophily in our sample. Studies within organizations find that while female managers reduce gender inequities, they do not create new gender inequities favoring women (Stainback, Kleiner, & Skaggs, 2016). Further, in experimental settings women are more egalitarian and inequality-averse than men, which may extend into treating other individuals equally regardless of gender (Fehr, Naef, & Schmidt, 2006). Audit studies (Bertrand & Mullainathan, 2004; Nunley et al., 2015) find that female applicants are discriminated against in settings where the decision makers are likely to be a mix of men and women, suggesting that discrimination against women is not restricted to male actors, and may provide a counterweight to homophily in the case of female managers. Lastly, in an organizational setting women in power may treat female subordinates differently depending on whether they must justify their actions to a male superior (Abraham, 2020). Any of these varying mechanisms may provide explanations as why we do not observe evidence of gender homophily from female managers in our sample.

Are Managers Correctly Adjusting to Differential Gender Risk Preferences?

While we observe male managers competing differently based on their direct report's gender, past research has also found women to be more risk averse than men (Croson & Gneezy, 2009). Perhaps male managers are statistically discriminating against women based on an accurate assessment that women are more risk averse, and thus, on average, would prefer that their managers select a piece-rate payment scheme rather than a competitive payment scheme on their behalf. In order to explore this possibility, we turn to the risk preferences of the direct reports.

We elicit direct reports' risk preferences using both a self-reported measure (Dohmen et al., 2011) and an elicited response from a series of potential gambles (Weber, Blais, & Betz, 2002). The elicited risk preference distribution is displayed in Figure 16, along with the mean risk aversion percentiles by gender. While we report the elicited measure, all qualitative conclusions hold for the self-reported measure. In our sample, female direct reports are slightly more risk-averse than male direct reports, in line with studies in experimental economics using incentivized gambles (Croson & Gneezy, 2009; Eckel & Grossman, 2008). The mean elicited risk was 45.1 for female direct reports, and 52.4 for male direct reports, on a 100-point scale.

[Insert Figure 16 around here]

We ask whether men, on average, correctly infer a direct report's risk preference based on their gender, and discriminate in a manner consistent with the actual risk distributions in our study. Our results contradict this rational story and are consistent with men inaccurately using stereotypes to infer extreme levels of risk aversion in women and risk-loving in men.

For our information treatment, we paired managers with a sample of direct reports chosen such that they would be balanced across risk preference and performance deciles. That is, we selected a subsample of our direct reports to create a distribution of our independent variable with full support from the lowest to highest ratings on our performance and risk preference

scales. Thus, in our full sample female direct reports are slightly more risk averse and male direct reports slightly more risk loving than the sample of direct reports in our information treatment.

To test for statistical discrimination, we use the regression coefficients from our information treatment to predict how male managers would have behaved if the information treatment had been run using the complete distribution of risk preferences in our sample of all direct reports (including those for whom their risk preference was collected, but never revealed to managers). Managerial behavior under this simulation produces no gender discrimination; male managers with female direct reports are predicted to compete 46% of the time and male managers with male direct reports are predicted to compete 44% of the time (see Table 14).

[Insert Table 14 around here]

How risk averse would women have to be, relative to men, for male managers' behavior to be consistent with both statistical discrimination and an accurate perception of male and female average risk aversion? The answer is unrealistic. In our initial treatment, male managers were 15 percentage points more likely to compete for male rather than female direct reports. In our feedback treatment, in order for a male manager to be 15 percentage points more likely to compete for their direct report, the direct report's stated risk preferences must be 79 points higher on a 100-point scale. This would be consistent with male managers perceiving that the average woman dislikes risk so much that she is in the 11^{th} percentile of riskiness, while the average man is so risk loving as to be in the 90^{th} percentile of riskiness. We note that it is difficult for half of a population to be centered at either the 11^{th} or 90^{th} percentile of a distribution.

Our results are consistent with statistical discrimination based on false beliefs and stereotyping as in Bordalo et al., (2016), and the representativeness heuristic (Tversky & Kahneman, 1974), and not with the rational, fully informed, statistical discrimination described in Becker (2010). While there is a difference in the mean risk preference of men and women in

our sample, our subjects assigned the role of managers behave as if this difference were much larger. Our result is also consistent with Pondorfer et al. (2017), who find that (despite no actual difference in risk preferences relative to men in their sample) men underestimate women's risk preferences in a patrilineal society, as well as with the finding in Dargnies (2012) that men do not avoid competition to punish 'undeserving' low performers.

5. Discussion

After years of progress, women continue to be significantly underrepresented in more prestigious academic tracks, and in higher paying professions and positions. A recently suggested cause is women's lower competitiveness (Niederle & Vesterlund, 2007). But educational and career paths depend not only on individuals' own competitiveness, but also on the competitiveness of others such as academic advisors or managers who can advocate on behalf of, or sponsor, their protégés to gain access to prestigious schools or attain high-promotability tasks and promotions. In this paper, we ask how competitiveness changes when the earnings from competition accrue to another person, relative to when they accrue to oneself. Specifically, we investigate in a (simulated) organizational setting how the gender of managers and direct reports impacts managers' willingness to compete on behalf of their direct reports. Using experimental methods, we find that when earnings accrue to their direct reports, female, but not male, managers enter into competition more relative to when earning for themselves; in fact, female managers are similar to their male counterparts in their willingness to compete for their direct reports. However, when earning for their direct reports, male managers compete at a significantly higher rate for male rather than female direct reports. Finally, we find that male managers' preference to compete for male direct reports disappears when they receive information about their direct

reports' risk preferences, whereas information about direct reports' performance has no effect, consistent with statistical discrimination based on false risk-related stereotypes.

While our research contributes to a range of academic inquiries, from gender differences in competitiveness to, more broadly, women's underrepresentation in more prestigious academic tracks and in higher paying professions and positions, it also has significant implications for firms. In particular, sponsorship has been proposed as a solution to women's underrepresentation in senior management, and a key feature of sponsorship is that managers have to advocate and compete on behalf of their protégés for high visibility assignments, exposure, and promotions (Hewlett et al., 2011; Ibarra, 2019). Professional firms have implemented mentorship and sponsorship programs to address women's underrepresentation in management (Baldiga & Coffman, 2018; Foust-Cummings et al., 2011). As a result, women in some professional fields are receiving more mentorship, in the form of advice, than men. However, these women receive less sponsorship, which requires competitive actions from their sponsors, than men (Ibarra et al., 2010). Our results suggest that for male managers to be willing to sponsor female protégés at rates similar to sponsoring male protégés, they need additional information to overcome biases. Signals of risk preferences could be included in performance reviews or promotion discussions to encourage male managers to rely on relevant information from protégés rather than stereotypes.

Our findings prompt multiple directions for future research. First, while competitiveness is a component of sponsorship, it is not the only factor influencing sponsors' willingness to compete on behalf of their protégés. Sponsors are likely to develop a long-term rapport with their protégés, have reputational concerns, and spend social capital in advocating for their protégés. Thus, further research could extend our experimental setup and use these additional dimensions to more closely replicate a sponsorship scenario. As an example, providing some payoff

consequences to the sponsor for their protégé's future performance could be incorporated into an experimental setting to examine how not just competitiveness, but confidence in a protégé's abilities influences sponsorship decision.

In addition, we find that a larger proportion of female managers compete when earnings accrue to their direct reports rather than themselves. Are there performance consequences in this context? Do women increase not only their competitiveness but also their performance? And are there spillovers from women's increased competitiveness for men's performance? In addition, our research focused on contexts where managers have a single direct report. A next step would, naturally, involve the selection of one, or multiple, direct reports to sponsor, from a larger group of direct reports. When faced with a choice of which direct report to compete for, are male managers likely to choose a male over a female direct report, possibly because biased evaluations (Botelho & Abraham, 2017)?

In this paper, we suggested that pro-social preferences, homophily, and inequality aversion might be forces/mechanisms that impact competitiveness. We posit that pro-social preference may be a counterweight to men's, relative to women's, greater preferences for competition or overconfidence. One promising avenue for future research would be to investigate whether our setting, whereby managers compete and earnings go to their direct reports, affects managers' confidence or risk preferences, and whether this effect varies by gender (Chang, Ferris, Johnson, Rosen, & Tan, 2012).

For the literature on gender and competitiveness, our finding that competing for others rather than having a managerial role assigned drives gender differences in competitiveness suggests that more research into how social norms shape competitive behavior (Zhang, Zhang, & Palma, 2018) is warranted, in order to determine the extent of their effect, and that this might have significant implications for efficiently allocating human capital in organizations. Would

women be more competitive for positions within organizations with more collectivist, rather than individualist culture, or in organizations with less pay inequality across ranks? What pay structures would encourage women to compete more, or men to compete less?

Finally, while our paper identifies behavior in a controlled laboratory-like setting, future research should examine how preferences for competing for others and willingness to sponsor impact decisions in organizational setting. Following the identification of gender differences in competitiveness, evidence was uncovered that this behavior affected the choice of educational track, job applications, and future salary (Buser et al., 2014; Flory et al., 2015; Reuben et al., 2015). A similar vein of exploration related to our findings of competing on behalf of others would examine how gender and the provision of information in sponsorship relationships affects career outcomes.

Tables

Table 6 – Summary statistics, comparison of means between men and women participants in all treatments

	No Role						Managers					
	Self			Other			Self			Other		
	M	F	*p*-value	M	F	*p*-value	M	F	*p*-value	M	F	*p*-value
Variables												
Task 3 Performance	10.8 [.33]	10.6 [.26]	0.68	10.2 [.24]	10.2 [.2]	0.82	10.6 [.22]	10.5 [.17]	0.57	10.8 [.21]	10.5 [.17]	0.23
Age	35.7 [.93]	42 [1.1]	0.00	37 [.68]	40.4 [.82]	0.002	38 [.67]	39 [.71]	0.3	37.4 [.63]	41.9 [.76]	0.00
Confidence (0-10 Likert)	6.2 [.20]	5.9 [.20]	0.31	6.5 [.14]	5.8 [.14]	0.00	6.4 [.13]	5.7 [.14]	0.00	6.4 [.13]	5.7 [.13]	0.00
College or Professional Degree	0.61 [.04]	0.64 [.04]	0.56	0.63 [.03]	0.63 [.03]	0.96	0.60 [.03]	0.64 [.03]	0.24	0.72 [.03]	0.7 .03]	0.52
Employed Full Time	0.71 [.04]	0.51 [.04]	0.00	0.7 [.03]	0.51 [.03]	0.00	0.68 [.03]	0.51 [.03]	0.00	0.72 [.03]	0.55 [.03]	0.00
Siblings	1.7 [.10]	2.3 [.14]	0.00	1.9 [.08]	2 [.09]	0.28	1.8 [.08]	2.1 [.09]	0.00	1.9 [.09]	2.1 [.09]	0.04
Observations	143	148		276	272		296	320		296	299	

Note: Means reported with standard errors in brackets. P-values of independent sample t-tests are reported.

Table 7 – Summary statistics, comparison of means between self and other

	No Role			Managers		
	Self	Other	*p*-value	Self	Other	*p*-value
Variables						
Task 3 Performance	10.7	10.2	0.09	10.5	10.6	0.66
	[.21]	[.16]		[.14]	[.14]	
Age	39	38.7	0.79	38.5	39.7	0.10
	[.74]	[.54]		[.07]	[.07]	
Confidence (0-10 Likert)	6	6.2	0.81	6	6	0.77
	[.14]	[.10]		[.10]	[.09]	
College or Professional Degree	0.63	0.63	0.82	0.62	0.71	0.002
	[.03]	[.02]		[.02]	[.02]	
Employed Full Time	0.61	0.61	0.97	0.59	0.64	0.11
	[.03]	[.02]		[.02]	[.02]	
Siblings	2	1.9	0.83	2	2	0.81
	[.09]	[.06]		[.06]	[.06]	
Observations	291	548		616	595	

Note: Means reported with standard errors in brackets. P-values of independent sample t-tests are reported.

Table 8: Entry into Competition by Group

	Participant Gender	Role	Earning For	Obs.	% Competing and p-values of gender difference						P-value Male vs. Female Partner
					Overall		Female Partner		Male Partner		
1	Female	No Role	Self	148	29%	[0.01]	27%	[0.13]	32%	[0.02]	[0.56]
1	Male	No Role	Self	143	45%		39%		50%		[0.20]
2	Female	No Role	Partner	272	40%	[0.08]	42%	[0.10]	39%	[0.43	[0.67]
2	Male	No Role	Partner	276	48%		51%		44%		[0.22]
3	Female	Manager	Self	320	28%	[0.00]	30%	[0.00]	27%	[0.03]	[0.56]
3	Male	Manager	Self	296	42%		46%		39%		[0.23]
4	Female	Manager	Dir Rep	299	37%	[0.39]	36%	[0.54]	38%	[0.08]	[0.69]
4	Male	Manager	Dir Rep	296	41%		33%		48%		[0.01]

First column refers to the treatment group.
Numbers in brackets under "Overall," "Female Partner," and "Male Partner" are p-values of 2-sided t-test between percentage of male and female participants selecting to enter competition in each category. The last column is the p-value of the comparison of means test between subjects in the row entering competition when they have a male vs. when they have a female partner.
Observations count total observations, including both participants with female partners and male partners.

Table 9 – Descriptive Statistics and Correlation Matrix for All Treatments

Variable	Obs	Mean	Std. Dev.	Min	Max
Female	2427	.504	.5	0	1
Manager	2427	.499	.5	0	1
Competing for Other	2427	.543	.498	0	1
Male Manager	2427	.244	.43	0	1
Female Manager	2427	.255	.436	0	1
Male, Other	2427	.272	.445	0	1
Female, Other	2427	.271	.445	0	1
Decision to Compete	2427	.389	.488	0	1
Performance (Overall)	2427	39.971	12.054	0	75
Performance (Task 3)	2427	10.51	3.483	0	19
Age	2427	39.167	12.535	18	83
Risk Preferences (Stated)	2427	4.912	2.554	0	10
Risk Preferences (Elicited)	2427	12.286	2.748	9	18
Confidence	2427	6.046	2.372	0	10

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1) Female	1.000													
(2) Manager	0.014	1.000												
(3) Competing for Other	-0.011	-0.104	1.000											
(4) Male Manager	-0.572	0.569	-0.050	1.000										
(5) Female Manager	0.581	0.586	-0.071	-0.332	1.000									
(6) Male, Other	-0.617	-0.063	0.561	0.290	-0.358	1.000								
(7) Female, Other	0.605	-0.054	0.559	-0.346	0.279	-0.373	1.000							
(8) Decision to Compete	-0.083	-0.040	0.055	0.029	-0.075	0.063	-0.001	1.000						
(9) Performance (Overall)	-0.027	0.041	-0.023	0.052	-0.004	-0.000	-0.026	0.138	1.000					
(10) Performance (Task 3)	-0.017	0.025	-0.040	0.034	-0.005	-0.011	-0.034	0.140	0.901	1.000				
(11) Age	0.123	-0.006	0.015	-0.067	0.059	-0.082	0.099	-0.064	-0.106	-0.069	1.000			
(12) Risk Preference, (Stated)	-0.178	-0.035	-0.003	0.110	-0.149	0.114	-0.118	0.192	-0.026	-0.008	-0.090	1.000		
(13) Risk Preference, (Elicited)	-0.106	-0.005	0.027	0.069	-0.074	0.093	-0.063	0.097	0.079	0.079	-0.091	0.210	1.000	
(14) Confidence	-0.120	-0.008	0.018	0.076	-0.084	0.087	-0.067	0.106	-0.016	-0.014	0.136	0.428	0.034	1.000

Note: this correlation matrix includes all participants who received no risk preference or performance information about the participant they were paired with. This sample consists of 2,427 participants: 829 participants with no role, 1,211 participants assigned the role of manager, and 377 participants assigned the role of direct reports.

Table 10: Control Group (No Role), Decision to Compete

	(1) Self	(2) Self	(3) Other	(4) Other	(5) Both	(6) Both
Male	0.143	0.115	0.0738	0.0581	0.143	0.126
	[2.55]	[2.04]	[1.74]	[1.34]	[2.55]	[2.28]
Earn for Other					0.107	0.114
					[2.23]	[2.4]
Male * Other					-0.0694	-0.0753
					[-0.99]	[-1.09]
Performance in Round 3		0.0283		0.00852		0.0146
		[3.73]		[1.43]		[3.11]
Age		-0.00121		-0.000182		-0.000701
		[-0.55]		[-0.10]		[-0.51]
Risk Loving		0.0308		0.00906		0.0164
		[3.13]		[1.14]		[2.65]
Confidence		0.016		0.0144		0.0161
		[1.41]		[1.55]		[2.23]
Constant	0.297	-0.424	0.404	0.131	0.297	-0.123
	[7.89]	[-2.32]	[13.57]	[0.94]	[7.89]	[-1.06]
Observations	291	291	548	548	839	839

Dependent variable: decision to enter competition for task 4.
Linear probability model with robust standard errors. T-statistics in brackets.

Table 11: Managers' Decision to Compete

	(1) Self	(2) Self	(3) Other	(4) Other	(5) Both	(6) Both
Male	0.138	0.108	0.0342	-0.0164	0.138	0.104
	[3.6]	[2.8]	[0.85]	[-0.41]	[3.6]	[2.73]
Earn for Other					0.0869	0.0937
					[2.3]	[2.58]
Male * Other					-0.104	-0.118
					[-1.87]	[-2.19]
Performance in Round 3		0.0236		0.0269		0.0248
		[4.12]		[4.63]		[6.04]
Age		-0.00346		-0.00231		-0.00283
		[-2.42]		[-1.41]		[-2.60]
Risk Loving		0.0215		0.00985		0.0164
		[3]		[1.37]		[3.24]
Confidence		0.0137		0.0384		0.0251
		[1.81]		[4.66]		[4.48]
Constant	0.284	-0.162	0.371	-0.152	0.284	-0.204
	[11.26]	[-1.32]	[13.26]	[-1.15]	[11.26]	[-2.26]
Observations	616	616	595	595	1211	1211

Dependent variable: decision to enter competition for task 4.
Linear probability model with robust standard errors. T-statistics in brackets.

Table 12: Participants assigned no role and manager earning for their partner or direct report

	(1) No Role	(2) No Role	(3) No Role	(4) Managers	(5) Managers	(6) Managers
Female Participant/Manager	-0.0484	-0.0301	-0.0423	-0.101	-0.0452	-0.0559
	[-0.80]	[-0.49]	[-0.69]	[-1.76]	[-0.79]	[-0.95]
Female Partner/Direct Report	0.0745	0.074	0.0593	-0.157	-0.155	-0.155
	[1.24]	[1.24]	[0.97]	[-2.77]	[-2.82]	[-2.81]
Female Participant/Manager * Female Direct Report	-0.0482	-0.0533	-0.0314	0.134	0.124	0.128
	[-0.57]	[-0.63]	[-0.36]	[1.69]	[1.6]	[1.6]
Performance in Round 3		0.00843	0.0084		0.0271	0.0253
		[1.43]	[1.43]		[4.73]	[4.31]
Age		-0.000187	0.00154		-0.00215	-0.000728
		[-0.11]	[0.64]		[-1.32]	[-0.30]
Risk Loving		0.00874	-0.00395		0.0107	0.022
		[1.11]	[-0.36]		[1.5]	[2.13]
Confidence		0.0146	0.0192		0.0378	0.0296
		[1.59]	[1.52]		[4.6]	[2.46]
Age * Female Direct Report			-0.00321			-0.00272
			[-0.94]			[-0.83]
Confidence * Female Direct Report			-0.00755			0.0161
			[-0.41]			[0.97]
Risk Loving * Female Direct Report			0.0247			-0.0235
			[1.59]			[-1.61]
Constant	0.439	0.342	0.349	0.483	0.17	0.193
	[10.13]	[4.75]	[4.87]	[11.76]	[2.31]	[2.56]
Observations	548	548	548	595	595	595

Dependent variable: decision to enter competition for task 4.
Linear probability model with robust standard errors. T-statistics in brackets.

Table 13: Effect of Information on Male Manager Behavior

	(1) No Information Treatment	(2) Information Treatment
Female Direct Report	-0.159 [-2.87]	0.0495 [0.87]
Direct Report's Performance		0.000266 [0.3]
Direct Report's Risk Preference		0.00179 [2.02]
Performance (Manager)	0.0257 [3.58]	0.0252 [3.02]
Age (Manager)	0.000377 [0.14]	-0.00113 [-0.46]
Risk Loving (Manager)	0.0143 [1.43]	0.0141 [1.35]
Confidence (Manager)	0.0355 [3.16]	0.0275 [2.26]
Constant	-0.215 [-1.10]	-0.251 [-1.25]
Observations	296	300

Dependent variable: decision to enter competition for task 4.
Linear probability model with robust standard errors. T-statistics in brackets.

Table 14- Simulation of male managers' behavior shows no gender discrimination

Direct Report Gender	(1) No Information	(2) With Information	(3) Simulated - All Subjects	(4) Simulated - Direct Reports
Male	48%	45%	45%	44%
Female	33%	48%	47%	46%

Cells in columns labeled (1) and (2) represent the percentage of managers who chose to compete on behalf of their direct reports in our experiment under the no information and information treatments. The simulated results are the estimated percentages of managers entering into competition for direct reports using the actual distributions of performance and risk preferences in our experimental sample. We generated these estimates using the regression coefficients from Table 6, and the distribution of elicited risk and actual performance deciles from either our entire sample (column 3) or only our direct reports (column 4)

Figures

Figure 11

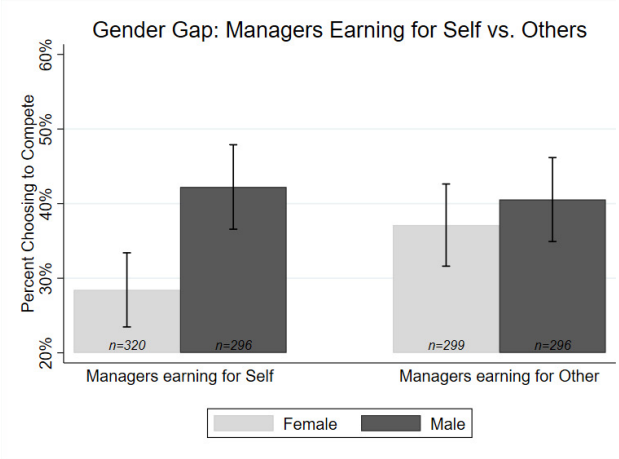
0	1	0	1	1
0	1	1	0	0
0	1	1	1	0
0	0	1	0	1
1	1	0	1	0

Number of zeros: 12

Figure 12

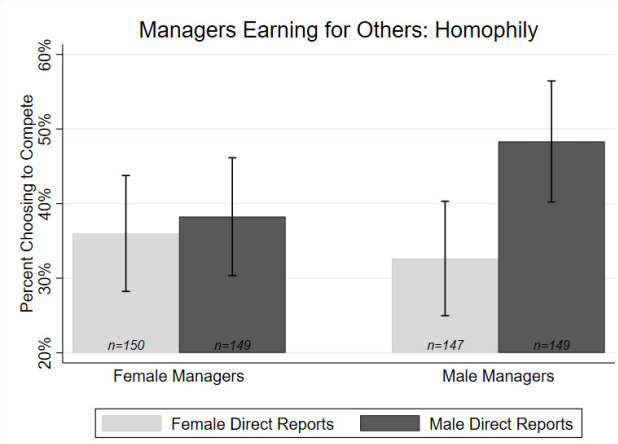
Participants are all assigned no role.

Figure 13



Participants are all assigned the role of manager

Figure 14



Participants are all assigned the role of manager and earnings accrue to their direct reports.

Figure 15

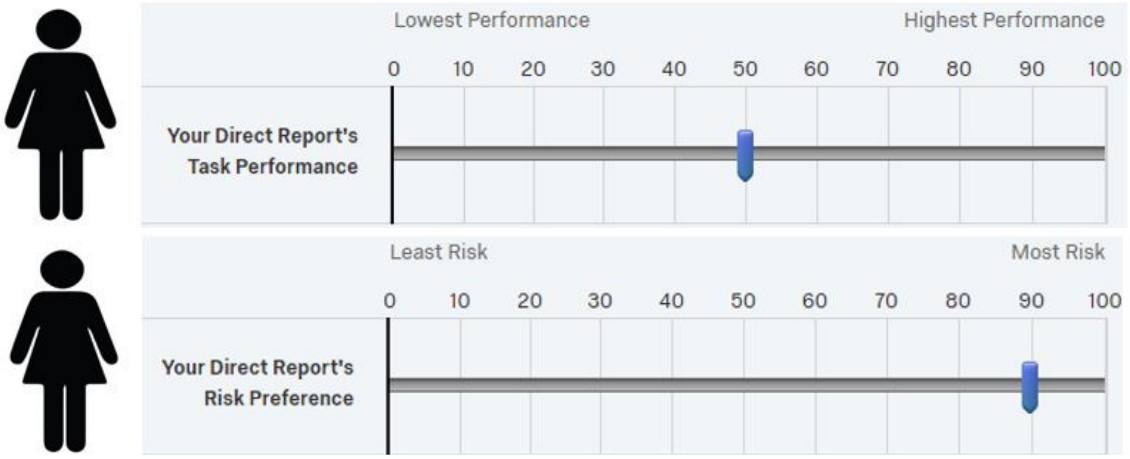
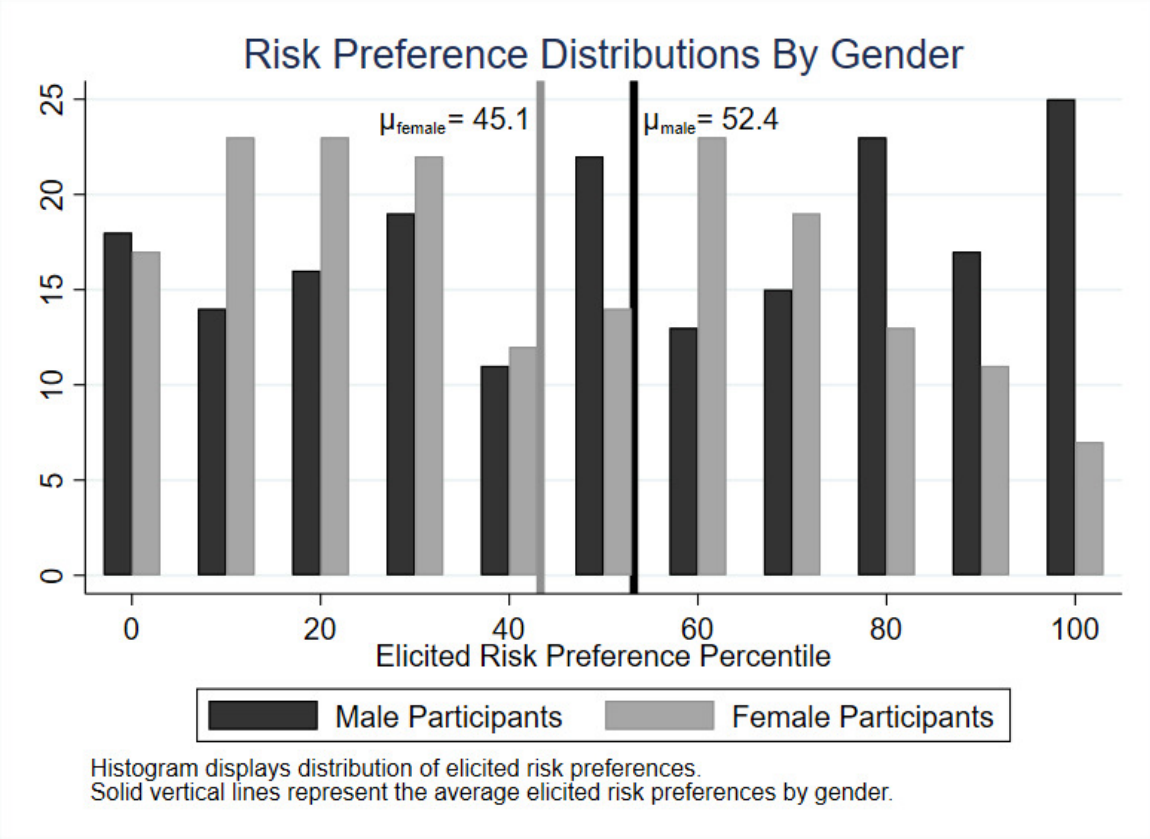

Lowest Performance
Highest Performance
0 10 20 30 40 50 60 70 80 90 100
Your Direct Report's Task Performance
Least Risk
Most Risk
0 10 20 30 40 50 60 70 80 90 100
Your Direct Report's Risk Preference

Figure 16


Risk Preference Distributions By Gender
μ_{female} = 45.1
μ_{male} = 52.4
0
5
10
15
20
25
0
20
40
60
80
100
Elicited Risk Preference Percentile
Male Participants
Female Participants
Histogram displays distribution of elicited risk preferences.
Solid vertical lines represent the average elicited risk preferences by gender.

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