ESSAYS IN EXPERIMENTAL ECONOMICS AND GENDER ECONOMICS

by

Elif E. Demiral Saglam
A Dissertation
Submitted to the
Graduate Faculty
of
George Mason University
in Partial Fulfillment of
The Requirements for the Degree
of
Doctor of Philosophy
Economics

Committee:

_____ Director

_____

_____

_____

_____ Department Chairperson

_____ Program Director

_____ Dean, College of Humanities and Social Sciences

Date: _____ Summer Semester 2020
George Mason University
Fairfax, VA

Essays in Experimental Economics and Gender Economics

A Dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy at George Mason University

by

Elif E. Demiral Saglam
Master of Arts
George Mason University, 2016
Bachelor of Science
Istanbul Bilgi University and the University of London, 2013

Director: Johanna Mollerstrom, Associate Professor
Department of Economics

Summer Semester 2020
George Mason University
Fairfax, VA

DEDICATION

This is dedicated to my mom, Ayşe Necla Ersoy.

ACKNOWLEDGEMENTS

I would like to express my deepest gratitude to my advisor Johanna Mollerstrom, who guided and supported me throughout my time at Mason and who shared the excitement of several years of discovery. Her enthusiasm and expertise in economics kept me constantly engaged in my research, and her generosity helped make my life as a graduate student extremely enjoyable. Without her guidance and persistent help, this dissertation would not have been possible.

I am also extremely grateful to Daniel Houser for his invaluable support on all of the projects in this dissertation. All of our conversations have been incredibly inspiring and very useful. I am also thankful to the rest of my committee members, Cesar Martinelli and Kevin McCabe for their encouragement, insightful comments and challenging questions that improved the chapters in this dissertation. I am also grateful to Coren Apicella for her precious support.

I would also like to thank the many fellow students at GMU and ICES, who not only provided their help and support but also inspired and encouraged me as beautiful friends.

I am also thankful to my family for their invaluable support. My mom has been the inspiration behind everything in this dissertation. I am also especially grateful to my dear aunt and uncle, Serap and Robert, for their constant encouragement throughout my adventure at Mason. My sister Alize and my brother Ali have been wonderful companions, especially when I struggled to keep the work-life balance. My dad made our time in Izmir much more enjoyable than it would otherwise be. Thank you all for believing in me and for always being there!

Last but not least, I am indebted to my husband Umit for his endless support and understanding throughout this journey. His love is what has gotten me through when I wanted to give up. None of these would have been possible without him. Finally, I would like to thank my dearest daughter Defne. She made me stronger, better and more fulfilled than I could ever imagine. You are my inspiration to achieve greatness!

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

ESSAYS IN EXPERIMENTAL ECONOMICS AND GENDER ECONOMICS

Elif E. Demiral Saglam, Ph.D.

George Mason University, 2020

Dissertation Director: Dr. Johanna Mollerstrom

This dissertation focuses on understanding some of the behavioral factors behind the gender differences in labor market outcomes, and makes suggestions about the design of policies that could reduce such gender differences.

Chapter 1 investigates the impact on employability of signaling alternative personal tastes for competitions. We define three types of job candidates who vary in their competitive preferences: self-competitive, other-competitive, and non-competitive. Using three studies, we investigate whether the candidate's competitive taste affects (perceptions about) their likelihood of being hired for a job. First, findings from Study 1 show that self-competitive candidates are most likely to be hired in an experimental hiring market. Second, to increase the likelihood of being hired, hypothetical candidates are overwhelmingly recommended by other participants to mention that they are self-competitive in a cover letter in Study 2. Third, candidates who express their taste for self-competition in their cover letters are regarded as more employable and more socially

likable when compared to the other two types in Study 3. Additionally, other-competitive candidates are rated the least favorably in the social domains in Study 3 (i.e., they experience a backlash from being other-competitive). Self-competitive candidates, on the other hand, are believed to be the highest performers among all of the three types, but they receive no negative feedback for being competitive. The findings, therefore, suggest that self-competitiveness is potentially an advantageous channel to signal productivity while keeping the risk of backlash low. All of the findings hold for both male and female candidates.

The second chapter also uses a total of three studies, and tests willingness to select into and preferences for other- and self-competitions. The first two studies replicate the well-documented gender differences in the willingness to compete against others, but report no evidence of a gender difference in the willingness to compete against one's own previous performance. Results from Study 3 illustrate that both men and women prefer self-competitions to competitions against other individuals, especially when they are forced to compete but can choose how. Additionally, when self-competition is available as a compensation scheme choice along with other-competition and piece rate, more people choose to compete, which results in an increase in productivity. Moreover, we document that confidence, risk preferences, and causal attributions can explain why there exists a gender difference in willingness to compete against others but not against self.

CHAPTER ONE: COMPETITIVENESS AND EMPLOYABILITY

1. Introduction

A gender gap in labor market outcomes remains despite significant efforts to ensure gender parity. Women earn less than men and remain underrepresented in managerial positions (e.g., Blau and Kahn, 2017; Bertrand, 2018). One of the behavioral reasons behind this gender gap is believed to be the different taste women have relative to men towards competition. Starting with a seminal experiment by Niederle and Vesterlund (2007), numerous studies have demonstrated that women are more reluctant to select into competitions than equally able men.

The literature investigating competitiveness defines the willingness to compete as the willingness to enter a tournament against other people. In such a tournament setting, subjects decide whether to compete against another individual or group of individuals. We refer to this type of competition as *other-competition*. In an earlier work (Apicella et al., 2017), we implement a critical change to this paradigm and enrich the literature by introducing a new type of tournament: *self-competition.* We replicate that significantly fewer women than men enter tournaments when the competition is against another person, but document that they are equally likely to compete with their previous performance as men in a self-tournament setting. In a follow-up paper (Apicella et al.,

2020), we also show that when participants can choose the type of competition, both men and women prefer self-competitions to other-competitions.

The current paper aims to understand the effect of a candidate's competitive taste on their employability. Individuals are found to receive significant negative feedback (i.e., experience a backlash) when they express that they are competitive against other people (Buser et al., 2017b), and this backlash is also found to be more targeted towards women (Valian, 1999; Rudman and Phelan, 2008). We are, thus, especially interested in testing whether this backlash emerges in our setting and investigating whether self-competitiveness can alternatively help signal productivity with minimal concerns about such a backlash. Here, we document the results of one laboratory hiring experiment and two online studies with hypothetical scenarios. We study three types of candidates with different tastes for competitions: some are self-competitive (i.e., prefer to compete against own, previous performance), some are other-competitive (i.e., prefer to compete against others) and some are non-competitive (i.e., prefer not to compete).

We start by documenting from the lab experiment that male and female participants who are self-competitive are more likely to be hired in an experimental labor market than the other two types. We find that performance expectations can partly explain this hiring interest. Second, findings from our first online study show that to increase the likelihood of being hired, hypothetical candidates of both genders are overwhelmingly recommended to mention in their cover letters that they are self-competitive, rather than mentioning a preference for other-competitiveness or non-competitiveness. Third, findings from our second online study suggest that male and

female candidates who express their taste for self-competition in their cover letters are regarded as more employable and more socially likable compared to those who are other-competitive or non-competitive.

Altogether, our findings demonstrate that both men and women are regarded as more employable and more socially likable when they express that they are self-competitive in job applications. When they express a preference for other-competitiveness, however, candidates of both genders receive unfavorable ratings, especially in the social domains (a similar finding to that of Buser et al., 2017b). Our results, therefore, suggest that self-competitiveness can be an effective method to signal productivity while also minimizing concerns about a backlash.

This paper is connected to two strands of literature. First, it is connected to the literature that investigates the labor market implications of competitiveness. This literature focuses on documenting the correlations between laboratory measure of willingness to *(other)*compete and the actual labor market choices from the decision maker's perspective – the supply side of the labor market (Buser et al., 2014; Flory et al., 2015; Reuben et al., 2015; Buser et al., 2017c). General perceptions about signaling competitiveness in job applications from the employer perspective – the labor demand side, and its relation to labor market selection have remained under-researched. Through an examination of the labor demand side, we find that having differing tastes for competitiveness and expressing it in job applications can be associated with different levels of hiring interest.

The second strand of literature we contribute to is the literature on negative social perceptions (i.e., backlash). In an effort to maintain gender parity in the labor market, several institutional changes, such as affirmative action policies, have been proposed in order to encourage women to compete more (Niederle and Vesterlund, 2011). However, the possible push for individuals to compete more comes with a caution as other-competitive individuals are often disliked in the lab and field settings (Valian, 1999; Rudman and Phelan, 2008; Buser et al., 2017b). Thus, our research is also relevant for policy, to uncover the possible adversity men and women can face when advised to express a desire for *other*-competitiveness. We, indeed, confirm that signaling other-competitiveness in job applications can have adverse effects on employability for both genders. Furthermore, we show that disclosing self-competitiveness in job applications instead can be a way to signal the highest productivity while also minimizing concerns about a backlash.

The remainder of this chapter is organized as follows: Section 2 provides a literature review. In Section 3, we report the design, implementation, and findings of the laboratory experiment, Study 1. Section 4 describes the design and documents the findings of Study 2, our first online study. Finally, Section 5 describes the design and reports the findings of the second online study, Study 3. Section 6 concludes.

2. Literature Review

The literature investigating the gender differences in taste for competitions is vast. Most of these studies are in consensus, suggesting that men and women with the same ability differ in their willingness to compete against others, with men competing too

much and women competing too little. This gender gap in competitiveness is also shown to contribute to the differential labor market outcomes of men and women. When compared to the participants who stay out of competitions, the ones who select in competitions against others for tournament pay are found to pursue more math-intensive college tracks, be employed in more lucrative industries, and ultimately earn more (Buser et al., 2014; Reuben et al., 2015; Buser et al., 2017c).

Researchers have long been trying to understand the reasons why such a competitiveness gap exists and what can be done to eliminate it. Recent findings indicate that the gender competitiveness gap can partly be explained by the differences in confidence and risk preferences between men and women (Gillen et al., 2015; van Veldhuizen 2017). Meanwhile, another group of studies focuses on ways to eliminate this gender gap by implementing various institutional changes. Such changes include implementation of affirmative action policies (e.g., quotas for women) (Balafoutas and Sutter, 2012; Niederle et al., 2013); giving people the option to compete in teams (Healy and Pate 2011); letting individuals choose opponent's gender (Grosse and Reiner 2010; Gupta et al., 2013); increasing prizes for winners (Petrie and Segal, 2015); transparently revealing opponent's performance (Ertac and Szentes, 2011); and giving costless advice to participants based on the previous findings of gender competitiveness gap (Kessel et al., 2019; for an additional review on institutional changes see Niederle and Vesterlund, 2011). From a firm's perspective, however, many of these policies can be infeasible and impractical. Moreover, simply eliminating competitions could mean sacrificing the performance-boosting effects of competitions (Gneezy et al., 2003).

We refer to the classical type of competition studied in the literature as *other-competition*. In the classical experimental design (Niederle and Vesterlund, 2007), subjects perform a task for three rounds. The first round is the piece rate round, which pays based on individual performance alone. The second is an other-tournament round, which pays tournament pay to the top performer and nothing to others. Lastly, the third round is a choice round, the choice being between piece-rate pay and other-tournament pay. The compensation scheme choice in this choice round, a decision on whether to enter the tournament or not, is often used as the experimental measure of competitiveness.

In Apicella et al. (2017), we take a different perspective on this classical design and introduce a new competition type: *self-competition.* Our change to this classical design involves having our experimental participants choose whether to compete against their own previous score for tournament pay (*self-competition*) or be paid a fixed payment based on individual performance alone (*piece rate payment*). We additionally implement a control treatment, identical to the classical Niederle and Vesterlund (2007) design, that has participants choose whether to compete against another individual (*other-competition*) or be paid based on their individual performance alone (*piece-rate payment).* While we replicate that women are indeed less willing than men to compete against others, we find no gender difference in the willingness to compete against oneself.[1]

[1] Bönte et al. (2017), Carpenter et al. (2018) and Klinowski (2019) report similar findings.

In a follow-up paper (Apicella et al., 2020), we continue our investigation of preferences for self- and other-competitions and find that self-competitions are widely preferred to other-competitions when they are simultaneously in the choice set and when the participants are forced to compete but can choose the type of competition. We also document that adding self-competition as an alternative competitive scheme in the choice set (along with other-competition and piece rate) significantly increases the share of participants who choose to compete. Moreover, this preference for self-competition holds for both genders, suggesting payment schemes that pay upon self-tournaments are preferred equally by men and women while deciding *whether* and *how* to compete. In light of these earlier findings, the aim of this current paper is to understand the role of signaling *self-* and *other*-competitiveness in labor market evaluation and selection.

The idea of *self-competitiveness* involves the notions of self-improvement, self-challenge, mastery, and personal development. Self-competitions are discussed in the literature related to sports performance (Howe 2008), under the framework of student learning and motivation (Zhi-Hong 2014), in the organizational behavior setting (Locke 1968), and to investigate salesperson performance (Brown et al., 1998). Psychologists have been discussing the idea of self-competitions for a while.[2] In this literature, competitiveness as a personal trait is believed to be multidimensional; the first dimension emphasizing the desire for being better than others, and the second stressing the desire for excellence and mastering a task (Griffin-Pierson, 1990; Kayhan, 2003; Menesini et al.,

[2] The terminology for *self-competitiveness* in psychology literature varies. It is most commonly named as *personal-development competitiveness, mastery competitiveness,* and sometimes as *goal-competitiveness.*

2018; Orosz et al., 2018).[3] Albeit its widespread applications, self-competitiveness had not been studied in economics until recently.

Self-competitiveness is also related to professional life as constant self-improvement and willingness to challenge against self are believed to be important indicators of success in business life (Hunt and Weintraub, 2016). It is evidenced that high achievers in social and professional life possess a commitment to self-challenge as an essential personal trait (Akdeniz and Stark, 2014). Moreover, endorsement of self-improvement contracts is recommended to managers to ensure a steady personal and professional growth (Harvard Business Review, 2016 and Hunt and Weintraub, 2016). Indeed, to motivate subordinates, decision makers in a laboratory setting are found to employ self-competition as an incentive scheme more often than other-competitions and no-incentives (Shurchkov and van Geen, 2019).

Studies that concern actual labor market observations and case studies find that participation in competitive activities – such as varsity sports – positively contribute to individuals' employability both in the short and long term (Kinash et al., 2015). Several additional studies explore the implications of resume and cover letter content on evaluative perceptions of hypothetical candidates (Thoms et al.,1999; Burns et al., 2014). To the best of our knowledge, there is not, however, any research that explicitly explores the potential implications of communicating competitive preferences in a job application and candidate evaluation process.

We conduct three experiments to explore the impact of competitiveness on

[3] See also Saville, 2009, for an experiment documenting the performance boosting effect of self-competitions.

employability. Our first (laboratory) experiment (Study 1) investigates the role of performance perceptions regarding competitiveness on the likelihood of being hired. In our two online studies (Studies 2 and 3), we illustrate the competitive taste of the hypothetical candidates in the cover letters and investigate assumptions about employability and social likeability.

3. Study 1: Laboratory Experiment on Hiring

3.1. Experimental Design and Implementation

The hiring experiment involved two groups of subjects. The first group was referred to as *workers* and the second group as *firms*. The focus variable in this experiment was the hiring decision of the firms. The (few) workers participated in a version of the Niederle and Vesterlund (2007) experiment, where they performed in a math addition task, which involved adding up a series of five randomly chosen two-digit numbers for four rounds under different payment schemes. Each round lasted for five minutes, and the objective was to do as many tasks correctly as possible. Subjects were told that there would be four rounds in total and that the instructions for each round would be given at the beginning of each round. Additionally, they were informed that one of those four rounds would randomly be selected for payment and that there would be no feedback about performance between rounds. The first round was a *piece-rate* payment task that paid $1 per correctly answered problem. The second round was an *other-tournament* task where subjects were paired in groups of two, and the subject with the highest score in the pair was paid double the piece rate ($2) per correctly solved task whereas the other subject received nothing. The third round was a *self-tournament* task.

Here, subjects' scores were compared to their own score in the first round, and if a subject solved more problems than they did in the first round, they received double the piece rate ($2) and nothing otherwise. In case of a tie, the payment was $1 per correct answer both in the self- and the other-tournament.

Before the fourth round started, participants were told that they would perform the same task again, but that they could choose which of those three previous payment schemes to apply to their performance in the fourth round. Subjects could choose between the *piece-rate* (paid $1 per correct answer), the *other-tournament* rate (paid $2 per correct answer if the performance was higher than the opponent's performance in the previous other-tournament round, and nothing otherwise) and the *self-tournament* rate (paid $2 per correct answer if the performance was higher than in the previous self-tournament round, and nothing otherwise).[4] If the subject picked other- or self-tournament, and if there was a tie, the payment was $1 per correct answer.

In a later experiment, we recruited the main subjects of interest to act as firms. Firms were told that there would be several parts in the experiment and that the instructions would be given at the beginning of each part. In the first part, firms performed in the math addition task for five minutes, where each correct answer was worth $0.20 to be paid out at the end of the experiment. No feedback was given regarding the performance in the math task until the very end of the experiment. We implemented the math task to familiarize the subjects acting as firms with the nature of the task that the

[4] Workers did not know that they would be referred to as *workers* and that their choices would be used for hiring decisions in a later experiment. We, however, told in the consent form that the de-identified data could be used for future research without additional consent from participants.

workers performed. In the second part, where we collected the main variable of interest, the firms' task was to hire a worker. As mentioned above, the workers performed in the math addition task for three rounds with different payment schemes and a final (fourth) choice round.[5] Firms could choose a worker to hire based on the compensation choice that the worker made in the fourth (choice) round. The hired worker's score in round 4 (choice round) determined the firm's payoff in the second part. For each math task that the hired worker solved correctly in the fourth round, the firm received $1. To eliminate the possibility of hiring choice being used to reward the worker, the workers' payoff was not impacted by the hiring decisions, a fact we also explicitly mentioned in the instructions to the firms.

The payoff function of firm *i* can be denoted with:

$$\pi_i(e_j) = e_j * P$$

Where e_j is the performance of the worker *j* and *P* is the amount of compensation to the firm per each correct answer that the worker *j* has given (*P* was equal to $1 per correct answer in the experiment). The firm's payoff function is maximized when

$$e_j = \max \{e_j, e_k, e_l\}$$

Where e_j, e_k, e_l stand for the performance of the workers *j*. *k*, and *l*, respectively. Therefore, to maximize their payoff, it was in the firms' best interest to hire the worker

[5] Firms did not know in which order the workers performed in the other- and self-tournament. They only knew the first round was a piece-rate round, and the second and third rounds were either self- and other-tournament rounds.

with the highest performance.

The hiring experiment featured three treatments: female, male, and neutral. In the male and female treatments (which we also refer to as *known-gender* treatments), firms knew the gender of the potential workers. In these known-gender treatments, there were either three male or three female workers that the worker could choose between when hiring. We revealed the gender of the worker using a male/female avatar icon in the known gender treatments (please see Appendix A for the icons used in the experiment). Each of those three workers had chosen different compensation schemes in their final rounds: one of them competed against herself, one of them competed against another individual, and one of them did not compete (picked non-competitive piece rate). In the neutral treatment, firms were matched to three individuals whose gender was not known, and no gendered avatar icons were displayed to the firms in this treatment. In all treatments, firms did not learn the actual performance of the workers until the end.

After the hiring decision, firms took part in a belief elicitation section where we elicited the belief about the firm's own performance in part 1 and the hired worker's believed performance in round 4. For all belief elicitations, subjects received an additional 50 cents for each correct estimate. At the end of the experiment, subjects filled out a questionnaire, including demographic questions, risk preferences, and questions about self-reported other- and self-competitiveness measures (all instructions are available in Appendix A).

The experiment was conducted in April 2019, with 121 students (55 percent female) taking on the role of *firms*. There were 41 subjects participated in the female

treatment, 41 participated in the male treatment, and the remaining 39 participated in the neutral treatment. An additional 14 subjects participated in the earlier experiment (run in March 2019) as workers. Since the focus of the experiment is understanding the hiring decision of the firms, choices of the workers are not reported here.

The experiment (programmed with z-Tree, Fischbacher, 2007) was conducted at the ICES Laboratory at George Mason University. After the instructions were provided, and before the firms made a hiring decision, participants took part in a quiz to ensure that they had understood the instructions and procedures. Participants who had problems answering the quiz were given the repetition of instructions by the experimenter. The treatments were randomized at the individual level. Firms earned an average of $18.4 (including a fixed show-up fee) for participation in a session that lasted approximately 20 minutes.

3.2. Findings

The overall distribution of the hiring decisions, pooled for all three treatments, suggests that firms prefer to hire a worker who competed against herself. As outlined in Table 1, 44.6 percent of the firms hire the self-competitive, 33.1 percent hire the non-competitive, and 22.3 percent hire the other-competitive worker. The distribution of the hiring choices is statistically significantly different from a uniform distribution ($p=0.018$, Chi-square goodness of fit test). The preference towards self-competed workers seems to be invariant of the treatment (i.e., worker's gender) ($p=0.148$, Chi-square test), meaning that this significantly higher hiring interest for the self-competitive workers is independent of the worker's gender.

Out of the firms who hire a worker who chose to compete, 33.3 percent hire a worker who competed against others, whereas 66.6 percent hire a worker who self-competed (p=0.000 with t-test of proportions). In the male treatment only, among the firms who hire a worker who chose to compete, 26.9 percent hire a worker who other-competed, and 73.1 percent hire a worker who self-competed (p=0.001, t-test of proportions). Similarly, in the female treatment, among the firms who hire a worker who chose to compete, 23.3 percent hire a worker who other-competed, and 76.7 percent hire a worker who self-competed (p=0.000, t-test of proportions). When we compare the hiring decisions in the male and female treatments, proportions of firms who hire a self-competed worker (73.1 percent vs. 76.7 percent, respectively) do not differ significantly (p=0.757, t-test of proportions).

Table 1 Distribution of Hiring Decisions, by Treatment

	Hired Worker		
	Did not compete	Other-competed	Self-competed
Female Treatment	26.8	17.1	56.1
	(7.0)	(5.9)	(7.8)
Male Treatment	36.6	17.1	46.3
	(7.6)	(5.9)	(7.9)
Neutral Treatment	35.9	33.3	30.8
	(7.8)	(7.6)	(7.5)
Total	33.1	22.3	44.6
	(4.3)	(3.8)	(4.5)

Notes: In percentages. Standard errors in parentheses.

To explore what associates with the hiring interest, we conduct a logistic analysis, which is reported in Table 2. Since the focus variable in our dataset (the type of the hired worker) is a nominal categorical variable, we adopt a multinomial logistic regression

model with the base outcome being the preference for a worker who picked piece rate. Therefore the models 2 and 3 in Table 2 below correspond to the equation below:

$$
\begin{aligned}
&ln(\Pr(Worker_i)) \\
&\quad = \beta_{i0} + \beta_{i1}\, Female\ Treatment + \beta_{i2}\, Male\ Treatment \\
&\quad + \beta_{i3}\, Expected\ Worker\ Performance + \beta_{i4}\, Female\ Firm \\
&\quad + \beta_{i5}\, Firm\ Other\ Compet. + \beta_{i6}\, Firm\ Self\ Compet. + \beta_{i7}\, X_i + \epsilon_i
\end{aligned}
$$

In the regression above, the dependent variable stands for the likelihood of each worker type being hired by the firms: workers who picked piece-rate (treated as base outcome), workers who other-competed, and workers who self-competed. Regarding the independent variables, *Female Treatment* and *Male Treatment* are dummy variables stating whether the treatment was a female/male treatment (the neutral treatment is the baseline). *Expected Worker Performance* is the firm's belief about the hired worker's performance in the choice (fourth) round. *Female Firm* is a dummy taking on the value 1 if the firm was female, *Firm Other Competitiveness* and *Firm Self Competitiveness* are the 1-to-10 scale self-reported self and other competitiveness measures of the firm. X_i is a vector of control variables. Since ability and risk preferences are associated with the decision to enter tournaments (see, for example, Niederle and Vesterlund, 2011), the specifications above control for the firm's own performance in the math task and the firm's self-reported risk preferences. The exclusion of these controls does not alter the results of the analysis.

Table 2 Multinomial Logistic Regression of Hiring Decision

	(1)	(2)	(3)

VARIABLES	*Pr* (Did not compete) Base outcome	*Pr* (Other_competed)	*Pr* (Self_competed)
Female Treatment		-0.163*	0.305***
		(0.087)	(0.099)
Male Treatment		-0.175**	0.194*
		(0.086)	(0.103)
Expected Worker Performance		-0.030**	0.030*
		(0.015)	(0.016)
Female Firm		-0.144**	0.157*
		(0.073)	(0.087)
Firm Other Competitiveness		-0.017	0.011
		(0.016)	(0.019)
Firm Self Competitiveness		0.006	0.003
		(0.023)	(0.027)
CONTROLS:			
Risk Preference		YES	YES
Task Performance		YES	YES
Observations:	121	121	121
Pseudo R-square	0.111	0.111	0.111

*Notes: Marginal effects are shown. Dependent variable is the probability of the hired worker having other-competed for specification 2 and the probability of the hired worker having self-competed for specification 3. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

The treatment being a known gender treatment (as opposed to the neutral treatment) seems to be significantly associated with the probability of hiring a self- and other-competed worker. When compared to the neutral treatment, the likelihood of hiring a self-competitive worker is higher, and the likelihood of hiring an other-competitive worker is lower in the known gender (male and female) treatments.[6]

Firms' own gender seems to associate with the hiring decision. When the firm is a

[6] We discuss that this distinctive known-gender effect can be linked to social distance theory (Schelling, 1968) and the construal theory of psychological distance (Trope and Liberman, 2010). In the know-gender treatments, additional information on gender could have promoted a more detailed decision making process, resulting in a more significant and consistent hiring interest for self-competitive workers.

female, it is significantly less likely that they will hire a worker who other-competed, and it is marginally more likely that they will hire a worker who self-competed. Additionally, when compared to the belief of firms who hire workers who pick piece-rate or other-competition, firms who hire a self-competitive worker believe that their workers performed marginally better. Similarly, the workers who other-competed are believed to perform worse when compared to the workers who self-compete and pick piece-rate. This finding can suggest that a preference for other-competitions is not necessarily associated with the highest performance from a firm's perspective.

Findings from Study 1 suggest a preference for self-competitive workers in an experimental hiring market. We conduct Study 2 to investigate beliefs about the employability of other-, self-, and non-competitive candidates from a third party advice giver's perspective.

4. Study 2: Online Experiment on Advice-Giving

4.1. Experimental Design and Implementation

The advice-giving experiment was an online study run on Amazon's MTurk platform. We told our subjects that a few (hypothetical) friends of theirs were seeking advice about how to write a paragraph about competitive preferences in a cover letter. Subjects were told that the objective was to give a recommendation to candidates that could help increase the candidate's likelihood of being hired for a job.

To illustrate competitive taste, we told subjects that the candidate was a member of a running club. The positive impact of participation in competitive sports on graduate employability is evidenced by previous research (Allen et al., 2013; Kinash et al., 2015).

Whether or not the students (or graduates) plan on pursuing a sports-related career, it is shown that participation in sport enhances employability in most sectors and industries (Kinash et al., 2015). Furthermore, in job application materials, communicating individual interests and personality traits, such as competitive taste along with extracurricular activities, is believed to be a proper action for a job candidate to take (Knouse et al., 1988; Borchardt, 2014; Burns et al., 2014; Gould, 2014).

We told our Study 2 participants that the candidates' job market characteristics were aligned with the position.[7] We then described the three competitive preferences (*other-competitive, self-competitive,* or *non-competitive)* that the candidate possesses and asked the subjects to recommend one paragraph to be included in the candidate's cover letter. Although those three competitive preferences are conceptually different, they are not necessarily mutually exclusive or unconnected (Orosz et al., 2018). We articulated this notion by telling our participants that the candidate possesses all three competitive tendencies and is sometimes *self-competitive*, sometimes *other-competitive,* and sometimes *non-competitive.*

We then asked our participants what they would recommend putting forward in the candidate's cover letter. Particularly, they helped the candidate to complete the following paragraph with the options in Table 3 (presented in random order to each subject):

> ***"I enjoy running on a regular basis and am a member of a running club. While running, I try to run fast. Moreover, I take pride in...***

[7] We kept the details regarding industry/sector and the nature of the job neutral and did not provide a detailed description of the position. We reserve an investigation of how different sectors and industries value the taste for competititiveness for future research.

Table 3 Competitiveness Paragraphs

[1]	**[Self-competitive]:**	*...challenging myself to perform better than I have done previously. In my professional life, I am also a productive person, and I try to improve my own performance compared to how I have performed before."*
[2]	**[Other-competitive]:**	*...challenging other runners and to try to perform better than they do. In my professional life, I am also a productive person, and I try to perform better than my colleagues do."*
[3]	**[Non-competitive]**:	*...not being overly competitive and not comparing my performance with others, or with how I have performed previously. In my professional life, I am also a productive person, and I avoid comparing my performance."*

The advice-giving experiment involved four treatments. The advice seekers varied in gender (as manipulated by the name of the candidate[8]), and the job varied in the work structure. The work was described as either requiring independent decision making or teamwork. We implemented the latter variation to make the study more inclusive of potential real-life work scenarios.

Each subject gave a recommendation to two candidates, who varied in gender, and the order that the subjects saw the candidates was randomized for each participant. To ensure independence between observations, unless stated otherwise, here we report the findings from the first advice given to the first candidate. We asked for advice for a second candidate (who was the opposite sex of the first candidate) in order to explore

[8] The names adopted for females were Jennifer, Jessica and Sarah and the names adopted for males were Daniel, James and John. Names were selected from the U.S. Social Security Administration's list of most popular baby names in the 1980s and 1990s.

whether the same advice giver would differ in their recommendation between the two genders. The choices in the advice-giving part were not incentivized. To check whether participants' advice was similar to what they thought that the other people would advise, we also included an incentivized part where subjects predicted the modal suggestion given by the other participants.[9] The experiment was then finalized with a questionnaire where we collected demographic information and subjects' self-reported other- and self-competitiveness measures (all instructions are available in Appendix A).

The experiment was programmed with Qualtrics and conducted on Amazon Mechanical Turk in June 2019, with 797 participants (53 percent female). There were 391 subjects in the independent and 406 in the team treatment, 401 subjects gave a recommendation to a female candidate, and 396 gave a recommendation to a male candidate. Participants earned an average of $0.41 (including a fixed show-up fee) for participation in a session that lasted approximately 5 minutes.

4.2. Findings

The advice givers overwhelmingly suggest that hypothetical candidates should express preference towards self-competitiveness in their cover letters. As outlined in Table 4, among all participants, 84 percent suggest candidates to mention that they are self-competitive, 10 percent suggest mentioning that they are other-competitive, and the remaining 6 percent suggest to mention that they avoid competitions. The distribution of advice significantly differs from a uniform distribution (p=0.000, Chi-square goodness of fit test).

[9] Each correct guess paid a bonus of 15 cents.

The distribution of the content of the advice does not differ by the work structure (i.e., the job involving team or independent work), (p=0.744, Chi-square test) or by the gender of the candidate (p=0.357, Chi-square test). Additionally, comparing the first and second advice given from the same participant (a within-subject analysis) further supports the robustness of the null effect for the advice seeker's gender on the advice given (p=0.529, paired t-test). Therefore, while reporting the findings, we pool the data for the advice given to the first candidate from all treatments.

As mentioned above, we also asked our participants to predict the most common advice given by the other participants. 72.8 percent of the participants believe that the majority of other subjects recommended candidates to express self-competitiveness, 19.2 percent believe that they recommended other-competitiveness, and the remaining 8 percent believe that they recommended non-competitiveness. The distribution of the beliefs significantly differs from a uniform distribution (p=0.000, Chi-square goodness of fit test).

As shown in Figure 1, the distribution regarding the modal beliefs is in line with the subjects' own advice but differs significantly (p=0.006 for the difference in distributions with Chi-square test). Subjects believe that the rest of the participants would have suggested mentioning other-competitiveness more often (10 percent vs. 19.2 percent, p=0.000 with t-test of proportions) and self-competitiveness less often (84 percent vs. 72.8 percent, p=0.000 with t-test of proportions).

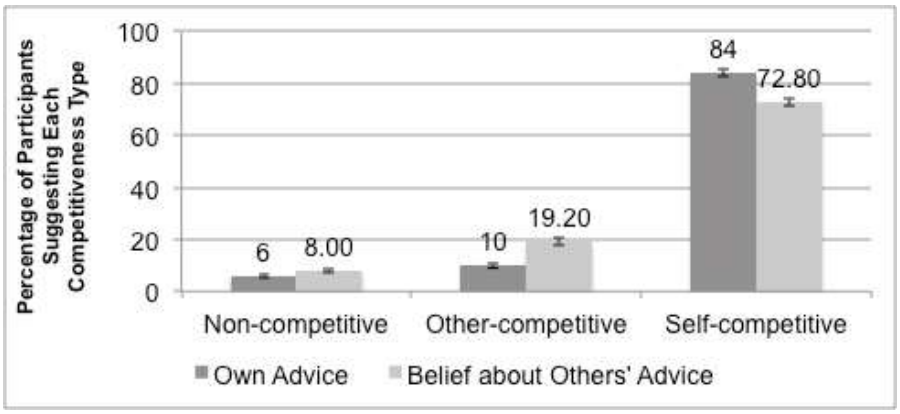

Figure 1 Distribution of Advice, and Beliefs about Others' Advice in Study 2

Findings from Study 2 indicate that to increase the likelihood of employment, third party advice givers recommend mentioning self-competitiveness in job applications significantly more often, and they also think that the others would suggest self-competitiveness more often. Table 4 reports the distribution of advice and belief about others' advice by the gender of the advice seeker.

Table 4 Distribution of the Content of the Advice

		Non-Competitive	Other-Competitive	Self-Competitive
Own Advice	Female Advice Seeker	5.2	9.0	85.8
		(1.1)	(1.4)	(1.8)
	Male Advice Seeker	6.8	11.1	82.1
		(1.3)	(1.6)	(1.9)
	Total	6.0	10.0	84.0
		(0.8)	(1.1)	(1.3)
Belief about Others' Advice	Female Advice Seeker	10	16.4	73.6
		(1.5)	(1.9)	(2.2)
	Male Advice Seeker	6.1	21.9	72
		(1.2)	(2.1)	(2.3)
	Total	8.0	19.2	72.8
		(1.0)	(1.4)	(1.6)

Notes: In percentages. Standard errors in parentheses.

To explore what associates with the likelihood of advice containing each option, we conduct a multinomial logit analysis. We define the base outcome as the advice consisting of mentioning non-competitiveness. Therefore models 2 and 3 in Table 5 below correspond to the equation below:

$$ln(\Pr(Advice_i)) = \beta_{i0} + \beta_{i1}\, Team + \beta_{i2}\, Female\ Candidate + \beta_{i3}\, Female\ Advice\ Giver + \beta_{i4}\, Other\ Competitive + \beta_{i5}\, Self\ Competitive + \beta_{i6}\, X_i + \epsilon_{ij}$$

In the regression above, *Team* is a dummy variable which takes on the value 1 if the work involves teamwork, *Female Candidate* is a dummy taking on the value 1 if the advice seeker is female, *Female Advice Giver* is a dummy taking on the value 1 if the advice giver is female, *Other Competitive* and *Self Competitive* are the 1-to-10 scale self-

reported competitiveness measure of the advice giver. X_i is a vector of control variables standing for the advice giver's education level, whether the advice giver has any previous experience in evaluating a job candidate and the advice giver's risk preferences. We control for the education level and job experience since MTurk participants have very diverse backgrounds. We further control for risk since it is known to be associated with one's own decision to compete. The exclusion of these controls does not alter the results of the analysis.

As outlined in Table 5, advice giver's own preference towards self- and other-competitions seem to associate with the advice's content. The more self-competitive an advice giver is, the higher the probability that s/he would recommend expressing self-competitiveness in the cover letter. Similarly, the more other-competitive the advice giver is, the more likely s/he will recommend mentioning other-competitiveness. The gender of the advice seeker (along with the advice giver) does not have an impact on the advice content.

Table 5 Multinomial Logistic Regression of the Advice Content

VARIABLES	(1) *Pr*(Non-competitive) Base outcome	(2) *Pr*(Other-competitive)	(3) *Pr*(Self-competitive)
Team		0.027	-0.028
		(0.021)	(0.025)
Female Candidate		-0.024	0.035
		(0.021)	(0.025)
Female Advice Giver		-0.001	0.006
		(0.021)	(0.025)
Other Competitive		0.033***	-0.029***
		(0.006)	(0.007)
Self Competitive		-0.030***	0.038***
		(0.006)	(0.007)
CONTROLS:			
Risk Preference		YES	YES
Education Level		YES	YES
Previous Experience		YES	YES
Observations:	797	797	797
Pseudo R-square	0.096	0.096	0.096

*Notes: Marginal effects shown. Dependent variable is the probability of the advice suggesting other-competitiveness for specification 2 and the probability of the advice suggesting self-competitiveness for specification 3. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

Our findings from Study 2 demonstrate overwhelming advice about mentioning self-competitiveness in a cover letter. This indicates that having a preference towards self-competitiveness and expressing it in the job market is believed to increase a candidate's employment prospects from an advice giver's perspective. This trend seems to be partly driven by the advice giver's own preference towards self-competitiveness. We conduct Study 3 to investigate the evaluations that other-, self-, and non-competitive candidates would receive in employment, social and performance domains.

5. Study 3: Online Experiment on Candidate Evaluation

5.1. Experimental Design and Implementation

Study 3 was an online experiment on candidate evaluation. Instead of asking for advice about which paragraph to include in the cover letter, in Study 3, we asked our participants to evaluate cover letters, which varied in the signaled competitive preference. We kept the paragraphs related to competitiveness constant between Studies 2 and 3. With the expressed competitive taste given in a letter, our participants rated each cover letter regarding their employability prospects, social impressions, and performance expectations.

Since a cover letter is an essential tool for connecting a candidate's skills, preferences and experience, and since such attributes are harder to fit in a resume, we used the example of a cover letter to express the candidate's competitive preference (in a similar vein with Knouse et al., 1988; Bowles et al., 2007; and Buser et al., 2017b). We presented subjects with a hypothetical cover letter.[10] We blurred out the irrelevant information, keeping the name of the candidate[11], a greeting clause (i.e., Dear Hiring Manager), the competitiveness paragraph, and the closing sentence. Figure 2 displays an example cover letter used in the experiment. We experimentally varied the candidate's gender (as manipulated with the name of the candidate) and the candidate's competitive taste. We asked the participants to rate the candidate on several general employability questions and personality traits. The candidate could either have described themselves as

[10] We also asked our participants to rate a second cover letter to be able to test for possible order effects. However, to keep the analyses of Studies 2 and 3 consistent with each other, here, we only report the findings from the first cover letter.

[11] We used the same names with Study 2 – Advice Giving, with the addition of the last names Wilson, Anderson, Clark, Williams, Turner and Smith.

self-competitive, other-competitive, or *non-competitive.* We illustrated the candidates' competitive taste in the cover letters using the exact paragraph below.

> ***"In short, I am very interested in this position and I am ready to dedicate myself to your company in the same way as I am committed to being an athlete. As a member of the college running team, I devote many hours every week to practices while maintaining a full course load. While running, I try to run fast. Moreover, I take pride in…*** *"*

The phrases that completed this paragraph were descriptions of either a *self-, other-,* or *non-competitive* preference and were identical to that of Study 2- Advice Giving experiment and are listed in Table 3.

Sarah M. Wilson

[redacted]

[redacted]

Dear Hiring Manager:

[redacted]

[redacted]

In short, I am very interested in this position and I am ready to dedicate myself to your company in the same way as I am committed to being an athlete. As a member of the college running team, I devote many hours every week to practices while maintaining a full course load. While running, I try to run fast. Moreover, I take pride in challenging myself to perform better than I have done previously. In my professional life, I am also a productive person, and I try to improve my own performance compared to how I have performed before.

Thank you for your time and consideration. I hope I can be invited for an interview.

Sincerely,

Sarah Wilson

Figure 2 Sample Cover Letter

Each participant assessed, on a 10-point scale, how likely they believed it to be that the applicant would be invited for an interview, that they would get hired, and that they would be promoted within a year. Additionally, in order to investigate the existence of a backlash, we asked two questions related to social perceptions about the candidate. In particular, we asked how enjoyable it would be to work with the candidate and how easy it would be to collaborate with them. To investigate perceptions about performance, we asked how productive they would be in the workplace, how interested would they be in hiring the applicant if the candidate would work under them as a subordinate or work with them jointly as a co-worker (i.e., different hierarchical working scenarios). Moreover, for the first three employability questions, we asked participants to predict how an expert in the field (an HR Advisor at a large U.S. university) would have rated the applicant.[12] The latter predictions were collected to understand subjects' beliefs regarding an expert opinion and were elicited using simple incentives[13] (All instructions are available in Appendix A).

The candidate evaluation experiment involved four treatments. The candidates' cover letters varied in gender, and the job differed in the work structure. Similar to the design of Study 2, the job either involved taking independent actions or working in teams. The experiment was programmed with Qualtrics and conducted on Amazon Mechanical Turk in July 2019 with 1,183 participants (58 percent female). MTurk subjects who participated in Study 2 were not allowed to take part in this study. There

[12] An HR Advisor at the Career Services Department at George Mason University evaluated the letters.
[13] Each exactly correct guess paid a bonus of 10 cents. If the guess was off by one, they received a bonus of 5 cents and nothing otherwise.

were 594 subjects who participated in the independent and 589 in the team treatment, 596 subjects evaluated a female candidate, and 587 evaluated a male candidate. Participants earned an average of $0.31 (including a fixed show-up fee) for participation in a session that lasted approximately 5 minutes. After the instructions were provided and the cover letter appeared on the screen, and before the participants started rating the letters, they answered two attention check questions to minimize the concerns regarding attrition and inattentiveness.[14]

5.2. Findings

Self-competitive candidates receive the highest ratings in all domains for employability when compared to the other two types (except for the prediction of the HR Advisor's rating on the *Promotion* question). The higher ratings favoring self-competitive candidates are significantly different both from the other two types for the *Hiring* question (p-values= 0.025 and 0.040 with t-test for the difference in means between self- vs. non-competitive and self- vs. other-competitive, respectively). Table 6 below reports the mean ratings for the employability questions.

In general, evaluators think that the HR Advisor has similar opinions as they themselves have. The only (marginally) significant difference between the evaluator's own rating and their prediction about HR's rating is for the question on *Hiring* of the other-competitive candidates. Evaluators rate other-competitive candidates less favorably on their likelihood of getting hired than how they think the HR Advisor rated (5.96 vs. 6.09, respectively. p=0.065 with t-test). None of the remaining ratings between own and

[14] For participants to be able to proceed, they had to correctly report the name of the candidate and the sport that the candidate practiced.

HR Advisor are significantly different from each other ($p>0.1$ for all comparisons with t-test).

Table 6 Mean Ratings for the Employability Questions, Based on Candidate's Competitive Type

	Interview	Hiring	Promotion	HR Interview	HR Hiring	HR Promotion
Non-competitive	6.40	5.94	5.52	6.49	6.00	5.39
	(0.11)	(0.11)	(0.12)	(0.11)	(0.11)	(0.12)
Other-competitive	6.51	5.96	6.13	6.62	6.09	6.07
	(0.10)	(0.11)	(0.11)	(0.11)	(0.11)	(0.12)
Self-competitive	6.72	6.27	6.16	6.82	6.33	6.02
	(0.10)	(0.10)	(0.11)	(0.11)	(0.10)	(0.12)

Notes: Mean ratings (on a scale from1 to 10, 10 being the most likely). Standard errors in parentheses. "Interview" is the answer to the question, "What do you think is the likelihood of the candidate getting invited for an interview?"; "Hiring" is the answer to the question, "What do you think is the likelihood of the candidate being hired for the position?"; "Promotion" is the answer to the question "If the candidate is hired, how likely do you think it is that they will be promoted to an upper level position within a year?". "HR Interview" is the answer to the question "On a scale from 1 to 10, how do you think the HR Advisor rated this cover letter based on the likelihood of the candidate getting invited for an interview"; "HR Hiring" is the answer to the question "On a scale from 1 to 10, how do you think the HR Advisor rated this cover letter based on the likelihood of the candidate being hired for the position"; "HR Promotion" is the answer to the question "On a scale from 1 to 10, how do you think the HR Advisor rated this cover letter based on the likelihood of the candidate getting a promotion to an upper level position within a year".

Regarding social and performance aspects, other-competitive individuals are rated the least enjoyable to work with, the hardest to collaborate with, and the least likely to be hired in both hierarchical working scenarios. On the other hand, non-competitive and self-competitive individuals are evaluated more enjoyable to work with and more likely to be hired in both hierarchical scenarios when compared to the other-competitive ones. Additionally, non-competitive individuals are regarded as the most collaborative. Lastly, self-competitive candidates are rated as the most productive ones, a similar finding to that

of our Study 1. Table 7 below reports the mean of the social aspect and performance ratings.

When we compare the ratings to the *Hiring* question under the two hierarchical working scenarios (i.e., subordinate vs. co-worker), we do not observe any significant difference in ratings for the self-competitive candidates (6.75 vs. 6.67, p=0.135 with t-test). We, however, observe that the ratings to non-competitive and other-competitive candidates differ with the hierarchical structure. Non-competitive candidates are significantly less likely to be hired when they will work as subordinate rather than as a co-worker (6.61 vs. 6.39, p=0.000 with t-test). Since non-competitive candidates are evaluated the most collaborative but the least productive, this finding can indicate that when acting in a managerial position, individuals are hesitant to hire a non-competitive subordinate due to productivity considerations.

In a similar sense, we observe that other-competitive candidates are significantly less likely to be hired when they will work as a co-worker rather than as a subordinate (6.20 vs. 5.91, p=0.000 with t-test). Since other-competitive candidates are rated as the least collaborative and enjoyable, this (further) lower hiring interest of an other-competitive candidate as a co-worker can be attributed to these social concerns.

Table 7 Mean Ratings of the Social Aspect and Performance Questions, Based on Candidate's Competitive Type

	Enjoyable	Collaborative	Productive	Hiring if Subordinate	Hiring if Co-worker
Non-competitive	6.89	7.14	7.23	6.39	6.61
	(0.09)	(0.09)	(0.09)	(0.11)	(0.11)
Other-competitive	5.90	5.82	7.36	6.20	5.91
	(0.12)	(0.12)	(0.10)	(0.12)	(0.13)
Self-competitive	6.85	6.79	7.50	6.75	6.67
	(0.10)	(0.10)	(0.09)	(0.11)	(0.11)

Notes: Mean ratings (on a scale from1 to 10, 10 being most likely). Standard errors in parentheses. "Enjoyable" is the answer to the question, "How enjoyable do you think it would be to work with this candidate?"; "Collaborative" is the answer to the question, "How easy do you think it would be to collaborate with this candidate?"; "Productive" is the answer to the question, "How productive do you think this candidate would be in the workplace?"; "Hiring if subordinate" is the answer to the question, "If the candidate would work under you, how interested would you be in hiring this individual?"; "Hiring if co-worker" is the answer to the question, "If the candidate would work with you as a co-worker, how interested would you be in hiring this individual?"

We move on to compare the statistical significance between the ratings to each competitive type using regression analysis. In this part, we evaluate how a hypothetical candidate's randomized competitive preferences and gender affect participants' ratings of hiring interest. We denote V_i as the rating that candidate *i* receives on a 1-10 Likert scale and estimate the variations of the following regression specification. This regression allows us to investigate the average evaluations of a candidate's competitive characteristics across participants in Study 3.

$$V_i = \beta_0 + \beta_1\, Self\_competitive + \beta_2\, Other\_competitive + \beta_3\, Female\_Candidate + \beta_4\, Female\_Evaluator + \beta_5\, Team + \beta_6\, E.Other\_compete + \beta_7\, E.Self\_compete + \beta_8\, X_i + \epsilon_i$$

In the above model, *Self_competitive* and *Other_competitive* are dummies taking on the value 1 if the candidate is *self-* or *other-competitive,* respectively (where ratings to the candidates who are non-competitive serve as the baseline). *Female_Candidate* and *Female_Evaluator* are dummies taking on the value 1 if the gender of either the candidate or the evaluator is female, *Team* is a dummy equal to 1 if the work involves teamwork (as opposed to independent decision making). *Evaluator's Self_competitiveness (E. Self_compete)* and *Evaluator's Other_competitiveness (E. Other_compete)* are the 1-to-10 point scale self-reported competitiveness measure of the evaluators. X_i is a vector of control variables, standing for the evaluator's education level, whether they have any previous experience in evaluating a job candidate and their risk preferences. Table 8 shows regression results where V_i is the "likelihood of getting invited for an interview" for model 1, "likelihood of getting hired" for model 2, "likelihood of getting promoted within a year" for model 3 and the predictions regarding an HR Advisor's ratings on these same measures for models 4, 5 and 6, respectively.

Table 8 OLS Regressions of the Employability Ratings

	(1) Interview	(2) Hiring	(3) Promotion	(4) HR Interview	(5) HR Hiring	(6) HR Promotion
Self-competitive	0.299**	0.315**	0.627***	0.316**	0.316**	0.610***
	(0.145)	(0.145)	(0.158)	(0.154)	(0.152)	(0.168)
Other-competitive	0.121	0.039	0.635***	0.137	0.112	0.710***
	(0.146)	(0.149)	(0.156)	(0.158)	(0.155)	(0.164)
Female Candidate	0.129	0.014	0.038	-0.045	-0.132	-0.139
	(0.119)	(0.120)	(0.128)	(0.127)	(0.125)	(0.136)
Female Evaluator	0.066	0.179	0.522***	0.094	0.205	0.420***
	(0.120)	(0.122)	(0.130)	(0.129)	(0.127)	(0.140)
Treatment (Team)	0.071	0.055	-0.087	-0.006	-0.083	-0.215
	(0.118)	(0.120)	(0.128)	(0.127)	(0.125)	(0.136)
E. Other-compete	0.020	0.070**	0.029	-0.012	0.011	0.018
	(0.031)	(0.032)	(0.032)	(0.032)	(0.032)	(0.035)
E. Self-compete	0.084**	0.032	0.050	0.074**	0.044	0.008
	(0.034)	(0.036)	(0.036)	(0.036)	(0.036)	(0.038)
Constant	5.858***	5.476***	4.611***	6.260***	6.057***	5.076***
	(0.392)	(0.406)	(0.430)	(0.433)	(0.420)	(0.445)
CONTROLS:						
Risk Preference	YES	YES	YES	YES	YES	YES
Education Level	YES	YES	YES	YES	YES	YES
Previous Experience	YES	YES	YES	YES	YES	YES
Observations	1183	1183	1183	1183	1183	1183
R-squared	0.038	0.045	0.055	0.022	0.030	0.042

*Notes: "Interview" is the answer to the question, "What do you think is the likelihood of the candidate getting invited for an interview?"; "Hiring" is the answer to the question, "What do you think is the likelihood of the candidate being hired for the position?"; "Promotion" is the answer to the question "If the candidate is hired, how likely do you think it is that they will be promoted to an upper level position within a year?". "HR Interview" is the answer to the question "On a scale from 1 to 10, how do you think the HR Advisor rated this cover letter based on the likelihood of the candidate getting invited for an interview"; "HR Hiring" is the answer to the question "On a scale from 1 to 10, how do you think the HR Advisor rated this cover letter based on the likelihood of the candidate being hired for the position"; "HR Promotion" is the answer to the question "On a scale from 1 to 10, how do you think the HR Advisor rated this cover letter based on the likelihood of the candidate getting a promotion to an upper level position within a year". Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

Evaluators rate hypothetical self-competitive candidates more favorably in all employment domains. Moreover, when asked to predict an expert's (HR Advisor) opinion, participants indicate that they expect an expert to rate self-competitiveness more favorably as well.

We then conduct the same regression analysis for the ratings about social and performance aspects. Table 9 reports the findings. Similar to what has been reported in previous literature, evaluators rate other-competitive candidates as significantly less enjoyable to work with (see Buser et al., 2017b for similar results) and hardest to collaborate. Evaluators further state that it is less likely that they would hire an other-competitive individual, especially if they would jointly work with the candidate as co-workers. Self-competitive individuals, on the other hand, are believed to be less collaborative than non-competitive candidates but are more productive and more likely to be hired if will work as subordinates. These findings can supplement the literature on possible backlash effect of *(other-)*competitiveness (Rudman and Phelan, 2008; Buser et al., 2017b) and suggest self-competitiveness being a potential channel to signal competitiveness (and thus productivity) with minimal concerns about a backlash.

Regarding the gender analysis, we do not observe a significant backlash specifically targeted to female candidates who are other-competitive. In our sample, candidates from both genders who report other-competitiveness in their cover letters are mostly disliked and rated less favorably when compared to the self- and non-competitive candidates. We, however, observe point estimates that are in line with the literature reporting a backlash explicitly targeted towards women. The coefficient of the interaction

variable for female and other-competitiveness dummy in the regressions above are -0.22 for the *enjoyability* and -0.10 for the *collaborativeness* questions (p=0.392 and p=0.710, respectively).

Table 9 OLS Regressions of the Social Aspect and Performance Ratings

	(1) Enjoyable	(2) Collaborative	(3) Productive	(4) Hiring if Subordinate	(5) Hiring if Co-worker
Self-competitive	-0.050	-0.365***	0.274**	0.330**	0.043
	(0.129)	(0.134)	(0.124)	(0.157)	(0.156)
Other-competitive	-0.987***	-1.321***	0.136	-0.179	-0.683***
	(0.142)	(0.148)	(0.129)	(0.161)	(0.166)
Female Candidate	0.132	0.106	0.020	0.112	0.030
	(0.113)	(0.118)	(0.104)	(0.130)	(0.133)
Female Evaluator	0.152	0.116	0.339***	0.076	0.047
	(0.116)	(0.120)	(0.106)	(0.132)	(0.135)
Treatment (Team)	-0.006	-0.089	0.123	0.036	0.058
	(0.113)	(0.119)	(0.103)	(0.130)	(0.133)
E. Other-compete	0.085***	0.078**	-0.002	0.077**	0.106***
	(0.030)	(0.031)	(0.026)	(0.034)	(0.036)
E. Self-compete	0.060*	0.059*	0.101***	0.040	0.033
	(0.033)	(0.035)	(0.029)	(0.039)	(0.040)
Constant	6.115***	6.433***	6.296***	5.786***	6.297***
	(0.386)	(0.397)	(0.357)	(0.437)	(0.442)
CONTROLS:					
Risk Preference	YES	YES	YES	YES	YES
Education Level	YES	YES	YES	YES	YES
Previous Experience	YES	YES	YES	YES	YES
Observations	1,183	1,183	1,183	1,183	1,183
R-squared	0.095	0.103	0.039	0.057	0.065

Notes: "Enjoyable" is the answer to the question, "How enjoyable do you think it would be to work with this candidate?"; "Collaborative" is the answer to the question, "How easy do you think it would be to collaborate with this candidate?"; "Productive" is the answer to the question, "How productive do you think this candidate would be in the workplace?"; "Hiring if subordinate" is the answer to the question, "If the candidate would work under you, how interested would you be in hiring this individual?"; "Hiring if co-worker" is the answer to the question, "If the candidate would work with you as a co-worker, how

*interested would you be in hiring this individual?" Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.*

Additionally, we index all of the social and performance ratings by calculating the average ratings to the *enjoyability* and *collaborativeness* questions. Point estimates of these average ratings suggest that females are rated (slightly) less favorably than men when they report other-competitiveness, and this difference is far away from significance (p=0.988 and the estimated power of the test is 0.05).

6. Discussion

We run three experiments to investigate general perceptions about signaling competitiveness in job applications. We define three types of job candidates who differ in their competitive preferences; candidates being either *self-competitive*, *other-competitive,* or *non-competitive*. We report on the results of one laboratory and two online experiments with over 2,000 participants and show that being self-competitive seems to have a positive impact on one's employability. This effect is driven both by the performance expectations and by social perceptions.

Study 1 is a laboratory experiment on hiring, with a focus on the performance aspect of signaling competitiveness. Simulating an experimental hiring market, it investigates whether workers who self-compete are hired more often by the firms whose payoff depends on the worker's performance. Studies 2 and 3 are online experiments investigating general perceptions, along with social and performance concerns about different types of competitive traits in hypothetical hiring scenarios.

Our results from Study 1 indicate that individuals who choose to compete against their previous score for performance pay, rather than competing against someone else or being paid based on piece rate, are hired more often in an experimental hiring market. Findings from Study 2 exhibit overwhelming advice encouraging candidates to express their preference for self-competition in a cover letter. Lastly, our results from Study 3 indicate that candidates who demonstrate their preference for self-competitiveness in a cover letter are regarded as the most employable and more likable in the workplace than the other two types.

Taken together, the three experiments reported here are indicative of a positive effect of signaling self-competitiveness on employability. Supplementing what is found in the earlier research (Rudman and Phelan, 2008; Buser et al., 2017b), our findings from the online experiments demonstrate an adverse effect of other-competitiveness (a backlash) on perceived employability and social impressions– but uncover that such backlash does not exist for self-competitiveness. Thus, our results caution against a push to compete and stressing other-competitiveness in job applications. Moreover, findings indicate that self-competitiveness (as opposed to other-competitiveness) can be a potential channel to signal productivity with little or no concerns about a backlash.

Investigating the field implications of signaling competitiveness in the actual labor market using correspondence studies and illustrating competitive taste using examples other than running (e.g., using non-athletic examples, such as reading, chess, or video games) is an exciting avenue for future work. Here, using one controlled laboratory experiment and two online experiments, we investigate the effect of competitive taste on

perceived employability and report the results indicating advantageous perceptions about signaling self-competitiveness in the labor market.

CHAPTER TWO: GENDER DIFFERENCES IN SELF- AND OTHER-COMPETITIONS

1. Introduction

A gender difference in competitiveness is a well-documented finding in the experimental economics literature. Men enter competitions to a larger extent than women do. In a seminal paper, Niederle and Vesterlund (2007) introduced a binary measure of competitiveness using a lab experiment, which reports the findings of a large and significant gender gap in willingness to enter tournaments. This gender gap in tournament entry remains substantial and significant even after controlling for ability, confidence, and risk preferences. It is also believed to account for a part of the gender differences in actual labor market choices.

Niederle and Vesterlund (2007)'s experiment has often been replicated. However, almost all of these studies focus extensively on the willingness to enter competitions against others, where subjects choose whether to compete against another individual or a group of individuals. Here, we refer to such competitions as *"*other-competitions.*"* In this paper, along with selection into other-competitions, we also study the gender differences in willingness to enter in "self-competitions." We define self-competition as a tournament setting in which individuals compete against their own previous performance. Such competitions involve the concepts of self-improvement and self-challenge, which are prevalent traits that apply to many of our daily decisions. Self-challenge and mastery are

also critical and widely-debated personal traits in business performance. It is, therefore, important to understand selection into and preferences for self- and other-competitions for two reasons. First, it is crucial to understand how individual preferences towards self- and other-competitions are shaped. Second, to reduce the gender disparities in economic outcomes, it is interesting to investigate if self-competitions can be used as alternative tournament payment schemes to attract a similar number of men and women in competitive environments.

We run a laboratory and an online experiment (Studies 1 and 2), confirming the fact that women are less willing than equally able men to select into other-tournaments, a tournament setting where the competition is against another person. In contrast, when the tournament is against one's own previous performance, a condition which we refer to as self-tournament, the gender gap in competitive scheme selection declines and looses its statistical significance. We then conduct another online experiment, Study 3, to further understand the preference for different tournament modes from competitors' point of view. We find that both men and women prefer self-tournaments to tournaments against others. We also report that when self-tournament is included in the choice set along with other-tournament and piece rate – the classical choice set used in the literature, more people choose to compete, which results in an increase in productivity. Following our discussion of these findings, we also discuss how confidence, risk preferences, and causal attributions can partly explain why there exists a gender difference in other- but not in self-competition.

The remainder of this chapter is organized as follows: Section 2 provides a literature review. Section 3 presents the design and reports the findings of the lab experiment (Study 1) on selection into self- and other-tournaments. Section 4 presents the design and reports the findings from an online experiment (Study 2) on the willingness to compete with self and others, and further discusses the possible underlying mechanisms. Section 5 presents an online experimental extension (Study 3) investigating the preference for self- and other-tournaments. Lastly, Section 6 concludes.

2. Literature Review

The gender disparity in competitiveness is a persistent finding and is often replicated with different tasks and on diverse groups.[15] Studies on adults (Niederle and Vesterlund 2011), high school students (Buser et al. 2014; Buser et al. 2017c), children (Gneezy and Rustichini, 2004; Sutter and Glatzle-Rutzler, 2014), isolated hunter-gatherers (Apicella and Dreber 2015), and businesspeople (Reuben et al. 2015) suggest that girls/women tend to shy away from entering tournaments.

The gender disparity in competitiveness is also believed to play a role in individuals' actual labor market choices. Flory et al. (2015) use a natural field experiment, which suggests that women disproportionately shy away from applying to job listings with competitive work settings. Buser et al. (2014) and Buser et al. (2017c) also suggest that the laboratory measure of competitiveness significantly correlates with high school students' college track choices; more competitive students (predominantly

[15] Though this does not imply that the difference is consistent or permanent.

male) being more prone to choose more math-intensive study tracks, which, in most cases is a prerequisite for selection into more lucrative sectors.

One strand of the literature focuses on potential institutional changes to create a gender balance in selection into competitions. Such changes include implementation of quotas for women as tournament winners (Balafoutas and Sutter, 2012; Niederle et al. 2013); giving participants the option to choose opponent's characteristics (Grosse and Reiner 2010; Healy and Pate 2011, Gupta et al. 2013); transparently revealing the opponent's performance (Ertac and Szentes, 2011); and changing the type of the prize for the benefit of participants' children (Cassar et al., 2016).

Another strand of the literature focuses on explanatory analysis to understand why there is a gender difference in willingness to compete and what can be done to eliminate it. One discussion explores how variations in male and female hormones influence competitive choices. As tournaments are perceived as stressful settings, several researchers focus on the reactions of cortisol, the stress hormone, to entering competitions. Apicella et al. (2011) do not find a correlation between cortisol levels and the willingness to compete. Buser et al. (2017a), on the other hand, report gender differences in stress arousal in response to performing in tournaments, although stress reactions cannot explain the gender difference in willingness to compete in their study. Studies that focus on sex hormones, on the other hand, document mixed and inconclusive findings (Hoffman and Gneezy, 2010; Buser, 2012; Wozniak et al., 2014).

Another discussion focuses on the role of culture in the willingness to compete. Although the gender gap in competitiveness is an often-replicated finding in developed

economies, there is no systematic gender difference in developing countries (Cardenas et al., 2012; Zhang 2013; Khachatryan et al., 2015).

In this current paper, we focus on understanding whether there is a gender difference in willingness to compete against self. In this competition setting, individuals decide whether to compete against their own past performance. We further test the preferences for different competition modes (i.e., competitions against self and others), to investigate decisions for "how to compete."

The idea of self-competition involves being committed to constant self-improvement and self-challenge. Thanks to the 21st century's rapid technological advancements, the devices that track our daily routines (e.g., smartphones, activity trackers) are now widely used. Pervasive availability and the use of such devices help individuals set better goals and promote self-challenge and self-improvement. Therefore, target setting and commitment to performing better have become pervasive notions in our daily personal practices. These factors make an investigation of gender differences in the willingness to compete with oneself an interesting research avenue. As such, self-competitions are discussed in the literature related to cognitive psychology (Saville, 2009), sports (Howe, 2008), education and learning (Zhi-Hong, 2014), organizational behavior, and worker motivation (Locke, 1968; Brown et al., 1998). Moreover, constant self-improvement and willingness to challenge against self are found to be important indicators of success in business life (Hunt and Weintraub, 2016).

Research in the field of economics that address similar research question on gender differences in self- and other-competitions largely confirm our findings (Bönte et

al., 2017; Carpenter et al., 2018; Klinowski, 2019).[16] Bönte et al. (2017) implement a lab-in-the-field experiment using a within-subject design with shoppers in a shopping mall. Every participant performs under three different payment schemes: piece rate, self-competition, and interpersonal competition (i.e., against one's own previous performance) with random order. They confirm that women are less willing to compete against another individual and further find that women, on average, are less likely to select into self-competitions. Carpenter et al. (2018) run a lab experiment with undergraduate students. They cannot replicate the gender difference in willingness to compete against others and report that women are equally likely to select into self-competition as men. Using a laboratory experiment, Klinowski (2019) also suggests that, when self-confidence and risk preferences are accounted for, men and women are equally self-competitive.

3. Study 1: Laboratory Experiment on Willingness to Compete

3.1. Experimental Design and Implementation

The laboratory experiment closely follows Niederle and Vestrelund (2007)'s design with slight modifications and involves two treatments: *Other* and *Self*. In the *Other* treatment, subjects performed a series of simple arithmetic problems (math task) for three rounds. Each round lasted for five minutes, and the objective was to do as many tasks correctly as possible. In the first round (piece rate task), subjects received a fixed

[16] In addition to these experiments, Khadjavi and Nicklish (2015) run a field study with children to understand how parents' ambitions shape children's competitiveness. Their experimental design adapts a reward structure where children had to choose between running to be in the top half of their peers and running faster than before, a similar mechanism to self-competitive payment scheme. They find that boys and girls are equally likely to compete against their peers or against self.

sure amount ($1) per correctly solved problem. In the second round, subjects were paired in groups of two (as opposed to groups of four in Niderle and Vesterlund 2007), and they were paid according to a tournament payment scheme; the subject with the highest score in the pair was paid double the piece rate ($2) per correctly solved task whereas the other subject received nothing. In the third round, before the subjects performed in the task, they got to choose which payment scheme to apply their performance in the third task. If a subject chose the piece rate, she was paid the fixed piece rate amount ($1) per task she solved correctly in the third round. If she chose the tournament rate, she competed against the same person that she was matched to in the second round. If she performed better than that person in the second round, she received double the piece rate ($2) per correctly solved task; otherwise, she earned nothing.

The *Self* treatment was identical to the *Other* treatment in design, with some exceptions. In *Self* treatment, subjects were not matched to another player. In the first round, they performed in the piece rate task (again, each correct answer paid $1). In the second round, subjects' scores were compared to their own score in the first round, and if the subject solved more problems than she did in the first round, she received double the piece rate ($2) and nothing otherwise. In the third round, subjects chose whether to get paid based on piece rate ($1) or tournament rate, which paid double the piece rate ($2) if the subject performed higher than her own second round score and nothing otherwise.

In both of the treatments, no feedback was given to subjects regarding their performance until the end of the experiment. They never learned their opponent's

performance in any round. Instructions regarding each round were only given at the start of each round, and they never learned the gender of their opponent.

At the end of the three rounds, we elicited participants' beliefs about how their performance in the various rounds compared, both against their own previous score and against others. Subjects predicted whether they solved more problems than their opponent in round 2 and whether their score improved between rounds 2 and 1 and between rounds 3 and 2. For each correct prediction, they received $1. We elicited these predictions to measure confidence. Our confidence variable in *Self* treatment was a binary measure that takes on the value 1 for subjects who believed that they improved their performance between the second and the third round. Similarly, in other-treatment, the confidence variable took on value 1 when the subject believed that they performed better than the person they were matched to in the second round. The experiment ended with a questionnaire where we elicited a subjective measure of risk aversion and collected basic demographics. Subjects were then paid in private for a randomly selected round before leaving the laboratory.

The experiment was programmed with z-Tree (Fischbacher, 2007) and conducted at the ICES laboratory at George Mason University in October 2016. The 204 subjects (50.5 percent female) earned an average of $17.40 (including a $5 show-up fee) for their participation in a session, which lasted approximately 40 minutes.

3.2. Findings

Our primary focus variable in Study 1 is the compensation scheme choices of our participants in the third (choice) round. Table 10 reports the percentage of subjects

choosing the tournament scheme by gender and treatment. In Study 1, 58 percent of men choose to compete in the third round in the *Other* treatment, compared to 38 percent of women (p=0.044 for the gender difference, t-test of proportions).[17] In the *Self* treatment, where the competition was against one's own previous score, the size of the gender gap is reduced to 13 percent, and it is no longer statistically significant (p=0.176, t-test of proportions). Figure 3 illustrates these findings.

Table 10 Percentage Choosing Tournament Rate, by Treatment and Gender

Treatment:	Women	Men	Total
Other	37.5 (7.1)	57.7 (6.9)	48.0 (5.0)
Self	41.8 (6.7)	55.1 (7.2)	48.1 (4.9)
Total	39.8 (4.8)	56.4 (5.0)	48.0 (3.5)

Notes: Standard errors in parentheses.

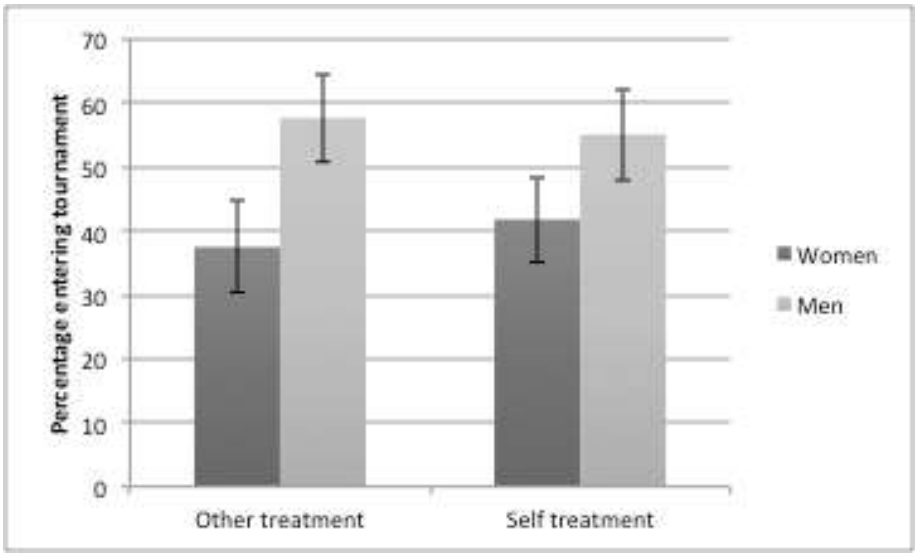

Figure 3 Percentage of Men and Women Entering Tournament in Study 1

[17] Our results are robust to using the nonparametric Fisher Exact test instead.

Table 11 outlines the OLS regression analysis for Study 1. Specifications (1) and (2) summarize the tournament choices in the *Other* treatment. There is a 20 percentage point gender gap in willingness to compete against others (Column 1), indicating that women are less willing than equally able men to other-compete.[18] Once controlled for confidence and risk preferences (Column 2), the gender gap declines and is no longer significant. Specifications (3) and (4) report the tournament choices in the *Self* treatment. There already is no significant gender difference in the willingness to self-compete, and once controlled for confidence and risk preferences, the difference virtually disappears. The decline in the gender difference is due to both women competing slightly more (4.3 percent), and men competing slightly less (2.6 percent). However, this difference in difference is not statistically significant in Study 1 alone (p=0.612).

[18] All of the regressions in this chapter always control for ability measured as subject's round 1 score.

Table 11 OLS Regressions for Study 1

	(1) (Other)	(2) (Other)	(3) (Self)	(4) (Self)
Female	-0.195**	-0.114	-0.132	-0.029
	(0.10)	(0.10)	(0.10)	(0.10)
Confidence		0.246**		-0.013
		(0.11)		(0.10)
Risk		0.039*		0.091***
		(0.02)		(0.02)
Constant	0.177	-0.212	0.503***	-0.008
	(0.14)	(0.22)	(0.16)	(0.20)
N	100	100	104	104
R-square	0.116	0.180	0.019	0.140

*Notes: Dependent variable is a dummy indicating choice of competition in the third round. Robust standard errors in parentheses. All regressions control for task ability measured as the score in round 1. Risk is a 1-10 self-assessed index of willingness to take risk with 1="Not at all willing to take risks" and 10="Very willing to take risk". Confidence is a dummy that takes on the value 1 for subjects who believed that they improved their performance between the second and the third round (Self-treatment) or that they performed better than the person they were matched to in the second round (the three Other-treatments). All results are robust to using probit instead of OLS. Significance: ***p<0.01 **p<0.05 *p<0.1*

4. Study 2: Online Experiment on Willingness to Compete

4.1. Experimental Design and Implementation

We used the survey platform Qualtrics and the online labor market Amazon Mechanical Turk (MTurk) to conduct an online version of our experiment to ensure that our results from the laboratory replicate in a real labor market setting. Horton et al. (2011) suggest that results from MTurk experiments are as valid as the results from laboratory and field experiments and are mostly replicable.[19] MTurk workers are also

[19] We confirm this finding in our experiments. Our laboratory findings largely replicate in the online experiment.

found to perform better on attention checks than college students (Hauser and Schwarz, 2016).

The online experimental design was different from the laboratory design in four ways: First, we replaced the math task with a chapta style counting zeros task to prevent cheating. This task involved counting the number of zeros in an 8x8 matrix consisting of zeros and ones. Second, the rounds were shortened to 90 seconds to minimize potential distraction/attrition. Third, the payment structure was changed, such that each correct answer paid $0.15 in the piece rate scheme.[20] Fourth, in addition to the treatments *Other* and *Self*, we also implemented two additional versions of the *Other* treatment: *Other, Same Gender*, and *Other, Same Ability* to be able to investigate the mechanisms underlying our findings.

In *Other, Same Gender* we matched participants of the same gender in the competition rounds, and in the *Other, Same Ability*, participants who did the same number of tasks correctly in the first round were matched with one another. Subjects were informed about these aspects of the matching ahead of the second round. We used these treatments to mirror two features of self-tournaments, first the fact that the person knows their own gender, and second, the fact that one has better information about their own ability in the task. We also investigate if these two modifications by themselves can attenuate or eliminate the gender difference in competitiveness.

[20] The payment in MTurk experiments is, on average, significantly lower than the payments in the lab experiments. See Horton et al. (2011) and Amir et al. (2012) for a discussion on payments in MTurk experiments.

In total, 994 subjects (49.9 percent female) participated in the online experiment that was conducted in November 2016. On average, participants earned $1.20 for an approximately twelve minute long session.

4.2. Findings

In the online experiment, we largely replicate our findings from the laboratory and further investigate the underlying mechanisms.

Table 12 reports that the gender gap in willingness to compete is 12 percentage points in the *Other* treatment in the online experiment (p=0.045, t-test of proportions). This gender gap in tournament entry is depicted in the left two bars of Figure 4. In the *Self* treatment, the sign of the gap reverses, and it is no longer significant (p=0.446, t-test of proportions). This is depicted in the right two bars in Figure 4. Moreover, the difference-in-difference estimation reveals that the gender gaps in the two treatments are significantly different from one other (p=0.052).

Table 12 Percentage Choosing Tournament Rate, by Treatment and Gender

Treatment:	Women	Men	Total
Other	27.8 (4.2)	40.0 (4.3)	34.3 (3.0)
Other, Same Gender	21.9 (3.7)	34.1 (4.2)	28.0 (2.8)
Other, Same Ability	30.6 (4.2)	33.3 (4.3)	32.0 (3.0)
Self	35.7 (4.2)	31.1 (4.3)	33.5 (3.0)
Total	29.0 (2.0)	34.7 (2.1)	31.9 (1.5)

Notes: Standard errors in parentheses.

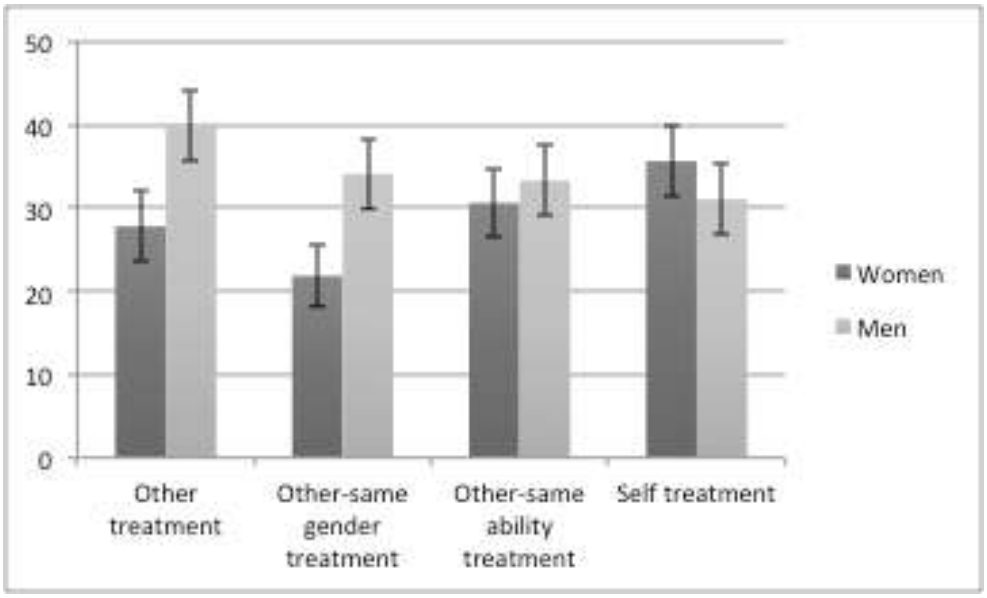

Figure 4 Percentage of Men and Women Entering Tournament in Study 2

Panel A of Table 13 summarizes the OLS regression analysis for the *Self* and *Other* treatments of the online experiment. Specifications 1 – 4 in Panel A of Table 13 demonstrate similar results to that of our laboratory experiment. When we do the same analysis for the two additional versions of the *Other* treatment, we still find a significant gender difference in competitiveness in the *Other*, *Same Gender* treatment. This is depicted in the middle left bars in Figure 4. This finding contributes to the already mixed findings of gender competitiveness gap in the same-sex tournaments. Although several studies report that single-sex tournaments can mitigate the gender difference in willingness to compete (Booth and Nolen, 2012; Sutter and Glatzle-Rützler, 2014; and Burow et al., 2017), some find that competition choices are independent of opponent's gender (Gupta et al., 2013; see also Niederle, 2015). Thus, the role of single-sex tournaments on closing the gender competition gap is not yet a robust finding.

In the *Other, Same Ability* treatment, there is virtually no gender difference in willingness to compete. This is shown in the middle right bars in Figure 4. This finding, which is consistent with the previous literature (Ertac and Szentes, 2011; Wozniak et al., 2014), indicates that, once opponents of similar abilities are matched with one another (a similar mechanism that of self-competition), the gender difference in competition entry totally disappears.

Table 13 OLS Regressions for Study 2

Panel A:

	(1) (Other)	(2) (Other)	(3) (Self)	(4) (Self)
Female	-0.126**	-0.090	0.052	0.083
	(0.06)	(0.06)	(0.06)	(0.06)
Confidence		0.246***		0.128**
		(0.06)		(0.06)
Risk		0.045***		0.032**
		(0.01)		(0.01)
Constant	0.297***	-0.114	0.371***	0.120
	(0.07)	(0.10)	(0.08)	(0.12)
N	245	245	248	248
R-square	0.028	0.172	0.006	0.042

Panel B:

	(5) (Other, Same Gender)	(6) (Other, Same Gender)	(7) (Other, Same Ability)	(8) (Other, Same Ability)
Female	-0.122**	-0.094*	-0.028	0.030
	(0.06)	(0.05)	(0.06)	(0.06)
Confidence		0.269***		0.287***
		(0.06)		(0.05)
Risk		0.027**		0.042***
		(0.01)		(0.01)
Constant	0.349***	0.063	0.307***	-0.117
	(0.07)	(0.09)	(0.07)	(0.11)
N	257	257	244	244
R-square	0.019	0.158	0.002	0.158

*Notes: Dependent variable is a dummy indicating choice of tournament rate in the third round. Robust standard errors in parentheses. All regressions control for task ability measured as the score in round 1. Risk is a 1-10 self-assessed index of willingness to take risk with 1="Not at all willing to take risks" and 10="Very willing to take risk". Confidence is a dummy that takes on the value 1 for subjects who believed that they improved their performance between the second and the third round (Self-treatment) or that they performed better than the person they were matched to in the second round (the three Other-treatments). Significance: ***p<0.01 **p<0.05 *p<0.1*

We additionally conduct an analysis of the tournament entry in the *Self*- and *Other*-treatments using the pooled data from Studies 1 and 2. Table 14 below outlines the OLS regression results from the pooled data for the *Other*- and *Self* –treatments in Studies 1 and 2. Specifications (1) and (2) summarize the tournament entry choices in the *Other* treatments. In the pooled data, women are 15 percent less likely than equally able men to other-compete (Column 1). When controlled for confidence and risk preferences, this gender gap declines to 10 percent and is still significant (Column 2). Specifications (3) and (4) summarize the tournament entry choices in the *Self*-treatments for the pooled data. We virtually find no gender difference in willingness to compete when competing against self in the pooled data (Columns 3 and 4).

Table 14 OLS Regressions for the Pooled Study 1 and 2 Data

	(1) (Other)	(2) (Other)	(3) (Self)	(4) (Self)
Female	-0.146***	-0.097**	-0.009	0.044
	(0.05)	(0.05)	(0.05)	(0.05)
Confidence		0.251***		0.097*
		(0.05)		(0.05)
Risk		0.041***		0.048***
		(0.01)		(0.01)
Constant	0.432***	0.017	0.372***	0.012
	(0.04)	(0.07)	(0.04)	(0.09)
N	345	345	352	352
R-square	0.066	0.18	0.01	0.063

*Notes: Regressions are for the pooled "Other" and "Self" treatments from the online and laboratory experiments. Dependent variable is a dummy indicating choice of competition in the third round. Robust standard errors in parentheses. All regressions control for the normalized task ability measured as the score in round 1. Significance: ***p<0.01 **p<0.05 *p<0.1*

Women, on average, are found to be more risk averse (Croson and Gneezy, 2009) and less (over)confident than men (Niederle and Vesterlund, 2007). We largely confirm these findings. In our experiments, men take more risk than women, both in the laboratory and online, regardless of the treatment. There is also a significant gender difference in confidence in the other-treatments, suggesting that women are less confident than men in their ability to beat another person's performance. However, this gender difference in confidence disappears in the self-treatments and is no longer significant. Table 15 summarizes the risk preference and confidence measures from Studies 1 and 2.

Table 15 Risk Preferences and Confidence Measures from Studies 1 and 2

	Risk Taking			Confidence		
Study 1 (Lab)	Women	Men	p-values for gender diff.	Women	Men	p-values for gender diff.
Self	6.16 (0.29)	7.35 (0.27)	0.004	0.56 (0.07)	0.61 (0.07)	0.615
Other	6.00 (0.29)	7.25 (0.24)	0.001	0.71 (0.07)	0.85 (0.05)	0.097
Study 2 (Online)						
Self	5.05 (0.18)	6.00 (0.19)	0.001	0.55 (0.04)	0.55 (0.05)	0.947
Other (x3)	5.14 (0.20)	5.79 (0.19)	0.000	0.51 (0.03)	0.58 (0.03)	0.085

Notes: Standard errors in parentheses. Confidence variable is a dummy equal to 1 for subjects who believe that they improved their performance between rounds 2 and 3 ("Self") or that they performed better than the person they were matched to in the second round (the three "Other" treatments). Risk is a 1–10 self-assessed index of willingness to take risk with 1 = "Not at all willing to take risks" and 10 = "Very willing to take risk."

Risk preferences and confidence are believed to be important mechanisms behind the gender gap in willingness to other-compete (see Gillen et al., 2015 and van Veldhuizen, 2017). We investigate whether the roles of risk aversion and confidence are more emphasized in the *Other* tournaments than they are in the *Self* tournaments and whether this could be a potential channel for the absence of the gender gap in self-competitions. To test for the roles that risk preferences and confidence play in tournament entry, we run two regressions that are formulated by Equation (1) and Equation (2) respectively:

$$Tournament_i = \alpha + \beta * risk_i + \gamma * Treatment_i + \theta * (risk_i * Treatment_i) \quad (1)$$

$$Tournament_i = \alpha + \beta * confidence_i + \gamma * Treatment_i + \theta * (confidence_i * Treatment_i) \quad (2)$$

The dependent variable is a dummy, which indicates the choice to compete in the third round. Treatment is a dummy which takes on the value 1 if the treatment was the *Other* competition treatment and 0 if the treatment was the *Self* competition treatment. The results from the online experiment indicate that both risk aversion (p=0.095) and overconfidence (p=0.014) have a more significant impact on the choice of whether or not to compete in the *Other* treatment than in the *Self* treatment.[21] We thus suggest that confidence and risk aversion play more critical roles for decisions concerning

[21] Laboratory data alone reveals a significant coefficient for confidence (p=0.068), but not for risk (p=0.469).

competition entry against others than it does for decisions concerning competition entry against self. We discuss that these two factors can serve as important mechanisms for the gender competitiveness gap. Table 16 summarizes these regression results.

Table 16 OLS Regressions for the Roles of Risk Preferences and Confidence on Tournament Entry Decision in Study 2

	(1)	(2)
Treatment (Other)	-0.171	-0.108*
	(0.11)	(0.06)
Risk	0.027*	
	(0.01)	
Risk*Treatment	0.032*	
	(0.02)	
Confidence		0.116*
		(0.06)
Confidence*Treatment		0.200**
		(0.08)
Constant	0.144	0.268***
	(0.10)	(0.06)
N	493	493
R-square	0.050	0.062

*Notes: Robust standard errors in parentheses. All regressions control for task ability measured as the score in round 1. Significance: ***p<0.01 **p<0.05 *p<0.1*

5. Study 3: Online Experiment on Preferences for Competition Modes

5.1. Experimental Design and Implementation

In Study 1, we showed that there is no gender difference in willingness to compete against one's own previous performance. In Study 2, we confirmed this finding with an online subject pool and further explained that risk preferences and confidence can account for the gender differences in willingness to compete against others, but are

emphasized less while deciding whether to self-compete. We thus suggest that self-tournaments can serve as gender-neutral incentive schemes as opposed to other-tournaments, where the gender gap in tournament entry is substantial and significant.

We build on these two previous experiments with an online experimental extension to further explore the preferences for the choices between self-competition and other-competition from the competitors' point of view. We investigate the decisions on choosing to compete against self or others along with whether to compete at all.

One of the objectives in Study 3 is to understand whether men and women differ in their preferences for self- vs. other-tournaments. If men and women are equally likely to prefer self-tournaments to other-tournaments, then we can suggest that self-tournaments are not only gender-neutral incentive mechanisms but are also more likely to be preferred over other-tournaments by both genders, creating no disadvantage or discrimination to any of the groups.

The design of this experiment is a version of our Study 2. However, in Study 3, we had three treatments, each lasting for four rounds (as opposed to three rounds in Studies 1 and 2). Additionally, the counting zeros task was replaced with 7x7 matrices (as opposed to 8x8 matrices in Study 2). To test for the preferences for the competition type, we ran two treatments, Treatment 1 and Treatment 2. Treatment 1 started with a piece rate payment round (which paid $0.15 per correct answer), and the second round continued with a self-tournament round, which paid double the piece rate amount ($0.30) if the subject surpassed her own round 1 score and nothing otherwise. In the third round, subjects performed in an other-tournament task that paid double the piece rate if the

subject performed higher than the anonymously matched opponent in the same round and nothing otherwise. Then in the fourth round, the subjects could choose which of the previous three payment schemes they want to apply their fourth round score. In particular, they could make a choice between the 1) piece rate (which would pay $0.15 per correct answer), 2) other-tournament rate (which would pay $0.30 if the subject's fourth round score is higher than her opponent's other-tournament round score and nothing otherwise), and 3) self-tournament rate (which would pay $0.30 if the subject's fourth round score is higher than her own self-tournament round score).

Our Treatment 2 was identical to Treatment 1 except for one difference. This time subjects were forced to compete in the fourth round, but they could choose "how to compete." In other words, the experiment proceeded identically to the first treatment until the fourth round, and in the fourth round, subjects chose between 1) other-tournament rate, and 2) self-tournament rate. We designed these two treatments to test for the preference for the competition type from competitors' perspective.

In Treatment 3, the first three rounds were identical to the other two treatments, but in the fourth round, subjects always made a choice on whether to compete against another person. That is, the fourth round choice was always between 1) piece rate, and 2) other-tournament rate. We added this treatment to investigate how the level of tournament entry would be impacted when the choice set involves self-tournament along with other-tournament and piece rate (i.e., to compare the level of tournament entry in Treatment 1 and Treatment 3).

In all of these three treatments, the order of the second and the third rounds (namely the order of self-tournament and other-tournament rounds) was randomized to control for any potential order effects. We also did not give any feedback about one's own performance until the end of the experiment. Once the experiment was finished, we conducted an in-depth belief elicitation to measure confidence[22], subjects' causal attributions for each round[23], and risk preferences. The experiment then concluded with a demographics survey, and subjects were paid based on one of the randomly selected four rounds. Table 17 summarizes the treatment structure.

Table 17 Treatment Structure and Number of Participants in Study 3

	Treatment 1	**Treatment 2**	**Treatment 3**
Round 1	Piece Rate	Piece Rate	Piece Rate
Round 2	Self-tournament	Self-tournament	Self-tournament
Round 3	Other-tournament	Other-tournament	Other-tournament
Round 4	*i) Piece Rate* *ii) Other-tournament* *iii)Self-tournament*	*i) Other-tournament* *ii)Self-tournament*	*i) Piece Rate* *ii) Other-tournament*
Number of participants (females)	217 (133)	240 (121)	230 (136)

Notes: The order of Round 2 and Round 3 was randomized.

[22] Confidence measures were collected for the first three tasks and the answers were incentivized under simple incentives.

[23] The "causal attribution" is a measure we collect to understand to what factors (namely controllable vs. uncontrollable) did the subjects attribute each round's results to.

A total of 687 subjects (56.8 percent female) participated in the online experiment that was conducted in March and April 2017. On average, participants earned $1.75 for a fifteen minute long session.

5.2. Findings

We designed the Study 3 to test the preferences for how to compete. We report three main findings: 1) men and women prefer self-tournaments to other-tournaments at equal rates, 2) including a self-tournament option in the choice set increases the percent who choose to compete, and 3) confidence and causal attributions play different roles in self- and other-competitions, and can possibly account for the gender gap in the willingness to compete against others.

Result 1: *Self-tournament is preferred to Other-tournament at equal rates by men and women*

We had two treatments that intended to measure the preference for self- vs. other-tournaments. In Treatment 1, all three payment schemes were available in the last *(choice)* round. They were; piece rate, other-tournament rate, and self-tournament rate. In Treatment 2, subjects were forced to compete in the last round, but they had the opportunity to choose the tournament type, self- or other-tournament.

In the first treatment, where the choice set involved all three payment options, 53.5 percent of the participants choose the piece rate payment option. Among the 46.5 percent of the participants who choose to compete in Treatment 1, 56.4 percent choose to compete against themselves, and 43.6 percent choose the other-tournament rate. This slightly higher preference for the self-tournaments in Treatment 1 is not statistically

significantly different than 50 percent (p=0.197 with t-test) and is depicted in the left two bars of Figure 5. Additionally, the results are similar for men and women. 59.6 percent of women who choose to compete in Treatment 1 prefer to compete with themselves (p=0.147 with t-test), and 52.3 percent of men do so (p=0.767 with t-test). The percentage of men and women who choose the self-tournament rate in Treatment 1 is not statistically different from each other (p=0.464 with t-test).

We then investigate which type of tournament participants prefer when forced to compete. In Treatment 2, where subjects had to compete but could choose the mode of competition, 61.3 percent of the participants choose self-tournament, whereas 38.7 percent choose other-tournament. The difference is significant, meaning that self-tournaments are preferred to other-tournaments in the treatments where one is forced to compete (p=0.000 with t-test). This is depicted on the right-hand side of Figure 5. When grouped by gender, 58.0 percent of men and 64.4 of women prefer self-tournament to other-tournament when they had to compete (p=0.001, and p=0.081, respectively with t-test), and this 6-percentage point gender difference is not statistically significant (p=0.305 with t-test).

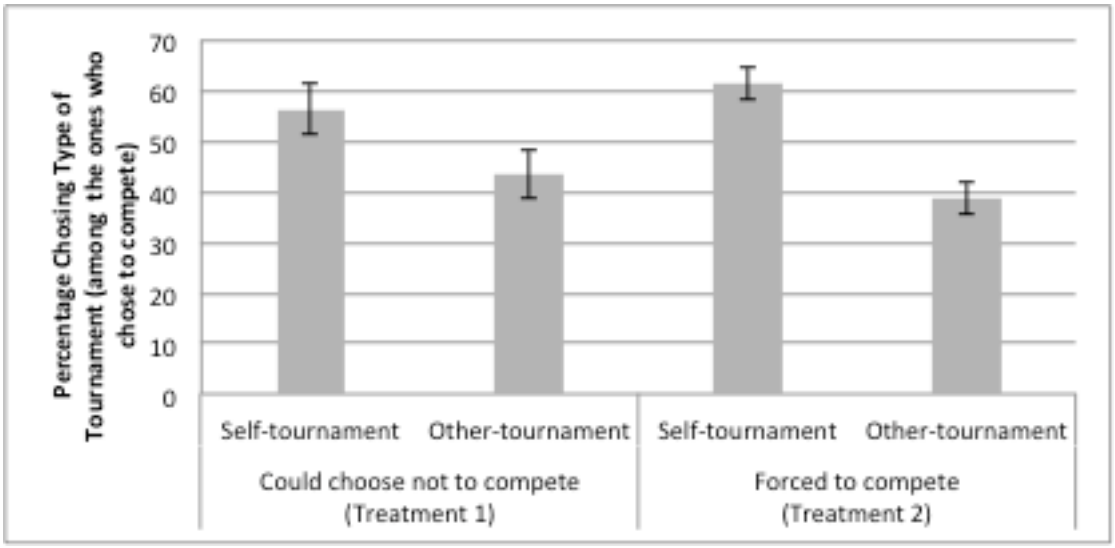

Figure 5 Percentage of Participants Choosing each Tournament Type

Findings from Treatments 1 and 2 suggest that self-tournaments are preferred to other-tournaments, especially when participants have to compete but can choose how. This finding is true for both men and women, meaning that self-competitions are not only gender-neutral while deciding whether to compete, but they are also more likely to be preferred to other-tournaments by both genders while deciding how to compete.

Result 2: *Self-tournament option increases the percentage who choose to compete, resulting in an increase in productivity*

On average, men and women perform quite similarly in Study 3, with a mean of 4.73 correctly solved tables in the first three rounds (p=0.533 with t-test for the gender difference).[24] This similar performance of men and women can translate into equal probabilities of winning in a tournament. Out of those who won in the other-tournament

[24] The average score in the all four rounds is 4.79 (p=0.523 for the gender difference, t-test).

rounds, 58.4 percent are female. Out of those who won in the self-tournament rounds, 56.3 percent are female. Given that females are slightly over-represented in our Study 3 sample (56.8 percent female in total), we can assert that there is no gender difference in probability of winning in the other- or self-tournaments. Indeed, statistical analyses suggest that men and women are equally likely to beat themselves and others in self- and other-tournaments (p=0.652 and p=0.426, respectively with t-test).

For a given performance level, a risk neutral individual whose incentive is to maximize earnings should be indifferent between the piece rate and a tournament rate when the chance of winning is 50 percent (a similar discussion to that of Niederle and Vesterlund, 2007). On average, in Study 3, our participants solved 4.92 correct tables in the other-tournament rounds. That means a subject who solved five or more correct tables in a given round would have higher expected monetary earnings from entering a tournament. In our sample, this translates into 62.3 percent of men and 61.8 percent of women who could win in the tournament by choosing to other-compete in the last (choice) round[25] (p=0.895 with t-test for the gender difference). A similar argument can also be made for self-tournaments. Among our subject pool, 78.5 percent of men and 76.9 percent of women won in the self-tournament rounds and could be better off by competing against themselves in the last round.[26]

[25] In particular, 62.3 percent of men and 61.8 percent of women solved at least five correct tables in other-tournament rounds (either round 2 or round 3). These numbers are still quite similar when tested for round 4 scores. In round 4, 63.6 percent of men and 61.8 percent of women solved five or more correct tables.
[26] In particular, 78.5 percent of men and 76.9 percent of women solved more correct tables in self-tournament rounds (either round 2 or round 3) than they did in the Piece rate round (round 1). When we do a similar analysis with round 4 (choice round) scores, we find that 65.5 percent of men and 71.3 percent of women could win in the tournament had they chosen the self-tournament option in round 4.

Based on the analysis above, both genders under-compete in our sample. In Treatment 3, where the payment scheme selection was between piece rate and other-tournament rate, only 28.3 percent of the participants choose to compete. When the self-tournament option was available along with the previous two, on average, 46.5 percent of participants choose a tournament payment scheme. This 18.2 percentage points increase in competition entry is statistically significant (p=0.000 with t-test). Figure 6 illustrates this finding. This finding suggests that including the self-tournament payment option into the choice set (along with the piece rate and the other-tournament rate) increases the number of competitive choices, getting it closer to the optimum number of competitions.

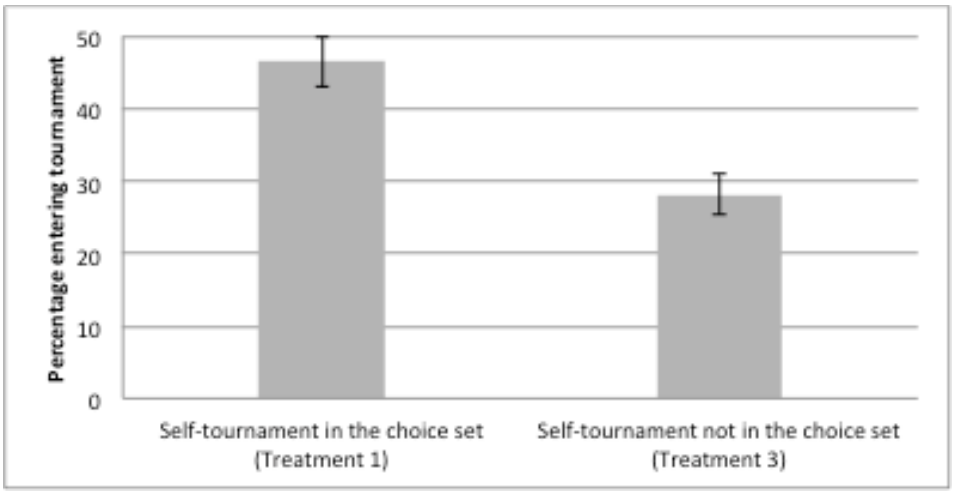

Figure 6 Percentage of Participants who Choose to Compete

Furthermore, this increase in percentage in participants who choose to compete also translates into higher average earnings. If round 4 was always chosen for payment, thanks to the higher level of competition entry, the average earnings in Treatment 1 could

have been 12.2 percent higher than the average earnings in Treatment 3 (p=0.088 with t-test).

Result 3: *Differences in confidence and causal attributions of men and women disappear in self-tournaments*

In Study 3, we collected detailed measures of confidence and causal attributions. In this part, we first summarize the trend of each measure for each gender and different competition types. We then discuss how we use these measures to interpret our main findings better.

Confidence:

In Study 3, confidence is measured with the use of two incentivized belief questions asked at the end of the experiment. For each round, we asked our participants to predict the number of correct tables that they believe they solved and the number of tables that they think their opponent solved (Moore and Healy, 2008).[27] These measures help us see how one places herself in her group, how well one estimates her own actual performance, and how one regards other people's performance overall.

In Study 3, confidence is defined as the ratio of one's own believed performance in a given round to one's belief on the opponent's performance in the same round for other-tournament rounds. For self-tournament rounds, the confidence is defined as the ratio of one's own believed performance in the given round to one's own believed round 1 performance. Therefore, when the confidence value is greater than one, the individual

[27] Moore and Healy (2008) classify overconfidence with three major measures: over estimation, over placement and excessive precision. In our Study 3, we adopt the first two of these measures.

thinks that she won in the tournament, and when the confidence value is less than one, the person thinks that she lost in the tournament. As Table 18 below summarizes, men are significantly more confident than women in the other-tournament rounds, and the gender difference disappears in the self-tournament rounds, similar to what we report in Studies 1 and 2.

Table 18 Confidence in Self- and Other-tournaments

	Women	Men	Total	p-values for gender diff.
Other-tournament	0.98 (0.02)	1.14 (0.03)	1.05 (0.01)	p=0.000
Self-tournament	1.05 (0.01)	1.08 (0.02)	1.07 (0.01)	p=0.159

Notes: Standard errors in parentheses. Confidence is the measure of how one compares herself against others in the other-tournament rounds, and how well they think they improved their score in the self-tournament rounds. It is the ratio of one's own believed score to her opponent's in the other-tournament and the ratio of believed own self-tournament round score to own round 1 score in the self-tournament.

As the measure of self-perception regarding ability, we use the ratio of one's believed performance to one's actual score to define (over)estimation. Thus, a value greater than one means that one overestimated her performance, a value less than one means that one underestimated her own performance. (Over)estimation serves as a measure of how well one predicts his or her actual ability and is believed to be one of the three components of confidence (Moore and Healy, 2008). We find that, on average, both men and women significantly overestimate their own performance (p=0.000, t-test for both genders), but men's overestimation is significantly higher than women's. The corresponding values are 1.49 for men and 1.34 for women (p=0.003 for the gender

difference with t-test). This means that men are not only overconfident when they compare themselves with others, but they also overestimate their own actual abilities at larger extents than women. This gender difference in overestimation is statistically significant both in the other- and self-tournament rounds. Table 19 summarizes these findings.

Table 19 Overestimation of One's Own Performance in Self- and Other-tournaments

	Women	Men	Total	p-values for gender diff.
Other-tournament	1.29 (0.04)	1.51 (0.07)	1.39 (0.04)	p=0.002
Self-tournament	1.35 (0.04)	1.56 (0.09)	1.44 (0.04)	p=0.022

Notes: Overestimation of one's own performance is a measure of how well one predicts her own performance. It is the ratio of one's own believed performance to one's actual performance.

Lastly, we examine how men and women perceive other people's abilities. We find that both genders overestimate others' performance. On average, in the first three rounds, men think that the other person could have solved 5.86 correct tables, and women believe that the other person could have solved 6.24 correct tables, creating a significant gender difference in perceptions on others' ability (p=0.011 with t-test). This, therefore, can suggest that the different perceptions about others' abilities can be one of the mechanisms why there exists a gender gap in willingness to compete with others but not against self.

Causal Attributions:

In addition to the confidence measures, we also elicited the subjects' believed causal attributions. Causal attributions of achievements and the gender differences therein have been studied by psychologists over the past several years. The findings suggest that women fail to take credit for their successful outcomes and are more prone to attribute their results to luck more than men (Deaux and Farris, 1977; Stipek and Gralinski, 1991). In Study 3, we were interested in understanding how men and women explain their expected results in self and other-tournaments. To measure that, at the end of the experiment, after subjects learned their score in each round, we asked them to what extent they think their result is due to controllable (i.e., effort) versus uncontrollable (i.e., chance and difficulty) factors.

On average, self-tournaments are perceived as more controllable than other-tournaments. If the task is a self-tournament round, both genders believe that the results are primarily due to controllable factors at similar rates. However, when the task is an other-tournament round, subjects think that their results are attributable to relatively more uncontrollable factors.[28] On a 10-point scale, the mean rating of controllability in self-tournaments is 7.44 (SE=0.09), and the corresponding figure is 6.20 (SE=0.10) in other-tournaments (p=0.000 with t-test for the differences in mean values). In other-tournaments, men and women differ in their perceptions of controllability, with men attributing their results more to controllable factors. Men think that their results are due to controllable factors, and women believe that their result is due to uncontrollable factors

[28] This is an intuitive finding since other-tournaments involve some uncontrollable and luck-dependent features. One example is that it is uncertain with whom a participant will be matched and how well that individual performs in such a task.

(p=0.068 with t-test). Whereas in self-tournaments, both genders perceive the situation more controllable and the gender gap disappears (p=0.900 with t-test). These findings are summarized in Table 20.

Table 20 Causal Attributions in Self- and Other-tournaments

	Women	Men	Total	p-values for gender diff.
Other-tournament	6.05 (0.13)	6.40 (0.14)	6.20 (0.10)	p=0.068
Self-tournament	7.45 (0.12)	7.43 (0.13)	7.44 (0.09)	p=0.900

Notes: Standard errors in parentheses. Attribution is measured by the following scale 1: Due to factors I could not control, 10: Due to factors I could control.

We believe that these results can partly explain two main findings. Firstly, the fact that men regard tournaments (marginally) significantly more controllable than women when competing against others but not against self can explain the findings in Studies 1 and 2. If women perceive other-tournaments less controllable than and self-tournaments as equally controllable as men, this can partly account for why we observe a gender difference in the willingness to compete against others but not against self. We reserve an investigation of the role of controllability on tournament entry for future research. Secondly, the perceived controllability of self-tournaments can partly explain why self-competitions are preferred overall by the participants in Study 3. We discuss that this can be due to subjects' preferences for being in control as previous findings suggest individuals have a preference for being in control of situations (Langer, 1975; Greenberg et al., 2004).

6. Conclusion

We run three experiments to investigate men's and women's willingness to select into and preferences for other- and self-competitions. Other-competition is a tournament payment scheme that involves competing against other individuals' performance and is most commonly studied in the literature. Self-competition is an alternative type of tournament, which involves competition against one's own past performance. Using one laboratory and two online studies, involving almost a total of 2,000 participants, we show that men and women are equally willing to compete with themselves and that both genders prefer self-competition to other-competition when they can choose the type of competition.

Study 1 is a lab experiment investigating the willingness to compete with self and others. Study 2 is an online experiment aimed to replicate Study 1 in an online labor market, further testing the underlying mechanisms. Study 3 is an online experimental extension investigating the preferences for different competition modes.

Findings from Study 1 show that while women are less willing than equally able men to compete with other people, there is no gender difference in the willingness to compete with one's own, previous performance. Results from Study 2 confirm these findings with an online experiment. Findings from Study 3 illustrate that both men and women prefer self-competitions to competitions against other individuals, especially when they are forced to compete but can choose how. Additionally, when self-competition is available as a compensation scheme choice along with other-competition and piece rate, more people choose to compete, which increases productivity. Moreover,

we document that confidence, risk preferences, and causal attributions can explain why there exists a gender difference in willingness to compete against others but not against self.

Overall, the findings from these three studies indicate that self-competitions can be used as alternative incentive schemes to attract more women in competitive environments. As opposed to affirmative action policies aiming to close the gender competitiveness gap by favoring a specific gender, the fact that both men and women prefer self- to other-competitions at equal rates can also mean that self-competitions are liked equally by men and women. We, therefore, suggest that incentive contracts that adopt self-tournaments rather than/or along with other-tournaments can help reduce the gender disparities in economic and labor market outcomes while avoiding concerns about favoring a specific gender.

APPENDICES

I provide two appendices. In Appendix A, I provide the experimental instructions for the three studies in Chapter 1. In Appendix B, I provide experimental instructions for the three studies in Chapter 2.

APPENDIX A: EXPERIMENTAL INSTRUCTIONS OF CHAPTER 1

Appendix A.1: Experimental Instructions of Study 1 – Lab Experiment on Hiring

A.1.1. Experimental Instructions (Firms)

Welcome

Welcome to the experiment. The experiment is now beginning. Please silence and put away your electronic devices. No communication is allowed during this experiment. If you have questions at any point in this experiment, please raise your hand and an experimenter will come by and answer your question privately.

This is an experiment about decision making. You have already earned $5 for showing up on time. You may earn more depending on your decision and the decisions made by the other participants. You will be paid privately in cash when the experiment is over.

The experiment is conducted anonymously and decisions you make will never be linked to your identity. There are several parts in the experiment and instructions will be given at the beginning of each part.

Please press OK to proceed.

The Rules for Part 1

In the first part of the experiment, you are asked to calculate the sum of five randomly chosen two-digit numbers.

You will be given 5 minutes to do a series of these problems. You are not allowed to use a calculator to determine the sum. However you are welcome to write the numbers down and make use of the provided scratch paper. You submit an answer by clicking the OK button with your mouse.

You get $0.20 per problem you solve correctly in the 5 minutes. Your profit does not decrease if you provide an incorrect answer to a problem. Also your performance in this part will have no impact on the following parts of the experiment.

Part 2 – New Rules!

In this part of the experiment, you are in the role of a Firm. You will now hire a worker. There are several workers and you will decide to hire one of them. The workers performed in the task you just completed for four rounds.

The hired worker's performance will determine your earnings from this second part of the experiment. However, your hiring decision will not affect the workers' payments.

On the next screen you will see detailed instructions for Part 2. Please keep in mind that there will be a quiz afterwards about the instructions for Part 2. Please pay attention to the instructions!

Please press OK for more detailed instructions about part 2.

Part 2 – Hiring Decision!

The workers performed the in task for four rounds with different payment schemes. The workers performed in the task once under the Piece Rate payment scheme, once under the Other-tournament payment scheme and once under the Self-tournament payment scheme. The Piece rate task paid 1 dollar per correctly solved problem.

In the Other-tournament task, each worker competed against another worker and tried to beat their performance. The worker was paid 2 dollars per correct answer only if s/he could beat the other worker's score, and 0 dollar if s/he could not beat the other person's score.

In the Self-tournament task, each worker competed against their own previous performance and tried to beat their own previous score. The worker was paid 2 dollars per correct answer only if s/he could beat his/her own previous score, and 0 dollar if s/he could not beat his/her own previous score.

Before the task in round 4 started, the workers got to choose how they wanted to get paid in round 4. They could choose one of these three previous payment schemes to be applied to their round 4 performance. That is, they could choose among the piece rate payment scheme, self-tournament payment scheme or other-tournament payment scheme.

If they choose the Piece Rate, they received 1 dollar per problem they solved correctly.

If they chose the Other-tournament Rate, the worker competed against another worker's performance in the previous Other-tournament task. If the worker correctly solved more problems than the other worker did in the previous task (Other-tournament), s/he received double the profit from the piece rate. That means they got 2 dollars per problem they solved correctly. The worker received no earning from round 4 if s/he chose the other-tournament rate and could not solve more problems correctly than the other worker did in the previous other-tournament task.

If they chose the Self-tournament Rate, the worker competed against his/her own performance in the previous Self-tournament task. If the worker correctly solved more problems than s/he did in the previous task (Self-tournament), s/he received double the profit from the piece rate. That means they got 2 dollars per problem they solved correctly. The worker received no earnings from round 4 if s/he chose the self-tournament rate and could not solve more problems correctly than they solved in the previous self-tournament task.

You will soon see three workers and you will hire one of them. The hired worker's performance will determine your payoff from this part of the experiment. However, the payoff of the workers will not be impacted by your hiring decision.

The workers are similar in many characteristics, except for their choices in round 4. Each of them picked a different payment scheme in round 4. In round 4, one of them picked the Piece rate, the other picked Self-tournament rate and the last one picked Other-

tournament rate. You will learn which payment scheme the workers chose, but will not learn about their actual performance.

We ask you to hire one of these workers. Your payoff in this part of the experiment will be determined by the hired worker's performance in round 4. For each problem that the worker correctly answered in round 4, you will receive 1 dollar.
Please press OK to proceed.

Quiz
We will now make sure that everyone has understood the instructions for part 2.
Please answer the questions on the screen. If you need help, please raise your hand.
When you have finished answering, please press "I understand".
If any of your answers are incorrect, the program will tell you so and you get to answer that questions again.
After everyone has finished answering, you will see three workers and will decide to hire one of them.
1. For how many rounds did the workers perform in the task?
2. In round 4, how many different payment schemes were available for workers to choose?
3. If the worker chose Self-tournament rate in round 4, then this means:
    a) s/he did not compete against anyone
    b) s/he competed against his/her own previous score
    c) s/he competed against another worker's score
    d) s/he did not perform in the task
4. If the worker chose Other-tournament rate in round 4, then this means:
    a) s/he competed against another worker's score
    b) s/he did not perform in the task
    c) s/he competed against his/her own previous score
    d) s/he did not compete against anyone
5. If the worker chose Piece Rate in round 4, then this means:
    a) s/he competed against his/her own previous score
    b) s/he did not perform in the task
    c) s/he did not compete against anyone
    d) s/he competed against another worker's score

6. Out of all the rounds that the worker performed, which round's performance determines your profit? (Please enter an integer)

Hiring Screen
[The phrases that will vary with treatment are denoted with a "/"]
The workers you can hire are either Worker 1, Worker 2 or Worker 3. The workers are similar in many aspects. They are all --male/female/NA for the neutral treatment--, a student at GMU and within the ages 18 and 28. The only difference between them is that each picked a different payment scheme in their round 4 choices. In round 4, one of them

competed against herself, one competed against another individual, and one chose not to compete. Below, you can see which person chose which payment scheme. Please indicate which worker you would like to hire.
Remember: hired worker's round 4 performance will determine your payoff in this part of the experiment. For each problem that the worker correctly answered in round 4, you will receive 1 dollar.
Please indicate which worker you would like to hire.

Part 3
Part 2 is now finished. Before the experiment ends, you now have a final chance to earn additional money.
In this part we want you to make some guesses. For each correct guess you will receive an additional earning of 50 cents.
- How many problems do you think you solved correctly in part 1?
- How many problems do you think that the worker you hired solved correctly in part 1?

Questionnaire
The experiment is now finished. While we prepare your payments, please answer a few questions.
When somebody completes a task there are some things they CAN control (such as how much effort they put in) and some things that they CANNOT control (such as who they happen to be matched to, or how difficult a particular problem is).

We are interested in learning to what extent you think that the hired worker's performance in the tournaments was mainly due to things that they COULD control (such as their effort) and to what extent you think it was due to things that they COULD NOT control (such as who they were matched to, or how difficult a particular problem was).
- Do you think that the worker you hired won or lost in the tournament against others?
- Do you think the worker you hired won/lost in the tournament against others because of controllable or uncontrollable factors?
- Do you think that the worker you hired won or lost in the tournament against himself/herself?
- Do you think the worker you hired won/lost in the tournament against himself/herself because of controllable or uncontrollable factors?
-[For the neutral treatment only] What do you think is the gender of the worker you hired?
-Are you a student?
-Have you ever participated an ICES experiment before?
-Please indicate your gender?
-What is your age?
-How do you see yourself: Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks?
- Have you ever been interviewed for a full-time job?
- Have you ever received a job offer?

- Have you ever evaluated an applicant for a job or been involved in a hiring process?
- Do you have any experience with conducting an interviewed with an applicant for a position?
- Would you consider yourself as a competitive individual?
- To what extent are you a self competitive person (i.e. a person who likes to challenge themself)?
- To what extent are you an other competitive person (i.e. a person who likes to challenge other people)?
- To what extent do you refrain from competitions?
-What is your major in college?
-How often do you participate in competitive sports and activities?
-How competitive is your workplace and/or school?
-How much are you exposed to the competitive environments overall?
-Please specify your ethnicity:
-Was there any part of the experiment that confused you? Please explain.
-Do you have any other comments?

A.1.2. Experimental Instructions (Workers)

Welcome
Welcome to the experiment. The experiment is now beginning. Please silence and put away your electronic devices. No communication is allowed during this experiment. If you have questions at any point in this experiment, please raise your hand and an experimenter will come by and answer your question privately.
This is an experiment about decision making. You have already earned $5 for showing up on time. You may earn more depending on your decision and the decisions made by the other participants. You will be paid privately in cash when the experiment is over.
The experiment is conducted anonymously and decisions you make will never be linked to your identity. There are several parts in the experiment and instructions will be given at the beginning of each part.
Please press OK to proceed.

General Instructions
In this experiment you will be asked to complete four different tasks. None of these will take more than 5 minutes.
At the end of the experiment we will randomly select one of the tasks. This is the task that will be relevant for your profit. Once you have completed the four tasks we determine which task counts for your profit by randomly drawing a number between 1 and 4.
The method we use to determine your earnings varies across tasks. Before each task we will describe in detail how your payment is determined.

Task 1 Instructions

For Task 1, you will be asked to calculate the sum of five randomly chosen two-digit numbers.
You will be given 5 minutes to do a series of these problems. You are not allowed to use a calculator to determine the sum. However you are welcome to write the numbers down and make use of the provided scratch paper. You submit an answer by clicking the OK button with your mouse.
If Task 1 is the one randomly selected for your profit, then you get 1 dollar per problem you solve correctly in the 5 minutes. Your profit does not decrease if you provide an incorrect answer to a problem. We refer to this task as the Piece Rate task.
If you have any questions before we begin, please raise your hand.
The time is up.
Please remain silent and wait until the next task starts. Do not communicate with any of the other players.

Task 2 Instructions
As in Task 1 you will be given 5 minutes to calculate the correct sum of a series of five 2-digit numbers.
However for Task 2, your payment depends on your performance relative to that of another participant who is here right now, and who has been put in a group together with you. Each group consists of two randomly grouped people.
If Task 2 is the one randomly selected for payment, then your profit depends on the number of problems you solve compared to the other person in your group. The individual who solves the most problems correctly will receive 2 dollars for every problem he or she solved correctly, while the other participant receives no profit. If there is a tie the payment will be split between the two of you.
We refer to this as the Other-Tournament Task. You will not be informed of how you did in the tournament until the end of the experiment.
If you have any questions before we begin, please raise your hand.

The time is up.
Please remain silent and wait until the next task starts. Do not communicate with any of the other players.

Task 3 Instructions
As in the previous two tasks you will be given 5 minutes to calculate the correct sum of a series of five 2-digit numbers. However for Task 3, your payment depends on your performance relative to your own performance in Task 1.

If Task 3 is the one randomly selected for payment, then your profit depends on the number of problems you solve in Task 3 compared to the number of problems you solved in Task 1. If you solve more problems correctly than you did in Task 1, you will receive 2 dollars for every correct answer you give in Task 3. Otherwise, you will receive no profit from Task 3. If there is a tie with your previous Task 1 score, then you will receive 1 dollar for every correct answer in Task 3.

We refer to this as the Self-Tournament Task. You will not be informed of how you did in the tournament until the end of the experiment.
The time is up.
Please remain silent and wait until the next task starts. Do not communicate with any of the other players.

Task 4 Instructions
As in the previous three tasks you will be given 5 minutes to calculate the correct sum of a series of five 2-digit numbers. However you will now get to choose which of the three previous payment schemes you prefer to apply to your performance on the fourth task.
If Task 4 is the one randomly selected for profit, then your earnings for this task are determined as follows.
If you choose the Piece Rate, you will receive 1 dollar per problem you solve correctly.
If you choose the Other-Tournament Rate, your performance will be evaluated relative to the performance of the other participant in your group in the task 2 (Other-Tournament). If you correctly solve more problems than s/he did during task 2, you will receive double the profit from the piece rate. That means you will get 2 dollars per problem you solve correctly. You will receive no earnings for this task if you choose the other-tournament rate and do not solve more problems correctly now, than the other person in your group did during task 2.
If you choose the Self-Tournament Rate, your performance will be evaluated relative to your own performance in task 3 (Self-Tournament). If you correctly solve more problems now than you did during task 3, then you receive double the profit from the piece rate. That means that you will get 2 dollars per problem you solve correctly. You will receive no earnings for this task if you choose the self-tournament and do not solve more problems correctly now, than you did during Task 3.

The next screen will ask you to choose whether you want the Piece Rate, Self-Tournament Rate or Other-Tournament Rate applied to your performance in task 4. You will then be given 5 minutes to calculate the correct sum of a series of five randomly chosen two-digit numbers in the same way as before.

Now click to continue to get started with task 4.

Task 4 Payment Scheme Choice:
Which compensation scheme do you prefer for Task 4?
The time is up.
Please remain silent and wait until the next task starts. Do not communicate with any of the other players.
Task 4 is now finished. Before the experiment ends, you now have a final chance to earn additional money.
In this part we want you to make some guesses. For each correct guess you will receive an additional earning of 50 cents.

Remember that you have completed four tasks in total. In this part, please guess how many problems that you think you and the person you are matched to solved correctly in the first task.
In Task 1- Piece Rate, how many problems do you think that you solved correctly? (enter an integer value with a maximum of 15)
In Task 1- Piece Rate, how many problems do you think that the person you are matched to solved correctly?

End of Experiment Questionanire
The experiment is now finished. While we prepare your payments, please answer a few questions.

- Are you a student?
- Have you ever participated an ICES experiment before?
- Please indicate your gender?
- What is your age?
- How do you see yourself: Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks?
- What is your major in college?
- How often do you participate in competitive sports and activities?
- How competitive is your workplace and/or school?
- How much are you exposed to the competitive environments overall?
- Please specify your ethnicity:
- Was there any part of the experiment that confused you? Please explain.
- Do you have any other comments?

A. 1. 3. Worker Images in the Hiring Stage

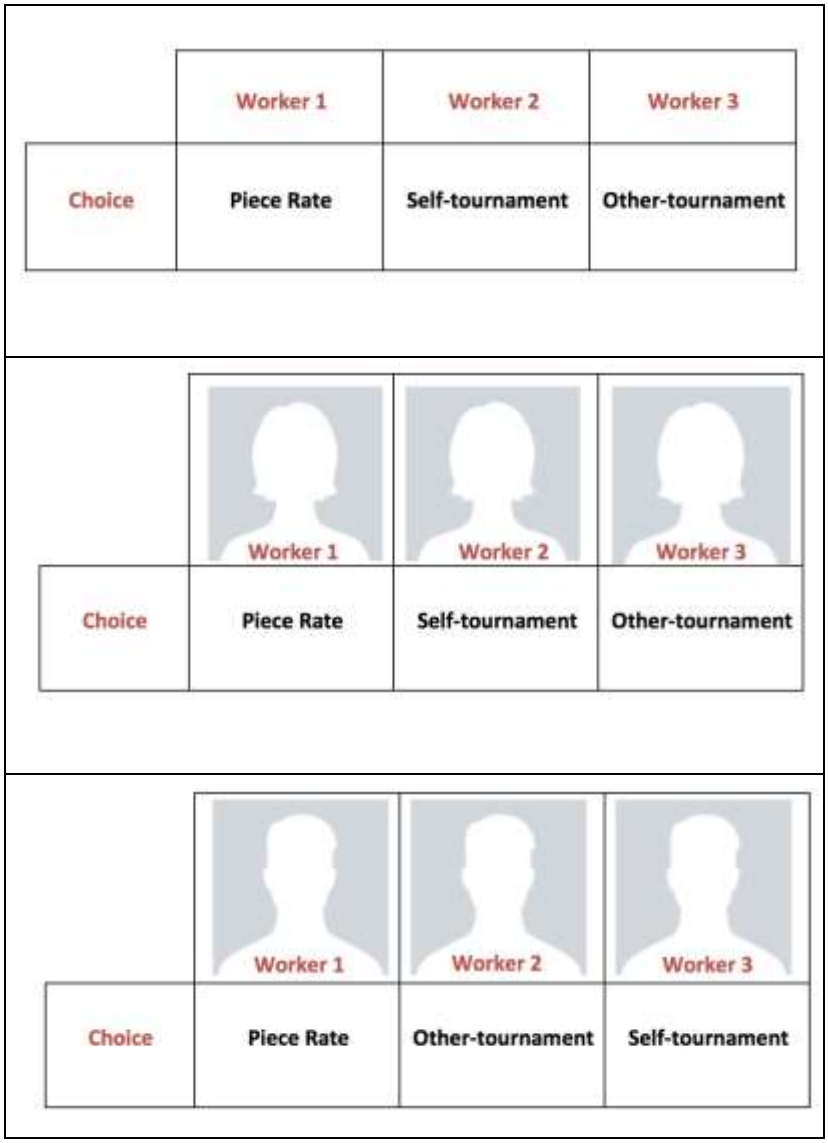

Figure A.1 Worker Images

Appendix A.2: Experimental Instructions of Study 2 – Online Experiment on Advice Giving

Intro:
You will receive $0.20 for completing the HIT. In addition to that, you can earn a bonus of up to $0.30 based on your decisions. The additional money will be paid to you as a bonus through Amazon Mturk in the next few business days.
We will now go through the instructions. Please read them carefully. You are only eligible for payment if you adhere to the instructions.
As established researchers and long-term Requesters on Amazon MTurk, we promise that the information in this survey is truthful and accurate and we always send you the money you earn in the survey. If you have any questions about this research, please feel free to email us at xxx@gmail.com.
Please press the NEXT button to proceed.

Advice
Imagine that a friend of yours, *"Daniel/James/John/Jennifer/Jessica/Sarah*," is interested in a job posting and will apply for it. The job he is interested in involves working alone and taking independent actions/ working in teams and taking actions with the group. *"Daniel/James/John/Jennifer/Jessica/Sarah"* s background is aligned with the position. However, s/he is looking for advice about how to shape the paragraph s/he is writing related to his taste for competitions in his/her cover letter.
"Daniel/James/John/Jennifer/Jessica/Sarah" enjoys running and is a member of a running club. Sometimes s/he competes with his previous performance, sometimes competes with the other runners and sometimes does not compete either with his/her previous performance or with the other runners. His/her athletic preferences are also reflected in his/her professional life. In the workplace, s/he sometimes competes with how s/he has performed before, sometimes competes with his/her colleagues' performance, and sometimes avoids comparisons.

Which of those three competitive aspects would you recommend *"Daniel/James/John/Jennifer/Jessica/Sarah* "to mention in his/her cover letter? Please pick an option below to complete the following paragraph:

"I enjoy running on a regular basis and am a member of a running club. While running, I try to run fast. Moreover, I take pride in...

- ...challenging myself to perform better than I have done previously. In my professional life, I am also a productive person, and I try to improve my own performance compared to how I have performed before."
- ...challenging other runners and to try to perform better than they do. In my professional life, I am also a productive person, and I try to perform better than my colleagues do."

- ...not being overly competitive and not comparing my performance with others, or with how I have performed previously. In my professional life, I am also a productive person, and I avoid comparing my performance."

[Subjects rated a second cover letter which belonged to another candidate of the opposite sex]

Your answers have been recorded. Before the study finishes, you now have a final chance to earn an additional Bonus!

Guess
In this part, we want you to make guesses. There are many other participants who participated in the same study as you. We want you to guess what the majority of these participants could have suggested to *"Daniel/James/John/Jennifer/Jessica/Sarah*," and *"Daniel/James/John/Jennifer/Jessica/Sarah*," to include in their cover letters. If you correctly guess what others have suggested, you will receive a bonus of $0.15 for each correct guess.

Please press NEXT to proceed.
How do you think the rest of the participants recommended *"Daniel/James/John/Jennifer/Jessica/Sarah*," to complete the following paragraph?

"I enjoy running on a regular basis and am a member of a running club. While running, I try to run fast. Moreover, I take pride in…

End of Experiment Questionnaire
The experiment is now finished. Please answer the following questions. You will then see the completion code on the last screen.

Please indicate your gender.

What was your total income last year? Take into account all your sources of income, including scholarships, health benefits, fringe benefits, and others. Please note that this is your personal income, not the income of your household.

What is your highest level of education completed?
What was/is your major in college/graduate school?
Have you ever been interviewed for a full-time job?
Have you ever received a full-time job offer?
Have you ever evaluated an applicant for a job?
Do you have any experience with conducting an interview with an applicant for a job?
How do you see yourself: Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks?

Do you consider yourself a "self-competitive" person (i.e. a person who is committed to challenging own performance over time)? Please rate on a scale of 1 to 10
Do you consider yourself an "other-competitive" person (i.e. a person who is committed to challenging other people's performance)? Please rate on a scale of 1 to 10
How often do you participate in competitive sports and activities?
How competitive is your workplace and/or school?
How much are you exposed to the competitive environments overall?

Thank you for your participation!
We will calculate and pay bonuses within the next few days.

Appendix A.3: Experimental Instructions of Study 3 – Online Experiment on Candidate Evaluation

You will receive $0.20 for completing the HIT. In addition to that, you can earn a bonus of up to $0.60 based on your decisions. The additional money will be paid to you as a bonus through Amazon Mturk in the next few business days. We will now go through the instructions. Please read them carefully. You are only eligible for payment if you adhere to the instructions. As established researchers and long-term Requesters on Amazon MTurk, we promise that the information in this survey is truthful and accurate and we always send you the money you earn in the survey. If you have any questions about this research, please feel free to email us at xxx@gmail.com.

Please click NEXT to proceed.

Cover Letter Evaluation
In this study, we ask you to evaluate hypothetical cover letters.

There are several candidates. Each candidate's background is very similar and are aligned with the position. The job that the candidates are applying for involves working alone and taking independent actions/ working in teams and taking actions with the group.

You will rate a total of two (2) cover letters. You will rate each cover letter based on their employability and other social characteristics on a scale from 1 to 10.

Some parts of the cover letters will be blurred out. For each cover letter, please carefully read the paragraph that is unblurred.

The cover letters look similar, but there will be some variation in the information provided in them. **To ensure a higher Bonus payment, please pay close attention to each cover letter!**

Depending on your internet speed, it may take a few seconds until the cover letters appear

on your screen. If you do not see a cover letter on your screen, **please wait for a few seconds** until the cover letter appears.

Please press NEXT to start evaluating the first cover letter.

[The first cover letter is displayed]

Regarding employment, on a scale from 1 to 10...

	Extremely unlikely (1)	……..	Extremely likely (10)
What do you think is the likelihood of the candidate getting invited for an interview?			
What do you think is the likelihood of the candidate being hired for the position?			
If the candidate is hired, how likely do you think it is that they will be promoted to an upper level position within a year?			

Regarding the social aspects, on a scale from 1 to 10...

	Not at all (1)	……..	Extremely (10)
How enjoyable do you think it would be to work with this candidate?			
How easy do you think it would be to collaborate with this candidate?			
How productive do you think this candidate would be in the workplace?			
If the candidate would work under you, how interested would you be in hiring this individual?			
If the candidate would work with you as a co-worker, how interested would you be in hiring this individual?			

Predicting an Expert Opinion (now you can earn an additional Bonus!):

Please reconsider the cover letter you just read. Now, we would like you to **guess** how an HR Advisor at a large US university have rated it!

Based on how close your guesses are to the HR Advisor's ratings, you can earn an extra bonus. For each guess that is exactly same with the HR Advisor's ratings, you will receive an additional bonus of 10 cents. If your guess is off by one, you will receive 5

cents. If your guess is off by more than one, you will not earn any bonus for that question.

REMEMBER: The closer your guesses are to the HR Advisor's, the higher is your Bonus!

On a scale from 1 to 10, how do you think the **HR Advisor** rated this cover letter based on:

	Extremely unlikely (1)	……	Extremely likely (10)
...the likelihood of the candidate getting invited for an interview			
...the likelihood of the candidate being hired for the position			
...the likelihood of the candidate getting a promotion to an upper level position within a year			

End of Experiment Questionnaire

The experiment is now finished. Please answer the following questions. You will then see the completion code on the last screen.

[The questionnaire is identical to the Study 2- Advice-giving.]

APPENDIX B: EXPERIMENTAL INSTRUCTIONS OF CHAPTER 2

Appendix B.1: Experimental Instructions of Study 1 – Lab Experiment on Willingness to Compete

Welcome
Hi and welcome! In this experiment you will be asked to complete different tasks.
Please press OK to get started with the experiment.

General Instructions
In this experiment you will be asked to complete three different tasks. None of these will take more than 5 minutes.
At the end of the experiment we will randomly select one of the tasks. This is the task that will be relevant for your profit. Once you have completed the three tasks we determine which task counts for your profit by randomly drawing a number between 1 and 3.
The method we use to determine your earnings varies across tasks. Before each task we will describe in detail how your payment is determined.

Rules for Task 1
For Task 1 you will be asked to calculate the sum of five randomly chosen two-digit numbers.
You will be given 5 minutes to do a series of these problems. You are not allowed to use a calculator to determine the sum. However you are welcome to write the numbers down and make use of the provided scratch paper. You submit an answer by clicking the OK button with your mouse.
If Task 1 is the one randomly selected for your profit, then you get 1 dollar per problem you solve correctly in the 5 minutes. Your profit does not decrease if you provide an incorrect answer to a problem. We refer to this task as the Piece Rate task.
If you have any questions before we begin, please raise your hand.

Rules for Task 2 – *Other treatment*
As in Task 1 you will be given 5 minutes to calculate the correct sum of a series of five 2-digit numbers.
However for Task 2 your payment depends on your performance relative to that of another participant who is here right now, and who has been put in a group together with you. Each group consists of two randomly grouped people.

If Task 2 is the one randomly selected for payment, then your profit depends on the number of problems you solve compared to the other person in your group. The individual who solves the most problems correctly will receive 2 dollars for every problem he or she solved correctly, while the other participant receives no profit. If there is a tie the payment will be split between the two of you.
We refer to this as the Tournament Task. You will not be informed of how you did in the tournament until the end of the experiment.
If you have any questions before we begin, please raise your hand.

Rules for Task 2 – *Self treatment*
As in Task 1 you will be given 5 minutes to calculate the correct sum of a series of five 2-digit numbers.
However for Task 2 your payment depends on your performance relative to your own performance in Task 1.
If Task 2 is the one randomly selected for payment, then your profit depends on the number of problems you solve in Task 2 compared to the number of problems you solved in Task 1. If you solve more problems correctly than you did in Task 1, you will receive 2 dollars for every correct answer you give in Task 2. Otherwise, you will receive no profit from Task 2. If there is a tie with your previous Task 1 score, then you will receive 1 dollar for every correct answer in Task 2.
We refer to this as the Tournament Task. You will not be informed of how you did in the tournament until the end of the experiment.
If you have any questions before we begin, please raise your hand.

Rules for Task 3 – *Other treatment*
As in the previous two tasks you will be given 5 minutes to calculate the correct sum of a series of five 2-digit numbers. However you will now get to choose which of the two previous payment schemes you prefer to apply to your performance on the third task.
If Task 3 is the one randomly selected for profit, then your earnings for this task are determined as follows. If you choose the Piece Rate, you receive 1 dollar per problem you solve correctly. If you choose the Tournament Rate, your performance will be evaluated relative to the performance of the other participant in your group in the Task 2-tournament. If you correctly solve more problems than s/he did during Task 2, then you receive two times the profit from the piece rate, which means you will get 2 dollars per problem you solve correctly. You will receive no earnings for this task if you choose the tournament and do not solve more problems correctly now, than the other person in your group did during Task 2.
The next screen will ask you to choose whether you want the piece rate or the tournament rate applied to your performance in Task 3. You will then be given 5 minutes to calculate the correct sum of a series of five randomly chosen two-digit numbers in the same way as before.
If you have any questions before we begin, please raise your hand.

Rules for Task 3 – *Self treatment*

As in the previous two tasks you will be given 5 minutes to calculate the correct sum of a series of five 2-digit numbers. However you will now get to choose which of the two previous payment schemes you prefer to apply to your performance on the third task.
If Task 3 is the one randomly selected for profit, then your earnings for this task are determined as follows. If you choose the Piece Rate, you receive 1 dollar per problem you solve correctly. If you choose the Tournament Rate, your performance will be evaluated relative to your own performance in the Task 2-tournament. If you correctly solve more problems than you did during Task 2, then you receive two times the profit from the piece rate, which means you will get 2 dollars per problem you solve correctly. You will receive no earnings for this task if you choose the tournament and do not solve more problems correctly now, than you did during Task 2.
The next screen will ask you to choose whether you want the piece rate or the tournament rate applied to your performance in Task 3. You will then be given 5 minutes to calculate the correct sum of a series of five randomly chosen two-digit numbers in the same way as before.
If you have any questions before we begin, please raise your hand.

Task 3 Payment Scheme Choice:
Which compensation scheme do you prefer for Task 3?

Rank Guess
In this part we want you to make some guesses.
For each correct guess 1 dollar will be added to your profit from the experiment.
First we would like you to guess in which round your own performance was the best.

- I did more tasks correctly in Task 2 than I did in Task 1.
- I did more tasks correctly in Task 3 than I did in Task 2.

Now we would like you to guess how you performed compared to the other person in your group.

(***Self treatment***: Now we would like you to guess how you performed compared to a randomly chosen person in this room.)

- In Task 2, I did more tasks correctly than what the other person in my group did.

End of Experiment Questionnaire

- How do you see yourself: Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks?
- Do you consider yourself a "competitive" person? Please rate on a scale of 1 to 10
- Do you think men or women would do better in this addition task?
- Are you an undergraduate or graduate student?
- Have you seen math task in an ICES experiment before?
- Please indicate your gender.
- What is your age?

- What is your major?
- Please specify your ethnicity.
- Was there any part of the experiment that confused you? Please explain:
- Do you have any comments or other suggestions on today's experiment? Please explain.

Appendix B.2: Experimental Instructions of Study 2 – Online Experiment on Willingness to Compete

Thank you for participating in our study. We estimate that this study will take about 5-10 minutes to complete. After you have finished, you will receive a completion code. Please return to the HIT on MTurk and enter the completion code in the space provided, in order to receive your credit. You will receive $0.25 for completing the HIT. In addition to that, you can earn a bonus of up to $3.50 based on your, and others', performance. The additional money will be paid to you as a bonus through Amazon Mturk in the next few business days. We will now go through the instructions. Please read them carefully. You are only eligible for bonus payment if you adhere to the instructions. As established researchers and long-term Requesters on Amazon MTurk, we promise that the information in this survey is truthful and accurate. We never use deception: the decisions you make are real, any groups that you participate in is real and we always send you the money that you earn in your interactions with others in this HIT. If you have any questions about this research, please feel free to email us at xxx@gmail.com.

Before we move on, please answer the following demographic questions:

- What is your age (in years)?
- What is your ethnicity?
- What is your gender?
- What is your country of residence?
- Are you currently a student?

You will participate in an experiment. This experiment has many other participants in addition to you. Your payoffs will be paid to you as a bonus on Mturk and will depend on your performance and/or on the performance of others. In this experiment you will be asked to complete three tasks that will each take 90 seconds. At the end of the experiment we will randomly select one of the tasks. This is the task that will be relevant for your profit. We determine which task counts for your profit by randomly drawing a number between 1 and 3. The method used to determine your earnings varies across tasks. Before each task we will describe in detail how your payment is determined.

Rules for task 1

For task 1, you will be asked to solve a series of problems by counting the number of zeros (0) in tables consisting of zeros (0) and ones (1). You will be given 90 seconds to

count the zeros in as many tables as possible. After the 90 seconds are up you will automatically continue to the next page. That means that you do not need to keep time yourself, but can concentrate on solving the tables. If you solve all available tables before the time is up, please just wait for the survey to continue automatically. In task 1, you get 15 cents per table you solve correctly in the 90 seconds. Your profit does not decrease if you provide an incorrect answer to a table. We refer to this task as the Piece Rate task. Now click to continue to get started with task 1
This is task 1. Please count the number of 0s in each table below and provide the answer.

Rules for task 2 – *Self treatment*
As in task 1, you will be given 90 seconds to count the zeros in a series of tables with ones and zeros. However, for task 2 your payment depends on your performance relative to that of your own performance in task 1. In task 2, your profit depends on the number of tables you solve in task 2 compared to the number of tables you solved in task 1. If you solve more tables correctly now than you did in task 1, you will receive 30 cents for every correct answer you give in task 2. Otherwise you will receive no profit from task 2. If there is a tie with your previous task 1 score, you will receive 15 cents for every correct answer in task 2. We refer to this as the Tournament Task. You will not be informed of how you did in the tournament until you receive your bonus payment. Now click to continue to get started with task 2.

Rules for task 2 – *Other treatment*
As in task 1, you will be given 90 seconds to count the zeros in a series of tables with ones and zeros. However for task 2 your payment depends on your performance relative to that of another participant who is doing the same experiment with the same tables as you, and who has been put in a group together with you. Each group consists of two randomly grouped people. You will not be given any information about the other person in your group, and that person will not be given any information about you. In task 2, your profit depends on the number of tables you solve compared to the other person in your group. The individual who solves the most tables correctly will receive 30 cents for every table s/he solved correctly, while the other participant receives no profit. If there is a tie the payment will be split between the two of you. We refer to this as the Tournament Task. You will not be informed of how you did in the tournament until you receive your bonus payment. Now click to continue to get started with task 2.

Rules for task 2 – *Other Same Ability treatment*
As in task 1, you will be given 90 seconds to count the zeros in a series of tables with ones and zeros. However for task 2 your payment depends on your performance relative to that of another participant who is doing the same experiment with the same tables as you, and who has been put in a group together with you. Each group consists of two randomly grouped people. The only information that you will be given about the other person in your group is that your performance in task 1 was the same, that is you solved the same number of tables in task 1. This information is also given to the other person. In task 2, your profit depends on the number of tables you solve compared to the other

person in your group. The individual who solves the most tables correctly will receive 30 cents for every table s/he solved correctly, while the other participant receives no profit. If there is a tie the payment will be split between the two of you. We refer to this as the Tournament Task. You will not be informed of how you did in the tournament until you receive your bonus payment. Now click to continue to get started with task 2.

Rules for task 2 – *Other Same Gender treatment* (the information women/man and she/he is varied after the person's own gender)

As in task 1, you will be given 90 seconds to count the zeros in a series of tables with ones and zeros. However for task 2 your payment depends on your performance relative to that of another participant who is doing the same experiment with the same tables as you, and who has been put in a group together with you. Each group consists of two randomly grouped people. The only information that you will be given about the other person in your group is that she (he) is a woman (man). She (He) will get the same information about you. In task 2, your profit depends on the number of tables you solve compared to the other person in your group. The individual who solves the most tables correctly will receive 30 cents for every table s/he solved correctly, while the other participant receives no profit. If there is a tie the payment will be split between the two of you. We refer to this as the Tournament Task. You will not be informed of how you did in the tournament until you receive your bonus payment. Now click to continue to get started with task 2.

Rules for task 3 – *Self treatment*
As in the previous two tasks you will be given 90 seconds to count the zeros in a series of tables with ones and zeros. However, for task 3 you will get to choose which of the two previous payment schemes you prefer to apply to your performance on the third task. In task 3 your earnings are determined as follows: If you choose the Piece Rate, you receive 15 cents per table you solve correctly. If you choose the Tournament Rate, your performance will be evaluated relative to your own performance in task 2. If you correctly solve more tables now than you did during task 2, then you receive double the profit from the piece rate. That means that you will get 30 cents per table you solve correctly. You will receive no earnings for this task if you choose the tournament and do not solve more tables correctly now, than you did during Task 2. The next screen will ask you to choose whether you want the Piece Rate or the Tournament Rate applied to your performance in task 3. You will then be given 90 seconds to count the number of zeros in a series of tables with ones and zeroes, in the same way as before. Now click to continue.

Rules for task 3 – *Other treatments*
As in the previous two tasks you will be given 90 seconds to count the zeros in a series of tables with ones and zeros. However, for task 3 you will get to choose which of the two previous payment schemes you prefer to apply to your performance on the third task. In task 3 your earnings are determined as follows: If you choose the Piece Rate, you will receive 15 cents per table you solve correctly. If you choose the Tournament Rate, your

performance will be evaluated relative to the performance of the other participant in your group in the Task 2-tournament. If you correctly solve more tables than s/he did during Task 2, you will receive double the profit from the piece rate. That means you will get 30 cents per table you solve correctly. You will receive no earnings for this task if you choose the tournament rate and do not solve more tables correctly now, than the other person in your group did during Task 2. The next screen will ask you to choose whether you want the Piece Rate or the Tournament Rate applied to your performance in task 3. You will then be given 90 seconds to count the number of zeros in a series of tables with ones and zeroes, in the same way as before. Now click to continue.

Ranks Guess
In this part we want you to make some guesses. For each correct guess 0.1 dollar will be added to your profit from the experiment.

I did more tasks correctly in Task 2 than I did in Task 1:

I did more tasks correctly in Task 3 than I did in Task 2:

If my performance is compared to that of the person I was matched to (*for Self treatment:* that of a randomly chosen person who also participated in this experiment), I think that I did more tasks correctly in Task 2 than s/he did:

End of Experiment Questionnaire

- How do you see yourself: Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks?
- Do you think men or women generally do better in the "counting zeros"-task that you just did?
- The experiment is now finished. Please answer the following questions. You will then see the completion code on the screen.
- What was your total income last year? Take into account all your sources of income, including scholarships, health benefits, fringe benefits, and others. Please note that this is your personal income, not the income of your household.
- What is your highest level of education completed?
- What was/is your major in college/graduate school?
- Was anything unclear in the instructions or survey questions? (Optional)

Appendix B.3: Experimental Instructions of Study 3 – Online Experiment on Preferences for Competition Modes

Thank you for participating in our study. We estimate that this study will take about 15-20 minutes to complete. After you have finished, you will receive a completion code. Please return to the HIT on MTurk and enter the completion code in the space provided,

in order to receive your credit.
You will receive $0.25 for completing the HIT. In addition to that, you can earn a bonus of up to $5.00 based on your, and others' performance. The additional money will be paid to you as a bonus through Amazon Mturk in the next few business days. We will now go through the instructions. Please read them carefully. You are only eligible for bonus payment if you adhere to the instructions. As established researchers and long-term Requesters on Amazon MTurk, we promise that the information in this survey is truthful and accurate. We never use deception: the decisions you make are real, any group that you participate in is real and we always send you the money that you earn in your interactions with others in this HIT. If you have any questions about this research, please feel free to email us at xxx@gamil.com.

Before we move on, please answer the following demographic questions:

- What is your age (in years)?
- What is your ethnicity?
- What is your gender?
- What is your country of residence?
- Are you currently a student?

You will participate in an experiment. This experiment has many other participants in addition to you. Your payoffs will be paid to you as a bonus on Mturk and will depend on your performance and/or on the performance of others.

In this experiment you will be asked to complete four tasks that will each take 90 seconds.

At the end of the experiment we will randomly select one of the tasks. This is the task that will be relevant for your profit. We determine which task counts for your profit by randomly drawing a number between 1 and 4.

The method used to determine your earnings varies across tasks. Before each task we will describe in detail how your payment is determined.

Rules for task 1
For task 1, you will be asked to solve a series of problems by counting the number of zeros (0) in tables consisting of zeros (0) and ones (1). You will be given 90 seconds to count the zeros in as many tables as possible.

After the 90 seconds are up, you will automatically continue to the next page. That means that you do not need to keep time yourself, but can concentrate on solving the tables. If you solve all available tables before the time is up, please just wait for the survey to continue automatically.

In task 1, you get 15 cents per table you solve correctly in the 90 seconds. Your profit does not decrease if you provide an incorrect answer to a table. We refer to this task as the Piece Rate task.

Now click to continue to get started with task 1.

Rules for task 2
As in task 1, you will be given 90 seconds to count the zeros in a series of tables with ones and zeros.

However, for task 2 your payment depends on your performance relative to that of your own performance in task 1.

In task 2, your profit depends on the number of tables you solve in task 2 compared to the number of tables you solved in task 1. If you solve more tables correctly now than you did in task 1, you will receive 30 cents for every correct answer you give in task 2. Otherwise you will receive no profit from task 2. If there is a tie with your previous task 1 score, you will receive 15 cents for every correct answer in task 2.

We refer to this as the **Self-Tournament Task**. You will not be informed of how you did in the tournament until you receive your bonus payment.

Now click to continue to get started with task 2.

Rules for task 3
As in the previous two tasks you will be given 90 seconds to count the zeros in a series of tables with ones and zeros.

However for task 3 your payment depends on your performance relative to that of another participant who is doing the same experiment with the same tables as you, and who has been put in a group together with you. Each group consists of two randomly grouped people.

In task 3, your profit depends on the number of tables you solve compared to the other person in your group. The individual who solves the most tables correctly will receive 30 cents for every table s/he solved correctly, while the other participant receives no profit. If there is a tie the payment will be split between the two of you.

We refer to this as the **Other-Tournament Task**. You will not be informed of how you did in the tournament until you receive your bonus payment.

Now click to continue to get started with task 3.

Rules for task 4
As in the previous three tasks you will be given 90 seconds to count the zeros in a series of tables with ones and zeros.

However, for task 4 you will get to choose which of the three previous payment schemes you prefer to apply to your performance on the fourth task.

In task 4 your earnings are determined as follows:
[Treatments 1 and 3]: If you choose the **Piece Rate**, you will receive 15 cents per table you solve correctly.
[Treatments 1 and 2]: If you choose the **Self-Tournament Rate**, your performance will be evaluated relative to your own performance in task 2 (Self-Tournament). If you correctly solve more tables now than you did during task 2, then you receive double the profit from the piece rate. That means that you will get 30 cents per table you solve correctly. You will receive no earnings for this task if you choose the tournament and do not solve more tables correctly now, than you did during Task 2.
[Treatments 1, 2 and 3]: If you choose the **Other-Tournament Rate**, your performance will be evaluated relative to the performance of the other participant in your group in the task 3 (Other-Tournament). If you correctly solve more tables than s/he did during task 3, you will receive double the profit from the piece rate. That means you will get 30 cents per table you solve correctly. You will receive no earnings for this task if you choose the tournament rate and do not solve more tables correctly now, than the other person in your group did during task 3.

The next screen will ask you to choose whether you want the Piece Rate, Self-Tournament Rate or Other-Tournament Rate applied to your performance in task 4. You will then be given 90 seconds to count the number of zeros in a series of tables with ones and zeroes, in the same way as before.

Now click to continue to get started with task 4.
Which compensation scheme do you prefer for task 4?

Questionnaire

Task 4 is now finished. Before the survey ends, you now have a final chance to earn additional money.

Confidence
In this part we want you to make some guesses. Two guesses will be selected randomly and for each correct guess that is selected for payment, you will receive an extra bonus of 25 cents.

Remember that you have completed four tasks in total. In this part, please guess how many tables that you think you and the person you are matched to solved correctly in the first three tasks.

In Task 1- Piece Rate, how many tables do you think that **you** solved correctly? (enter an integer value with a maximum of 15)

In Task 1- Piece Rate, how many tables do you think that **the person you are matched to** solved correctly?

[Confidence questions were repeated for the first three tasks]

Risk
How do you see yourself: Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks?

Causal Attributions
When you complete a task there are some things you CAN control (such as how much effort you put in) and some things that you CANNOT control (such as who you happen to be matched to, or how difficult a particular problem is).

You will now be told how many tables you solved correctly in each of the four tasks.

Later, when you get the bonus payment, you will also learn whether you won or lost in the tournament rounds.

We are interested in learning to what extent you think that your performance in each of the four tasks was mainly due to things that you COULD control (such as your effort) and to what extent you think it was due to things that you COULD NOT control (such as who you were matched to, or how difficult a particular problem was).

Task 1 was the **Piece Rate task.**

Your Task 1 score was:

My result in Task 1...

…was only due to factors I COULD control (1) …was only due to factors I COULD NOT control (10)

[Attribution questions were repeated for all four tasks]

End of Experiment Questionnaire

- How do you see yourself: Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks?
- Do you think men or women generally do better in the "counting zeros"-task that you just did?
- The experiment is now finished. Please answer the following questions. You will then see the completion code on the screen.
- What was your total income last year? Take into account all your sources of income, including scholarships, health benefits, fringe benefits, and others. Please note that this is your personal income, not the income of your household.
- What is your highest level of education completed?
- What was/is your major in college/graduate school?
- Was anything unclear in the instructions or survey questions? (Optional)

REFERENCES

Akdeniz, C., & Stark, J. (2014). *The Self Improvement Book: A Guide Book for Success and Personal Development*. Createspace Publishing.

Allen, K., Bullough, S., Cole, D., Shibli, S., & Wilson, J. (2013). *The impact of engagement in sport on graduate employability*. British Universities and Colleges Sport.

Amir, O., Rand, D. G., & Gal, Y. K. (2012). Economic Games on the Internet: The Effect of $1 Stakes. *PLoS ONE*, *7*(2).

Apicella, C. L., & Dreber, A. (2015). Sex Differences in Competitiveness: Hunter-Gatherer Women and Girls Compete Less in Gender-Neutral and Male-Centric Tasks. *Adaptive Human Behavior and Physiology*, *1*(3), 247–269.

Apicella, C. L., Dreber, A., Gray, P. B., Hoffman, M., Little, A. C., & Campbell, B. C. (2011). Androgens and competitiveness in men. *Journal of Neuroscience, Psychology, and Economics*, *4*(1), 54–62.

Apicella, Coren L., Demiral, E. E., & Mollerstrom, J. (2017). No Gender Difference in Willingness to Compete When Competing against Self. *American Economic Review*, *107*(5), 136-40.

Apicella, C. L., Demiral, E. E., & Mollerstrom, J. (2020). Compete with others? No, thanks. With myself? Yes, please! *Economics Letters*, *187*, 108878.

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

Bertrand, M. (2018). Coase Lecture–The Glass Ceiling. *Economica, 85*(338), 205-231.

Blau, F. D., & Kahn, L. M. (2017). The gender wage gap: Extent, trends, and explanations. *Journal of Economic Literature, 55*(3), 789-865.

Bönte, W., Procher, V., & Urbig, D. (2017). Gender differences in selection into self-competition. *Applied Economics Letters*, *25*(8), 539–543.

Booth, A. & Nolen, P. (2012). Choosing to compete: How Different are Girls and Boys? *Journal of Economic Behavior & Organization, 81*(2), 542-555.

Borchardt, J. K. (2014). *Writing a Winning Cover Letter.* ScienceMag. http://www.sciencemag.org/careers/2014/08/writing-winning-cover-letter. Accessed 8 August 2019.

Bowles, H. R., Babcock, L., & Lai, L. (2007). Social incentives for gender differences in the propensity to initiate negotiations: Sometimes it does hurt to ask. *Organizational Behavior and Human Decision Processes, 103*(1), 84-103.

Brown, S. P., Cron, W. L., & Slocum, J. W. (1998). Effects of Trait Competitiveness and Perceived Intraorganizational Competition on Salesperson Goal Setting and Performance. *The Journal of Marketing, 62*(4), 88-98.

Burns, G. N., Christiansen, N. D., Morris, M. B., Periard D. A., & Coaster, J. A. (2014). Effects of applicant personality on resume evaluations. *Journal of Business and Psychology, 29*(4), 573-591.

Burow, N., Beblo, M., Beninger, D., & Schröder, M. (2017). Why Do Women Favor Same-Gender Competition? *DIW Berlin Discussion Paper No. 1662.*

Buser, T., Dreber, A., & Mollerstrom, J. (2017a). The Impact of Stress on Tournament Entry. *Experimental Economics, 20*(2), 506-530.

Buser, T., Ranehill, E., & van Veldhuizen, R. (2017b). Gender differences in willingness to compete: The role of public observability. *University of Zurich, Department of Economics, Working Paper 257.*

Buser, T., Niederle, M, & Oosterbeek, H. (2014). Gender, Competitiveness, and Career Choices. *The Quarterly Journal of Economics, 129*(3), 1409-1447.

Buser, T., Peter, N., & Wolter, S. C. (2017c). Gender, Competitiveness, and Study Choices in High School: Evidence from Switzerland. *American Economic Review, 107*(5), 125-130.

Buser, T. (2012). The Impact of the Menstrual Cycle and Hormonal Contraceptives on Competitiveness. *Journal of Economic Behavior & Organization, 83*(1), 1-10.

Cardenas, J., Dreber, A., Von Essen, E., & Ranehill, E. (2012). Gender Differences in Competitiveness and Risk Taking: Comparing Children in Colombia and Sweden. *Journal of Economic Behavior & Organization, 83*(1), 11-23.

Carpenter, J., Frank, R., & Huet-Vaughn, E. (2018). Gender differences in interpersonal and intrapersonal competitive behavior. *Journal of Behavioral and Experimental Economics, 77*, 170-176.

Cassar, A., Wordofa, F., & Zhang, Y. J. (2016). Competing for the Benefit of Offspring Eliminates the Gender Gap in Competitiveness. *Proceedings of the National Academy of Sciences, 113*(19), 5201-5205.

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

Deaux, K., & Farris, E. (1977). Attributing Causes for One's Own Performance: The Effects of Sex, Norms, and Outcome. *Journal of Research in Personality, 11*(1), 59-72.

Ertac, S., & Szentes, B. (2011). The Effect of Performance Feedback on Gender Differences in Competitiveness: Experimental Evidence. *Koc University Working Paper*.

Fischbacher, U. (2007). z-Tree: Zurich Toolbox for Ready-made Economic Experiments. *Experimental Economics, 10*(2), 171-178.

Flory, J., Leibbrandt, A., & List, J.A. (2015). Do Competitive Workplaces Deter Female Workers? A Large-scale Natural Field Experiment on Job Entry Decisions. *The Review of Economic Studies, 82*(1), 122-155.

Gillen, B., Snowberg, E., & Yariv, L. (2015). Experimenting with Measurement Error: Techniques with Applications to the Caltech Cohort Study. *National Bureau of Economic Research Working Paper No. 21517.*

Gneezy, U., & Rustichini, A. (2004). Gender and Competition at a Young Age. *American Economic Review, 94*(2), 377-381.

Gneezy, U., Niederle, M., & Rustichini, A. (2003). Performance in competitive environments: Gender differences. *The Quarterly Journal of Economics, 118*(3), 1049-1074.

Gould, J. (2014). *Make your Cover Letter and CV Stand Out.* Nature Jobs blog. http://blogs.nature.com/naturejobs/2014/02/28/make-your-cover-letter-and-cv-stand-out/. Accessed 8 August 2019.

Greenberg, J., Koole, S. L., & Pyszczynski, T. A. (2004). *Handbook of Experimental Existential Psychology*. The Guilford Press.

Griffin-Pierson, S. (1990). The Competitiveness Questionnaire: A Measure of Two Components of Competitiveness. *Measurement and Evaluation in Counseling and Development, 23*(3), 108-115.

Grosse, N. D., & Riener, G. (2010). Explaining Gender Differences in Competitiveness: Gender-task Stereotypes. *Jena Economic Research Papers 017.*

Gupta, N. D., Poulsen, A., & Villeval, M. (2013). Gender Matching and Competitiveness: Experimental Evidence. *Economic Inquiry, 51*(1), 816-835.

Harvard Business Review. (2016). *HBR Guide to Delivering Effective Feedback*, Harvard Business Press.

Hauser, D. J., & Schwarz, N. (2016). Attentive Turkers: MTurk Participants Perform Better on Online Attention Checks than Do Subject Pool Participants. *Behavior Research Methods, 48*(1), 400-407.

Healy, A., & Pate, J. (2011). Can Teams Help to Close the Gender Competition Gap? *The Economic Journal, 121*(555), 1192-1204.

Hoffman, M., & Gneezy, U. (2010). Left Handed Women are more Competitive than Right Handed Men: On the Biological Basis of Gender Differences in Competitiveness. *University of California San Diego Working paper.*

Horton, J. J., Rand, D. G., & Zeckhauser, R. J. (2011). The Online Laboratory: Conducting Experiments in a Real Labor Market. *Experimental Economics, 14*(3), 399-425.

Howe, L. A. (2008). On Competing Against Oneself, Or 'I Need to Get a Different Voice in My Head'. *Sports Ethics and Philosophy, 2*(3), 353-366.

Hunt, J. M., & Weintraub, J. R. (2016). *The Coaching Manager: Developing Top Talent in Business.* Sage Publishing.

Kayhan, E. (2003). Two facets of competitiveness and their influence on psychological adjustment. *Illinois Wesleyan University: Honors Projects.*

Kessel, D., Mollerstrom, J., & van Veldhuizen, R. (2019). Can Simple Advice Eliminate the Gender Gap in Willingness to Compete? *Working Paper.*

Khachatryan, K., Dreber, A., Von Essen, E., & Ranehill, E. (2015). Gender and preferences at a young age: Evidence from Armenia. *Journal of Economic Behavior & Organization, 118*(8), 318-332.

Khadjavi, M., & Nicklisch, A. (2015). Parents' Ambitions and Children's Competitiveness. *Working Paper*.

Kinash, S., Crane, L., Judd, M., Knight, C., McLean, M., Mitchell, K., & Dowling, D. (2015). Case studies to enhance graduate employability: Competitive sports, athletes and employability. *Australian Government Office for Learning and Teaching*.

Klinowski, D. (2019). Selection into self-improvement and competition pay: Gender, stereotypes, and earnings volatility. *Journal of Economic Behavior & Organization, 158*, 128-146.

Knouse, S. B., Giacalone, R. A., & Pollard, H. (1988). Impression management in the resume and its cover letter. *Journal of Business and Psychology, 3*(2), 242-249.

Langer, E. J. (1975). The Illusion of Control. *Journal of Personality and Social Psychology, 32*(2), 311-328.

Locke, E. A. (1968). Toward a Theory of Task Motivation and Incentives. *Organizational Behavior and Human Performance, 3*(2), 157-189.

Menesini, E., Fulvio, T., & Annalaura, N. (2018). The competitive attitude scale (CAS): a multidimensional measure of competitiveness in adolescence." *Journal of Psychology and Clinical Psychiatry, 9*(3), 240–244.

Moore, D. A., & Healy, P. J. (2008). The Trouble with Overconfidence. *Psychological Review, 115*(2), 502-517.

Niederle, M. (2015). Gender. In J. H. Kagel, and A. E. Roth (Ed.), *The Handbook of Experimental Economics: Volume 2* (pp. 481-546). Princeton University Press.

Niederle, M., & Vesterlund, L. (2007). Do Women Shy Away from Competition? Do Men Compete too much? *The Quarterly Journal of Economics, 122*(3), 1067-1101.

Niederle, M., & Vesterlund, L. (2011). Gender and Competition. *Annual Review Economics, 3*(1), 601-630.

Niederle, M., Segal, C., & Vesterlund, L. (2013). How Costly is Diversity? Affirmative Action in Light of Gender Differences in Competitiveness *Management Science, 59*(1), 1-16.

Orosz, G., Tóth-Király, I., Büki, N., Ivaskevics, K., Bőthe, B., & Fülöp, M. (2018). The Four Faces of Competition: The Development of the Multidimensional Competitive Orientation Inventory. *Frontiers in psychology, 9*, 779.

Petrie, R., & Segal, C. (2015). Gender Differences in Competitiveness: The Role of Prizes. *Working Paper.*

Reuben, E., Sapienza, P., & Zingales, L. (2015). Taste for Competition and the Gender Gap among Young Business Professionals. *National Bureau of Economic Research Working Paper 21695.*

Rudman, L. A., & Phelan, J. E. (2008). Backlash effects for disconfirming gender stereotypes in organizations. *Research in Organizational Behavior, 28*, 61-79.

Saville, B. K. (2009). Performance under Competitive and Self-Competitive Fixed-Interval Schedules of Reinforcement. *Psychological Record, 59*(1), 21-38.

Schelling, T. C. (1968). The life you save may be your own. *Problems in public expenditure*, 127-162.

Shurchkov, O., & van Geen, A. (2019). Why Female Decision-Makers Shy away from Promoting Competition. *Kyklos, 72*(2), 297-331.

Stipek, D. J., & Gralinski, J. H. (1991). Gender Differences in Children's Achievement-related Beliefs and Emotional Responses to Success and Failure in Mathematics. *Journal of Educational Psychology, 83*(3), 361-371.

Sutter, M., & Glätzle-Rützler, D. (2014). Gender Differences in the Willingness to Compete Emerge Early in Life and Persist. *Management Science, 61*(10), 2339-2354.

Thoms, P., McMasters, R., Roberts, M. R., & Dombkowski, D. A. (1999). Resume characteristics as predictors of an invitation to interview. *Journal of Business and Psychology, 13*(3), 339-356.

Trope, Y., & Liberman, N. (2010). Construal-level theory of psychological distance. *Psychological review, 117*(2), 440.

Valian, V. (1999). *Why So Slow? The Advancement of Women*. MIT Press.

van Veldhuizen, R. (2017). Gender Differences in Tournament Choices: Risk Preferences, Overconfidence or Competitiveness? *WZB Discussion Paper SP II 2016–207.*

Wozniak, D., Harbaugh, W. T., & Mayr, U. (2014). The Menstrual Cycle and Performance Feedback Alter Gender Differences in Competitive Choices. *Journal of Labor Economics*, *32*(1), 161-198.

Zhang, Y. J. (2013). Can Experimental Economics Explain Competitive Behavior Outside the Lab? *Working Paper*.

Zhi-Hong, C. (2014). Learning Preferences and Motivation of Different Ability Students for Social-Competition or Self-Competition. *Journal of Educational Technology & Society*, *17*(1), 283-293.

BIOGRAPHY

Elif E. Demiral Saglam was born in Izmir, Turkey. She received her Bachelor of Science degree both from Istanbul Bilgi University and the University of London in 2013.