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Gender Differences in Competitiveness: The Role of Social Incentives

Abstract

The provision of social incentives in the workplace, where performance benefits a charitable cause, has been frequently used in modern organizations. In this paper, we quantify the impact of social incentives on performance under two incentive schemes: piece rate and a winner-take-all tournament. We introduce social incentives by informing individuals that 50% of their performance earnings will be donated to a charity of their own choice. Our findings indicate that, in the presence of social incentives, women increase their performance by approximately 23% and 27% in the piece rate and tournament payment schemes, respectively. These effects are sizable and significant. Despite the fact that women also become more confident when social incentives are used, their willingness to compete is not affected due to their general lack of willingness to take financial risks.

JEL-Codes: C920, D640, J160, J200.

Keywords: social incentives, task performance, piece rate, tournament, competitiveness, gender differences.

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1 Introduction

Modern organizations employ a broad range of incentive schemes in order to promote employee performance and career prospects (see Prendergast (1999)). Traditionally, these incentive plans rely on extrinsic rewards (see, for example, Lazear (2000) on piece-rates and Harbring & Irlenbusch (2003) on tournaments). While tying performance to pay might have positive effects in raising productivity, there is evidence that financial incentives are not always an ideal motivator and can sometimes backfire (e.g., Deci (1971); Ariely et al. (2009); Gneezy et al. (2011)). This suggests that self-benefiting monetary incentives may not be the optimal approach to motivate individuals to increase their productivity. It is therefore important to uncover mechanisms that can potentially motivate workers. One such mechanism is to incorporate social incentives. Corporate social responsibility activities constitutes a widely used strategy that incorporate social incentives in modern corporations. In 2017, more than 90% of the 250 largest companies in the world reported on their corporate responsibility activities (KPMG, 2017). Being socially responsible, firms adopt policies which have a positive impact on social and environmental indicators. For example, firms can adopt proactive management strategies that promote the protection of the environment, minimize the use of resources that generate negative externalities to others and/or encourage employees' pro-social acts by linking their performance to philanthropic activities. The focus of our paper is on this latter form of corporate social responsibility techniques by measuring the impact of social incentives under two commonly implemented incentive

schemes (i.e. piece-rate and tournament) in workplace environments. We examine the impact of social incentives on two key measures of workplace behavior: performance in a real-effort task and willingness to compete. To address our research questions, we exploit the advantages of the experimental methodology which allows us to causally identify the effects of social incentives on both of our measures of interest.

We are particularly interested in the differential effects that social incentives may have on men and women. Our study is motivated by existing research showing that women are more sensitive to cues of the decision-making environment in which they interact and typically have been found to be more pro-social than men (for an overview, see Croson & Gneezy (2009)). This idea is also supported by an evolutionary psychology framework suggesting that given men and women have different biological characteristics, they may have developed different approaches to adapt to social environments and their behavior may not be necessarily the same when confronted with socially motivated incentive mechanisms (Hrdy, 1981; Cosmides & Tooby, 1997; Hrdy, 1999; Cassar & Rigdon, 2021a). We hypothesize that social incentives are more likely to enhance women's productivity due to their inclination to be more socially responsible. We expect that this will be the case both under piece rate and tournament incentives when these are exogenously assigned to them. However, when it comes to the endogenous selection of these two schemes, there are two opposing factors that might affect their choices. Higher performance may boost women's confidence about their own capabilities and thus may make them more willing to select the tournament incentive. On the other hand, women are typically more risk averse compared to men and may be discouraged from selecting to compete with others, especially because their decision to do so will also affect the payoff of a third party, a charitable cause. Combined with the observation that women are more pro-social than men, women may prefer to opt for the safer outcome of the piece rate incentive which yields a sure income for themselves

and for the charity. If this mechanism is at work, we expect that social incentives will not have any impact on women's willingness to compete. Understanding which of these two opposing factors — confidence vs. risk aversion — dominate in an environment characterized by socially-oriented incentives is an open empirical question which our experiment addresses.

We contribute to a growing experimental literature examining the impact of social incentives on workers' productivity when performance benefits a charitable cause. Most of the existing literature looks at behavior in piece rate incentive schemes. For example, Tonin and Vlassopoulos (2010, 2015) conduct experiments and compare the role of financial and social incentives when subjects are paid varying levels of piece rates and report that workers' productivity is enhanced when the social incentives are implemented. In terms of performance effects between men and women, Tonin & Vlassopoulos (2010) report significant gender effects where women are more productive than men in the pro-social treatments; however, no such gender effects are reported in Tonin & Vlassopoulos (2015). Imas (2014) also finds positive performance effects in the presence of social incentives when the piece rate is low. Increasing the piece rate payment does not affect task performance. Overall, no gender effects are reported in this study. Charness et al. (2016) analyses similar incentive schemes and finds that, when the piece rate is low, workers exerted higher effort when the money was donated to a charity instead of being paid directly to them. In the presence of social incentives, a higher piece rate does not affect workers' performance. In relation to gender, no significant productivity differences are found. Overall, the existing evidence paints an overall mixed picture with the examined socially-oriented incentive mechanisms yielding differential gender effects.

In contrast, the literature on how social incentives work under tournament schemes when performance is linked to charitable giving is scant. This is surprising given that

the use of tournament incentives plays a significant role in motivating employees' performance. An exception is Cassar & Rigdon (2021a) who examine how introducing a social option, where the winner of a tournament can share part of their earnings with the loser, affects performance in a winner-take-all incentive scheme. Their findings show that the gender gap in performance closes once their sharing option is available. This social option also encourages women to enter the tournament at a significantly higher rate than the standard winner-take-all tournament (Cassar & Rigdon, 2021b). A crucial difference in our experiment is that our socially-oriented incentive ties subjects' performance with donations to an external charity. This rules out strategic consideration effects stemming from the interaction between the available sharing option and subjects' play in the game, but also charitable contributions resemble naturally occurring environments where firms implement corporate social responsibility initiatives benefitting a charitable cause.

Further, our study advances the existing literature of social incentives through charitable contributions by measuring employees' willingness to compete. The decision whether to enter a tournament or not is a key behavioral indicator that has been shown to predict individuals' career decisions and labor market outcomes (e.g., Buser et al. (2014)). A robust finding from this literature is that women shy away from competition against men (for an overview, see Niederle & Vesterlund (2011)), indicating that gender is a crucial aspect that needs to be taken into account when workplace relationships are examined. The potential effects of social incentives on tastes for competition between men and women is unclear as confidence and risk aversion may counteract each other neutralizing any positive effects that social incentives can induce on women's performance.

To test our hypotheses, we adopt a standard experimental framework that allows us to control for within-subject differences (Niederle & Vesterlund, 2007). Our design

consists of three treatments: Baseline (NSI-High), Social Incentive (SI), and Double Baseline (NSI-Low). In all treatments, subjects performed a real-effort task, consisting of rearranging pairs of letters to form a correct word. Each treatment had three rounds. In the Baseline, there are no social incentives. In Round 1, subjects were each paid £0.40 per correct answer (piece rate incentive). In Round 2, subjects were paired with one other subject and the top performer was paid £0.80 per correct answer and the lowest performer received £0 (tournament incentive). In Round 3, subjects selected whether they would like to get paid based on the piece rate incentive or the tournament incentive. Subjects' choices in the third round provides us with a simple measure of their willingness to compete. To understand how a social incentive interacts in this setting, our main treatment, Social Incentive, informs subjects that 50% of their earnings from the task performance will be donated to a charity of their own choice. This essentially implies that the piece rate in the presence of social incentives is reduced by half. To allow for a comparison of the impact of social incentives, we include a third treatment, Double Baseline, where there are no social incentives and subjects get paid £0.20 per correct answer in the piece rate stage and £0.40 per correct answer in the tournament stage if they win the tournament.

The impact of social incentives on women's performance is striking: women increase their performance by 23% and 27% under the piece rate and the tournament incentive, respectively. Women also become more confident about how they rank in their group. Men, on the other hand, decrease their performance in the presence of social incentives.

When it comes to their willingness to compete, we find that in the Baseline there are no gender differences in terms of tournament entry. This is in line with previous studies that have examined gender differences in competitiveness using a verbal task (e.g., Grosse & Riener (2010); Shurchkov (2012); Dreber et al. (2014)). Despite the fact that women are more confident when they are faced with social incentives, we

observe that their willingness to enter the tournament remains unaffected. This lack of treatment effect appears to be driven by women being less willing to take (financial) risks, in general, which prevents them from selecting the competitive environment.

Our findings have potential implications for remuneration policies and the labor market. We emphasize the crucial role that the social incentives can play in shifting behavior as a potential source for workers' motivation in modern organizations. Importantly, we show that socially-oriented incentives have beneficial effects on women's productivity suggesting that these should be targeted at women rather than men. In contrast, introducing social incentives may backfire when workers are men. Consequently, our experiment offers evidence that the introduction of social incentives works better for those individuals characterized by pro-social inclinations like women as previous evidence suggests. Despite the positive effects of social incentives on women's productivity and on raising their confidence, the lack of significant effects on tournament entry due to their reluctance to take financial risk suggests that firms may want to adopt policies that encourage women to take more financial risks in the workplace.

Our paper is organized as follows. Section 2 outlines the experimental design and procedures. Section 3 presents the experimental results and Section 4 concludes.

2 Experimental design

To analyze the impact of social incentives on subjects' performance and their subsequent willingness to compete, we design an experiment that consists of three treatments: Baseline, Social Incentive, and Double Baseline. Across treatments, we employ a between-subjects design. Our Baseline treatment adopts a similar design to the one introduced by Niederle & Vesterlund (2007). Subjects had to perform a real-effort task across three different rounds in a given treatment.

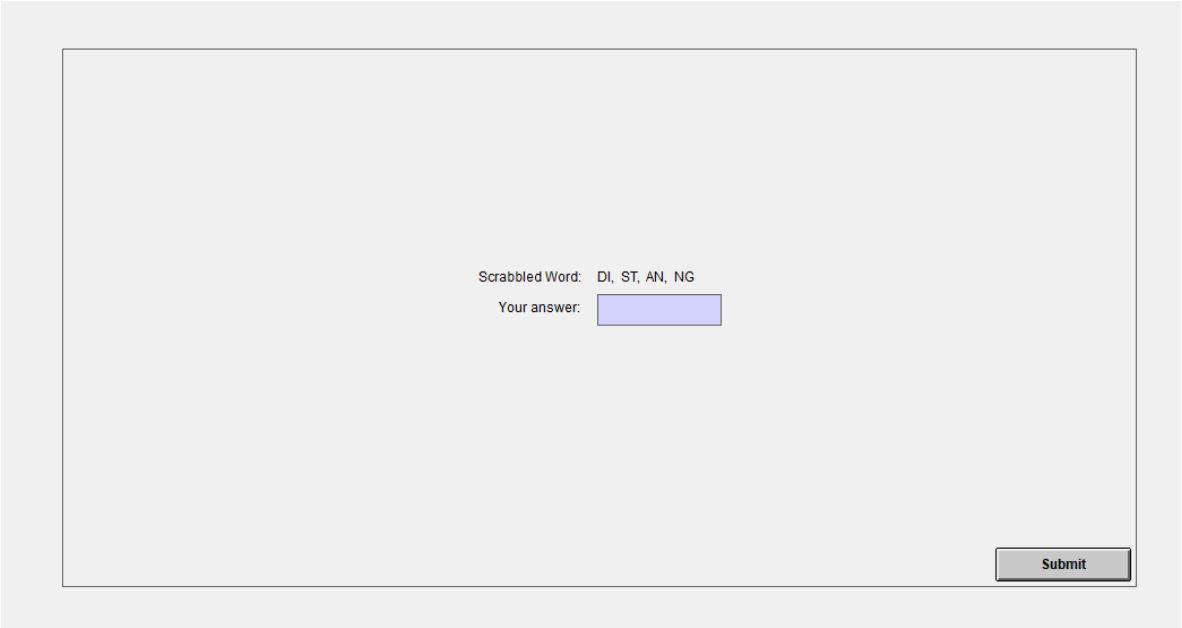

Figure 1: Example screenshot for the word task

2.1 Real-effort task

In all three rounds, subjects had to perform a word task. Each subject had to arrange four pairs of letters to form a word. Subjects were told that they have to use all pairs of letters to form the correct word and can rearrange the order of the pairs, but not the order of the letters within each pair. If a submitted answer is not correct, the pairs of letters change and a different set of pairs appears next. Subjects could type in their answer and click an 'OK' button to submit their answer. After each submission, subjects were shown the next four pairs of letters to rearrange. Subjects were provided with a sheet of paper and a pen, but no other form of help was available to them. Figure 1 provides an example screenshot of subjects' computer interface for the word task.

2.2 Baseline treatment

Our Baseline treatment is a similar experimental design to that employed by Niederle & Vesterlund (2007). In our experiment, subjects were paired with another subject and performed the word task across three separate rounds. Each round lasted for three minutes and differed with respect to how subjects' payment was determined in each round. At the end of the experiment, one of the three rounds was selected at random for payment and each round was equally likely to be selected. The structure of each round is detailed as follows:

Round 1 (Piece rate): In this round, subjects received £0.40 for each correct answer provided in the word task. In the piece rate round, there was no winner and each subject's performance did not affect the earnings of the other subject in the pair as each subject was compensated according to their own individual performance.

Round 2 (Tournament): In this round, the subject who provided the highest number of correct answers in a pair was the winner of the tournament who received £0.80 for each correctly solved problem in the word task. The other subject in the pair, who lost the tournament, received £0. In the case of ties between the two subjects in the pair, the winner of the tournament was randomly chosen.

Round 3 (Piece rate vs. Tournament): Prior to the three-minute period, subjects were asked to decide whether they wanted to get paid according to a piece rate (as in Round 1) or a tournament (as in Round 2) compensation scheme. The compensation choice made in Round 3 represents subjects' willingness to compete. In the case that subjects selected the piece rate, they got paid based on their own performance in Round 3 and received £0.40 for each correct answer in the word task. In the case that subjects selected the tournament, their Round 3 performance was compared to the number of correct answers their counterpart in the pair had provided in Round 2. If subjects answered correctly more questions than their counterpart in Round 2, the corresponding

payment for the tournament was the same as in the Baseline, £0.80 for each correctly solved problem. If subjects answered fewer questions correctly than their competitor in Round 2, they received zero payment. In the case of ties, the subjects who selected the tournament in Round 3 received the tournament winnings with a 50% chance and received no payment with a 50% chance.

2.3 Experimental treatments

The main aim of our experiment is to assess the impact of social incentives on subjects' performance and subsequent willingness to compete. We examine behavior in three separate treatments. In our Baseline treatment, called NSI-High, where no social incentives are present, subjects get paid £0.40 per correct answer in the piece rate scheme. In our second treatment that introduces social incentives, called SI, subjects are told that 50% of their earnings will be donated to a charity of their own choice and the remaining 50% will be kept for themselves. This essentially implies that a subject's piece rate payment in the SI treatment equals £0.20 per correct answer (i.e. £0.40 $\times$ 50%). Consequently, by comparing the NSI-High with the SI treatment, any difference in observed behavior may be due to the presence of social incentives or the lower piece rate. For this reason, we include a third treatment in our experimental design, called NSI-Low. This treatment is identical to the NSI-High treatment with the only difference being that the piece rate payment was equal to £0.20. By comparing the NSI-High with the NSI-Low treatment, we can assess whether financial incentives — high vs. low piece rate — make any difference to the subjects' behavior. In the case of a lack of significant difference between these two treatments, we pool the two no social incentive treatments (NSI-High and NSI-Low) and compare them with the SI treatment. This will address our main research question pertaining to the impact of social incentives on individuals' performance and their willingness to compete.

At the end of the experiment, we also elicited beliefs about subjects' relative performance in Round 1 (piece rate) and Round 2 (tournament). Specifically, subjects indicated whether they think they ranked first or second relative to the other subjects' performance in their pair. The elicitation of relative ranking was incentivized: subjects could earn an extra £0.50 for accurate guesses (in each of the two questions). The responses to the ranking guess question is a measure for each subject's confidence regarding their relative perfromance.

To measure risk attitudes, we asked subjects questions adopted from German Socio-Economic Panel (SOEP) that indicate their willingness to take financial risks (Dohmen et al., 2011). Subjects answered the question 'How would you rate your willingness to take risks in financial matters?' on a scale from 0 ('risk averse') to 10 ('fully prepared to take risk'). In addition, we elicited more general risk attitudes (on the same $0--10$ scale): 'Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks?'.

2.4 Procedures

In total, 250 subjects participated in our experiment. Of these, 78 took part in the NSI-High treatment, 64 took part in the NSI-Low treatment, and 108 took part in the SI treatment. All subjects were recruited at the University of Birmingham, using the ORSEE software (Greiner, 2015). The vast majority of participants were undergraduate students from various academic fields. The experiment was conducted in the Birmingham Experimental Economics Laboratory. All treatments were computerized and programmed with the z-Tree software (Fischbacher, 2007). Sessions were conducted in Winter 2018 and Spring 2019. The full set of instructions used in the experiment is provided in Appendix B. Some of the instructions were also presented on the computer screen. Average earnings (including a show-up fee of £2.50) were £6.61 across

all treatments. Sessions lasted no more than 50 minutes.

3 Results

3.1 Does the level of the monetary incentive matter in the absence of social incentives?

First, we test whether the level of the financial incentive — high vs. low piece rate — makes any difference in subjects' behavior. To address this question, we compare behavior between the NSI-High and the NSI-Low treatments. This allows us to understand whether subjects' behavior differs depending on whether the piece rate payment is equal to £0.40 (NSI-High treatment) or £0.20 (NSI-Low treatment). We concentrate on our key measures of behavior: performance under piece rate and tournament schemes as well as willingness to compete. Table 1 presents six regression models. The dependent variable in Models 1-2 (3-4) correspond to subjects' piece rate (tournament) performance in Round 1 (Round 2), respectively. In Models 5-6, we consider whether subjects' willingness to compete differs between the NSI-High and the NSI-Low treatments. In particular, the dependent variable for the last two models, called "Tournament entry", is equal to 1 if a subject has selected the tournament scheme in Round 3 and 0 otherwise. This provides us with a simple measure of subjects' willingness to compete. In all models, treatment differences are captured by the treatment dummy called NSI-High which equals 1 for the NSI-High and 0 for the NSI-Low treatment. In Models 2, 4 and 6, we control for gender differences, captured by the dummy variable Female which equals 1 if a subject is Female and 0 otherwise. Our regression results are shown in Table 1.

Table 1 offers evidence that, in the absence of social incentives, subjects' perfor-

Table 1: High vs. low piece rates in the absence of social incentives

	Performance (piece rate)		Performance (tournament)		Tournament entry	
	(1)	(2)	(3)	(4)	(5)	(6)
NSI-High	1.22	1.12	0.88	0.76	-0.08	-0.11
	(0.83)	(0.83)	(0.99)	(0.97)	(0.21)	(0.21)
Female		-1.26		-1.54		-0.31
		(0.82)		(0.96)		(0.21)
Constant	7.14***	7.87***	9.83***	10.72***	-0.08	0.10
	(0.64)	(0.80)	(0.77)	(0.88)	(0.16)	(0.20)
N	142	142	142	142	142	142

Notes: OLS regressions for Models $(1-4)$ and Probit regressions for Models $(5-6)$. Robust standard errors are reported in parentheses. The dummy variable NSI-High equals 1 for the no social incentives treatment with high piece rate (£0.40 per correct answer) and 0 for the no social incentives treatment with low piece rate (£0.20 per correct answer). The dummy variable Female equals 1 if a subject is female and 0 otherwise.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

mance behavior under both the piece rate and tournament incentives is not significantly different between the NSI-High and 0 for the NSI-Low treatment. This indicates that when the piece rate was £0.20 and £0.40, subjects' performance was similar, as shown by the lack of statistical significance of the variable NSI-High. Our results are robust when we control for gender differences. We reach the same conclusion when we consider treatment differences in terms of willingness to compete. In particular, we find that the coefficient of the variable Tournament Entry is not statistically significant in either of the two regressions models (Models $5-6$).

Finding 1. In the absence of social incentives, subjects' performance and willingness to compete does not differ significantly between low and high piece rates.

3.2 The impact of social incentives on performance

Here, we address our main research questions. We first look at the impact of social incentives in terms of performance under the piece rate and tournament schemes. Given that in the absence of social incentives, the use of low and high piece rates makes little difference to behavior, we pool data for these two treatments (i.e. NSI-High and NSI-Low) and refer to them as the NSI treatment. To evaluate the impact of social incentives, we compare behavior between the NSI and SI treatment. This allows us to assess the effects that social incentives have on performance in piece rate (Round 1) and tournament (Round 2), which we discuss, in turn.

3.2.1 *Piece rate performance.*

Figure 2 demonstrates the distribution of correct answers in the word task under the piece rate payment by gender (Round 1). The top two panels show the distribution of performance in the NSI treatment (for men and women) and the bottom two panels present the same information in the SI treatment (for men and women). In NSI, we observe that the modal performance is 12 correct answers for men (13.64%) and either 4 or 8 correct answers for women (10.53%). When social incentives are introduced, we observe that subjects' maximum number of correct answers increases both for men and women. It is worth noting that the modal performance decreases for men, around 4, 6 or 7 correct answers (11.76%). For women, the modal performance corresponds to 5 correct answers (14.04%), but the second most frequently observed performance corresponds to 6 or 14 correct answers (10.53%).

Table 2 shows the average number of correct answers in the NSI and the SI treatments by gender. We find that men perform better than women (8.53 vs.7.18, respectively) in the NSI treatment compared to the SI treatment ($p = 0.069$). However, when social incentives are introduced, we observe a reversed pattern. Women increase their performance (7.18 vs. 8.82; $p = 0.052$); while, men's performance goes down

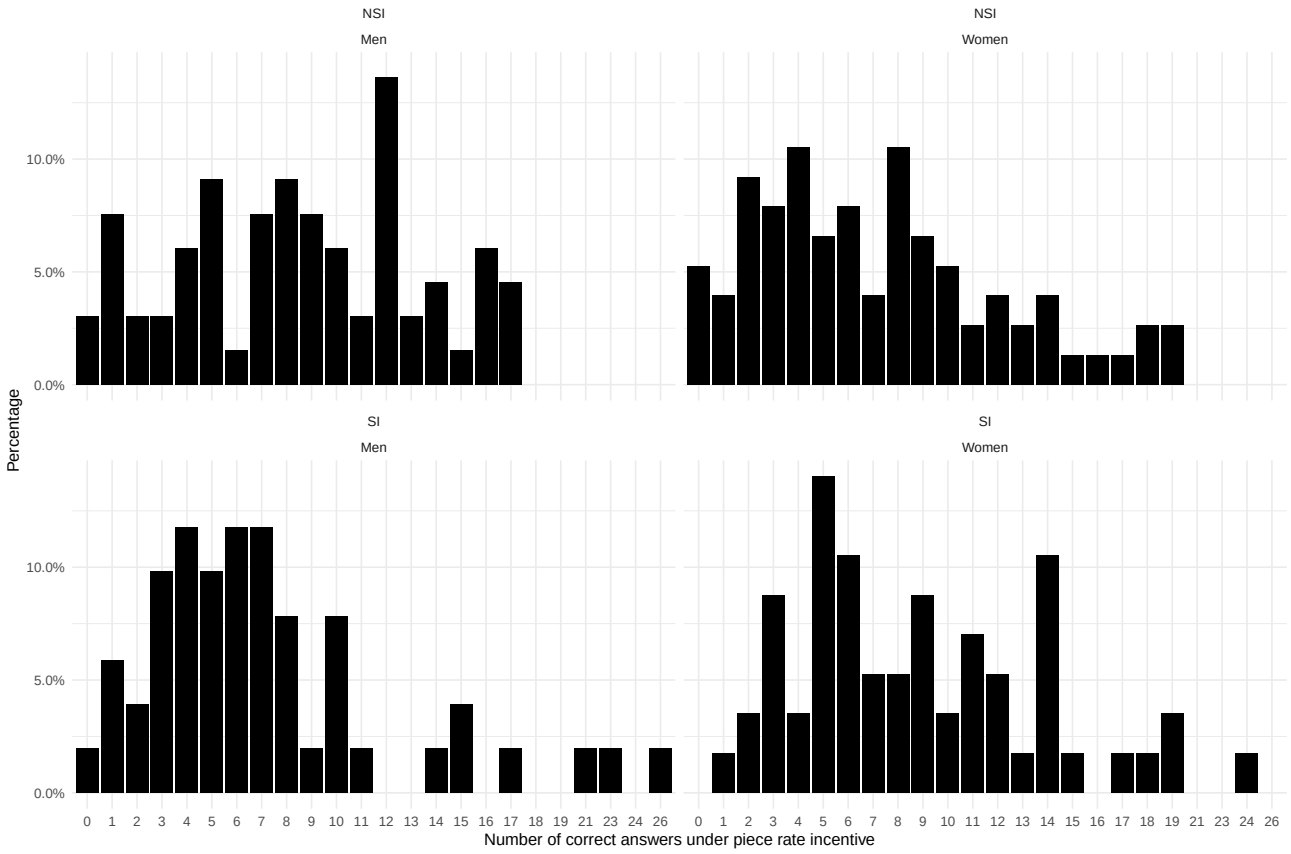

Figure 2: Distribution of performance across treatments by gender

Table 2: Performance in the piece rate scheme

Treatment	Men	Women	Men vs. Women (p-values)
NSI	8.53	7.18	$p = 0.069$
	(4.79)	(4.95)	
SI	7.29	8.82	$p = 0.052$
	(5.50)	(5.01)	
NSI vs. SI	$p = 0.045$	$p = 0.052$	

Notes: Numbers in parentheses indicate standard deviations. P-values from two-sided Wilcoxon ranksum tests are reported.

(8.53 vs. 7.29; $p = 0.045$). Taken together, when we compare gender differences in the presence of social incentives, women are more productive compared to men (8.82 vs. 7.29; $p = 0.052$).

Our findings from the non-parametric analysis are corroborated by our regression analysis shown in Table 3. We present two OLS models, in which the dependent variable is the number of correct answers provided by a subject in the piece rate scheme (Round 1). In Model (1), the independent variables consist of a treatment dummy, called SI, which equals 1 for the SI treatment and 0 otherwise; a gender dummy, called Female, which equals 1 for female subjects and 0 otherwise. Model (2) is augmented by adding an interaction term between the two dummy variables, called Female $\times$ SI.

Our regression analysis shows that both dummy variables, Female and SI, are not statistically significant in either Model 1 and 2. However, the coefficient of the interaction term is both positive and significant and the 5% level ($p = 0.028$). This indicates that the presence of social incentives causes females to become more productive, in line with our observation from the non-parametric analysis.

Finding 2. Under the piece rate scheme, introducing social incentives significantly improves women's performance.

3.2.2 *Tournament performance.*

Table 3: Performance differences in piece rate across treatments

	Performance (piece rate)	
SI	0.29	-1.24
	(0.65)	(0.97)
Female	-0.10	-1.35
	(0.64)	(0.82)
SI × Female		2.88**
		(1.30)
Constant	7.86***	8.53***
	(0.53)	(0.59)
N	250	250

Notes: OLS regressions. Robust standard errors are reported in parentheses. The dummy variable SI equals 1 for the social incentives treatment and 0 otherwise. The dummy variable Female equals 1 if a subject is female and 0 otherwise.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

We next turn to the effects of social incentives on tournament performance for men and women. Figure 3 presents the distributions of correct answers across treatments for men and women. The top two panels show the distribution of performance in the NSI treatment by gender and the bottom two panels present the same information in the SI treatment. In the NSI treatment, we observe that the modal performance is either 10 or 11 correct answers for men (10.61%) and 9 correct answers for women (13.16%). In addition, around 47% of men provide up to 10 correct answers while the corresponding percentage for women is equal to 68.42%. When social incentives are introduced, we observe that the modal performance decreases for men and becomes either 2 or 9 correct answers (11.76%). In contrast, women's modal performance increases to either 13 or 16 correct answers (8.77%). In the presence of social incentives, we also observe that the percentage of men providing up to 10 correct answers increases to approximately 57% and that of women decreases to approximately 42%.

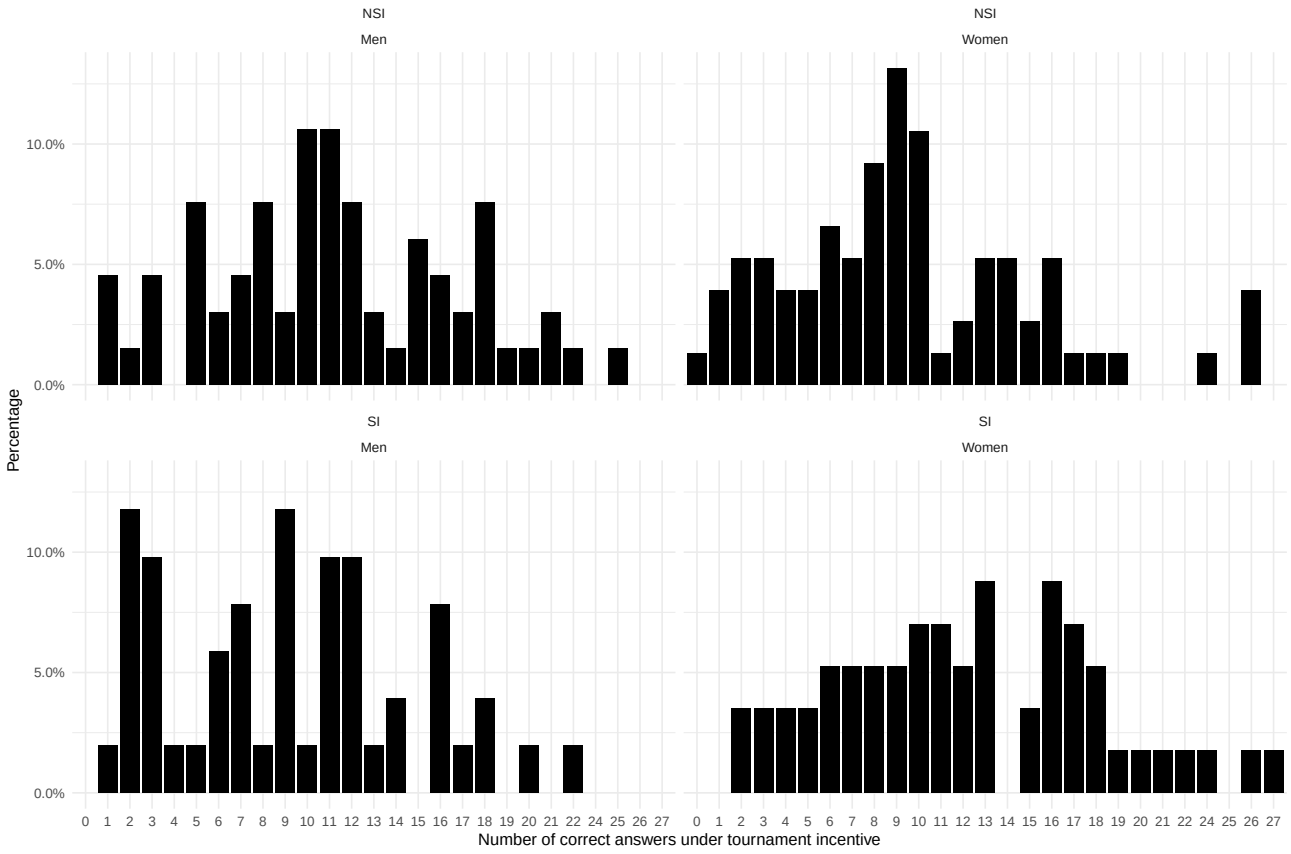

Figure 3: Distribution of tournament performance across treatments

Table 4: Performance in the tournament scheme

Treatment	Men	Women	Men vs. Women (p-values)
NSI	11.17	9.57	$p = 0.043$
	(5.61)	(5.86)	
SI	9.22	12.18	$p = 0.013$
	(5.41)	(6.03)	
NSI vs. SI	$p = 0.079$	$p = 0.008$	

Notes: Numbers in parentheses indicate standard deviations. P-values from two-sided Wilcoxon ranksum tests are reported.

The average number of correct answers in the NSI and the SI treatments by gender are shown in Table 4. Similar to our findings on piece rate performance, we find that men perform better than women (11.17 vs. 9.57, respectively) in the NSI treatment compared to the SI treatment ($p = 0.043$). When social incentives are introduced, we again observe a reversed pattern. Women increase their performance in the SI treatment (9.57 vs. 12.18; $p = 0.008$); while, men's performance goes down (11.17 vs. 9.22; $p = 0.079$). When we test for gender differences in the presence of social incentives, women become significantly more productive than men (9.22 vs. 12.18; $p = 0.013$).

In Table 5, we report the results of two OLS regression models in which the dependent variable is the number of correct answers provided in the tournament stage (Round 2). As independent variables, we include two dummy variables called Female and SI treatment (defined as described earlier) for Model 1. We augment this model by including the interaction term between the two dummies in Model 2.

In Model 1, we observe that neither of our two dummy variables are statistically significant at conventional levels. Turning to Model 2, we find that women are less productive compared to men in the absence of social incentives. In addition, we observe that the dummy variable SI treatment is negative and statistically significant at the 5% level ($p = 0.058$), implying that the introduction of social incentives has a negative

Table 5: Performance differences in tournament across treatments – regression results

	Performance (tournament)	
SI	0.371	-1.601
	(0.738)	(0.965)
Female	0.471	-1.951*
	(0.747)	(1.025)
SI × Female		4.561**
		(1.463)
Constant	10.111***	11.167***
	(0.620)	(0.691)
N	250	250

Notes: OLS regressions. Robust standard errors are reported in parentheses. The dummy variable SI equals 1 for the social incentives treatment and 0 otherwise. The dummy variable Female equals 1 if a subject is female and 0 otherwise.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

impact on men's performance. In contrast, the interacted term is positive and significant at the 1% level. By comparing the coefficients of SI treatment and the interaction term, we find that the introduction of social incentives improves women's performance ($p = 0.013$). Similarly, when comparing the coefficients of Female and the interaction term, we find that in the presence of social incentives, women are significantly more productive than men ($p = 0.008$). Overall, the main message from our analysis indicates that social incentives have a positive impact on women's productivity under tournament incentives.

Finding 3. Under the tournament scheme, introducing social incentives significantly improves women's performance under the tournament scheme.

3.3 The impact of social incentives on willingness to compete

Our previous analysis shows that the introduction of social incentives has beneficial effects on women's performance both under piece rate and tournament incentives. This is the case when subjects are exogenously assigned to these two schemes. It is natural to ask whether social incentives have any effect on their willingness to compete, as measured by tournament entry when they are given the opportunity to endogenously select either the piece rate or the tournament scheme. This is done in Round 3 of our experiment. Our main outcome variable in this section is Tournament Entry which equals 1 in case a subject has selected to get paid based on tournament incentives and 0 otherwise. In the absence of social incentives, we observe that 51.5% of men select to enter the tournament and 39.5% of women make the same selection (χ^2 test, $p = 0.150$). The introduction of social incentives makes little difference in both men's and women's decision to select the tournament option. Specifically, in the SI TREATMENT, 49% of men select to enter the tournament and 38.6% of women make the same selection (χ^2 test, $p = 0.275$). Taken together, we observe that subjects' willingness to compete is not affected by social incentives. The same conclusion is reached when we employ regression techniques which control for productivity differences as observed in Round 1 (piece rate) and Round 2 (tournament) of the experiment.

Table 6 presents three Probit regression models in which the dependent variable, called Tournament Entry, is binary taking the value of 1 if a subject selected the tournament option and 0 otherwise. In Model 1, we include three independent variables: Female, SI treatment and an interaction term between the two (Female $\times$ SI treatment). In Models 2 and 3, we control for performance differences in the previous rounds of the experiment (i.e., piece rate and tournament). Specifically, Model 2 further controls for the absolute performance in each of the two previous rounds and in Model 3, we include the difference in performance between the tournament and the piece rate round as a

Table 6: Performance differences in piece rate across treatments — regression results

	Tournament Entry		
SI	-0.063	0.026	-0.046
	(0.234)	(0.236)	(0.234)
Female	-0.305	-0.232	-0.299
	(0.213)	(0.216)	(0.213)
SI × Female	0.040	-0.173	-0.001
	(0.324)	(0.332)	(0.325)
Performance in piece rate		0.011	
		(0.021)	
Performance in tournament		0.038**	
		(0.019)	
Difference in Performance			0.223
			(0.018)
Constant	0.038	-0.488**	-0.022
	(0.155)	(0.228)	(0.162)
N	250	250	250

Notes: OLS regressions. Robust standard errors are reported in parentheses. The dummy variable SI equals 1 for the social incentives treatment and 0 otherwise. The dummy variable Female equals 1 if a subject is female and 0 otherwise.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

separate independent variable.

The main observation from Table 6 is that the coefficients of our main variables of interest (namely, Female, SI treatment and Female × SI treatment) are statistically insignificant across all specifications. In the absence of social incentives, we find that men and women are equally likely to enter the tournament. This result is in line with previous studies that have found no gender differences in competitiveness when a verbal task is used (e.g., Grosse and Riener, 2010; Shurchkov, 2013; Dreber, 2014). In addition, we find that the introduction of social incentives does not significantly affect tastes for

competition, ceteris paribus. The only coefficient that is statistically significant is performance in the tournament round, indicating that the higher the performance in the tournament, the more likely a subject is to enter the tournament in Round 3.

Finding 4. The presence of social incentives does not affect subjects' willingness to compete.

3.4 Why don't social incentives impact willingness to compete?

The focus of this section is to provide possible explanations for why the introduction of social incentives makes little difference in subjects' willingness to enter the tournament. We concentrate on two mechanisms that the previous literature has shown to play a key role in explaining tastes for competition: i) confidence and ii) risk aversion. First, we look at the role of confidence. We define Confidence as a subject's rank expectation in their group. Recall that at the end of each round we asked subjects to indicate what they think their rank is. The Confidence variable can take a value of either 1 (if a subject believes that s/he has ranked first) or 2 (if a subject believes that s/he has ranked second). Thus, higher values indicate lower confidence (i.e., subjects indicate that they expect to rank second in their group).

Table 7 reports two OLS regressions in which our measure of confidence is our dependent variable. Our main concern is with subjects' confidence in tournament (Round 2) which is likely to determine their willingness to compete. In Model 1, we include two dummy variables Female and SI treatment, while Model 2 also considers the interaction term between both dummy variables, Female $\times$ SI treatment.

In Model 1, we find that neither of the two dummy variables are statistically significant. When we control for the interaction variable, we find that the coefficient of Female

Table 7: Confidence in tournament stage — Regression results

	(1)	(2)
SI	-0.026	0.133
	(0.063)	(0.091)
Female	0.052	0.182**
	(0.062)	(0.082)
SI × Female		-0.299**
		(0.125)
Constant	1.387***	1.318
	(0.052)	(0.058)
N	250	250

Notes: OLS regressions. Robust standard errors are reported in parentheses. The dummy variable SI equals 1 for the social incentives treatment and 0 otherwise. The dummy variable Female equals 1 if a subject is female and 0 otherwise.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

is positive and significant at the 5% level, implying that women are less confident in the NSI treatment. In contrast, the sign of the interaction term Female × SI treatment is positive and statistically significant at the 5% level. By comparing the coefficients of the variables SI treatment and Female × SI treatment, we find that women have higher confidence in the SI treatment compared to the NSI treatment. Taken together, social incentives raise women's confidence significantly; however, such an increase in confidence levels is not sufficient to affect their decision to enter the tournament in Round 3.

Finding 5. Introducing social incentives significantly improves women's confidence in the tournament scheme.

The next mechanism that may explain women's lack of willingness to enter the tournament concentrates on attitudes towards risk taking. In particular, we look at the

Table 8: Risk aversion – Regression results

	(1)	(2)
SI	0.329	0.759*
	(0.365)	(0.418)
Female	-0.722*	-1.173***
	(0.368)	(0.382)
SI × Female	-0.189	-0.400
	(0.534)	(0.588)
Constant	5.985***	4.515***
	(0.253)	(0.274)
N	250	250

Notes: OLS regressions. Robust standard errors are reported in parentheses. The dummy variable SI equals 1 for the social incentives treatment and 0 otherwise. The dummy variable Female equals 1 if a subject is female and 0 otherwise.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

role of risk aversion. We employed a non-incentivized measure of risk aversion that has been validated and been shown to correlate with several aspects of economic decision making (see Dohmen et al. (2011)). In addition to this measure, we also elicit attitudes towards risk aversion with respect to financial matters. For both questions, subjects had to indicate how prepared they are to take risks with lower (higher) values implying higher (lower) risk aversion. The dependent variable in Table 8 ranges from 0 (risk aversion) to 10 (fully prepared to take risks). In Models 1 and 2, we used the same set of independent variables as reported in Table 7.

The main message from both regression models is that women are more risk averse than men in the absence of social incentives. However, the presence of social incentives does not affect this relationship: women are still more risk averse than men ($p = 0.024$ for Model 1 and $p = 0.001$ for Model 2). As a whole, our findings suggest that even

though the presence of social incentives increases women's confidence, their general aversion to taking risks in both treatments prevents them from being more competitive in Round 3.

Finding 6. Women are less willing to take (financial) risks than men regardless of the presence or absence of social incentives.

4 Conclusions

We report the results from an experiment testing the impact of social incentives on two key measures of behavior in the workplace: productivity and willingness to compete. In our experiment, social incentives are introduced by having subjects donate half of their earnings to a charity of their own choice. The use of social incentives is frequently observed in modern organizations through the means of corporate social responsibility. We take advantage of the experimental methodology to test for the causal effects of social incentives on employees' behavior.

Relying on an established experimental literature showing that gender is a key factor that needs to be considered when exploring behavior in the workplace, our analysis focuses on the differential effects that social incentives have on men and women. Our results are striking and highlight that the introduction of social incentives has beneficial effects on women's performance. This finding is robust when we consider piece rate as well as tournament incentives. Specifically, in the presence of social incentives, women increase their performance by 23% and 27% when piece rate and tournament incentives are employed, respectively. Compared to men, women perform 19% and 17% less well in the piece rate and tournament incentive schemes, respectively, when social incentives are absent. This relationship is reversed when social incentives are introduced: women are 21% and 32% more productive than men both in the piece rate and tournament

incentive schemes, respectively. These effects are sizable and significant, indicating the powerful effects that the introduction of social incentives can have in workplace behavior.

Our study has interesting implications for the role of social incentives in the labor market. We find that corporate social responsibility activities — as induced through charitable giving — has positive effects on women's productivity levels. This suggests that the use of social incentives is a function of the gender composition of the workforce, a dimension that previous research has underestimated. It would therefore be more beneficial for organizations to employ socially oriented mechanisms, especially in relation to occupations which are female dominated. Our findings show that the interaction between charities and organizations needs further strengthening as this would generate mutually beneficial outcomes. On the one hand, charities will be helped by having their profits raised when establishing partnerships with companies adopting corporate social responsibility initiatives. On the other hand, corporate social responsibility activities appear to be a good source of motivation for female employees (even in a competitive environment) and thus, can increase a firm's profits without raising their labor costs. Except for the potentially non-monetary positive effects that corporate social responsibility strategies can generate in the firm's external image and reputation, we show that these can also monetarily benefit a firm if specifically targeted at women. Our findings offer evidence on the crucial role of gender in the workplace: charitable contributions can be a cost-effective mechanism for the firm that can be used to spur women's productivity levels, and in response, firms need to carefully design incentive policies that take into account the gender composition of their workforce.

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A List of charities

Table 9

Charities	% of subjects selecting charity
Any charity / No preference / Don't know / No specific charity name was given	28.70
Cancer Research UK	18.52
Mind	4.63
Child First UK	3.70
MacMillan Cancer Support	3.70
Greenpeace	2.78
Beat	1.85
Oxfam	1.85
RSPCA	1.85
UNICEF	1.85
Water Aid	1.85
World Wildlife Fund	1.85
Acorns	0.93
Barnardo's	0.93
Camp Simcha	0.93
Comic Relief	0.93
Compton Hospice	0.93
Doctors Without Borders	0.93
Garden House Hospice	0.93
Islamic Relief	0.93
Isabel Hospice	0.93
St. Judes Children's Research Hospital	0.93
Julia's House	0.93
Little Princess Trust	0.93
Make A Wish	0.93
Medical Aid for Palestinians	0.93
Mental Health Foundation	0.93
Mermaids	0.93
Myeloma UK	0.93
NSPA	0.93
Nuffield Health	0.93
Parkinsons UK	0.93
Save the Children	0.93
Shelter	0.93
Sickle Cell Society	0.93
Special Need and Parents	0.93
SPCA	0.93
St. Gemma's Hospice	0.93
Teeside Hospice	0.93
The Salvation Army	0.93
Young Minds	0.93

B Experimental instructions

Note: These are the written instructions as presented to subjects facing the NSI-High treatment. For the NSI-Low treatment, the payment was £0.20 (£0.40) per correct answer provided in Round 1 (Round 2). Amendments to the SI treatment are given in square brackets.

General Instructions

Welcome! You are about to take part in a decision-making experiment. This experiment has been financed by various research institutions. Just for showing up you have already earned £2.50. You can earn additional money depending on the decisions made by you and other participants. It is therefore very important that you read these instructions with care. It is important that you remain silent and do not look at other people's work. If you have any questions, or need assistance of any kind, please raise your hand and an experimenter will come to you. You may use the provided scrap paper but no phones, calculators, or other devices. If you use a device, talk, laugh, exclaim out loud, etc., you will be asked to leave and you will not be paid. We expect and appreciate your following of these rules.

We would like to stress that any choices you make in this experiment are entirely anonymous. Please do not touch the computer or its mouse until you are instructed to do so. If you have any questions at any point, please raise your hand and one of us will come to your desk to answer your question. Please do not ask any question out loud. Thank you.

During the experiment, participants will be divided into groups of two. You will therefore be in a group with one other participant. You will remain paired with the same participant until the end of the experiment. At no point during the experiment, nor afterwards will you be informed about the identity of the other participant in your group and the other participant will never be informed about your identity.

Detailed Information about the Experiment

In this experiment, you will be given 3 minutes to perform a task during three separate rounds. You will be asked to perform the following task.

Word Task

This task consists of arranging four pairs of letters to form words like the following examples:

TR, EA, TS, RE = RETREATS. LI, CU, NK, FF = CUFFLINK.

You must use all the letters. You can change the order of the pairs but you cannot change the order of the two letters within each pair. You must submit your answer by pressing the 'Submit' button. As soon as you have submitted your answer, a new set of pairs of letters will be provided. You can choose not to answer a question by clicking the 'Submit' button without typing anything as an answer. In this case, you will be moved to the next problem. To help with time management, there will be a clock counting down the seconds for the 3 minute duration.

Payment

The method we use to determine your earnings will vary across rounds. Before each round we will describe in detail how your payment will be determined. Only one of the three rounds will determine your payment for the experiment and it will be randomly chosen at the end. Each round is equally likely to be selected. At the end of the experiment you will be paid in private and in cash depending on the outcomes of the randomly selected round.

[Social incentives treatment: Regardless of which round is randomly selected for payment, half of your earnings will be donated to a charity of your own choice which you will be asked to indicate when the experiment is over.]

Do you have any questions? Please raise your hand and an experimenter will come to your desk. Please do not ask any question out loud.

Onscreen instructions

Round 1: Piece rate

If Round 1 is the one randomly selected for payment, then you get £0.40 for each correct answer you provide in this round during the 3-minute time limit. We refer to this payment as the piece rate payment.

[Social incentives treatment: Half of your earnings will be donated to a charity of your own choice which you will be asked to indicate at the end of the experiment.]

At the end of the 3 minutes you will see a screen showing how many correct answers you provided during this round.

Please do not talk or try to communicate with other participants during the experiment. If you have any questions, please raise your hand. Once everyone has completed Round 1, you will receive new instructions for Round 2.

Are there any questions before we begin?

Round 2: Tournament

For Round 2, you will be placed in a tournament and compete against the other person in your pair in this task. The person with the highest score ("the winner") in this Round will receive 0.80 for each correct answer provided. The other person of the pair will receive zero payment. If there are ties, the winner will be randomly determined: with a 50% chance you will receive the tournament winnings and with a 50% chance the person you are paired with will receive the tournament winnings.

[Social incentives treatment: Half of your earnings will be donated to a charity of your own choice which you will be asked to indicate at the end of the experiment.]

At the end of the 3 minutes you will see a screen showing how many correct answers you provided.

Please do not talk or try to communicate with other participants during the experiment. If you have any questions, please raise your hand. Once everyone has completed

Round 2, you will receive new instructions for Round 3.

Are there any questions before we begin?

Round 3: Piece rate vs. Tournament

For Round 3, you will be given the opportunity to decide how you would like to be paid for your performance. You can either choose the individual piece rate pay or enter in a tournament. If Round 3 is the one randomly selected for payment, then your earnings for this round are determined as follows.

If you choose the piece rate, you receive £0.40 for each correct answer you provided in this Round.

If you choose the tournament, the number of correct answers will be compared to the number of correct answers the other person in your pair provided in Round 2. If you provide more correct answers in Round 3 than the number of correct answers the other person in your pair provided in Round 2, then you receive £0.80 per correct answer. You will receive zero payment in this Round if you choose the tournament and do not provide more correct answers now, than the other person in your pair did in Round 2. If there are ties, the winner will be randomly determined: with a 50% chance you will receive the tournament winnings and with a 50% chance you will receive zero payment.

[Social incentives treatment: Regardless of whether you select the piece rate or the tournament, half of your earnings will be donated to a charity of your own choice which you will be asked to indicate at the end of the experiment.]

At the end of the 3 minutes you will see a screen showing how many correct answers you provided.

Please do not talk or try to communicate with other participants during the experiment. If you have any questions, please raise your hand.

Are there any questions before we begin?