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WOMEN AND MOTIVATION TO COMPETE: THE ROLE OF ADVANTAGES

BEATRICE BRAUT

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Beatrice Braut

Dipartimento di Economia e Statistica "Cognetti de Martiis", University of Turin
Lungo Dora Siena 100, 10153 Torino TO (Italy)

Collegio Carlo Alberto
Piazza Arbarello 8, 10122 Torino TO (Italy)

E-mail: beatrice.braut@unito.it
ORCID: 0000-0003-2265-6150

Abstract

This work investigates the stability of the gender gap in competitiveness and tests a possible mechanism that influences it. Subjects play bargaining games where the two roles differ by decision contest - one has an advantageous position - and by the extreme values of their possible payment - the more advantaged can earn more. For all the experiment subjects are randomly assigned to be in the advantaged role or not. Competition takes place between subjects who are in the same role and it is based on their payoff in the bargaining. By comparing competitive behaviour of subjects assigned to the advantaged role or not, the experiment identifies the effect of having advantages, given the remaining factors. The main result is that when in the advantaged position, behaviour is more rational and does not differ by gender, while when not the gender gap in competitiveness exists and it causes inefficiencies. Giving an advantageous role makes men with low performances in the game competing less and women with high performances doing it more, closing down the total gender gap. This finding helps to explain the competitiveness gap and provides insights on which are the characteristics of the context that make competition detrimental for gender parity and also for efficiency.

Keywords: Gender, Gap, Competition, Competitiveness, Bargaining, Experiment.

JEL classification: C91, D91, J16.

1. Introduction

Gender gap is a term indicating "the differences between the way men and women behave or are treated in a society, especially in terms of opportunities, pay and status[1]". These differences are widespread and the attention paid to them has grown such that the term is nowadays of common use. Nevertheless, in the world gender parity will not be attained for the next 135.6 years (Global Gender Gap Report, 2021).

Comparing the estimated gender gap across countries, it sticks out that the margins for improvement are in the sphere of economic and political participation. Notoriously, political and economic participation differs between men and women, both in terms of sectors and in terms of hierarchy. The lack of women in leadership positions is a well-known and long-lasting phenomenon, with just the 27% of all managerial positions assigned to women (Global Gender Gap Report, 2021). This picture is possibly worse considering that the data available for the 2021 report do not reflect the total impact of the pandemic.

Competitive preferences notably matter for career choices, political and labour market outcomes (Buser et al., 2014, Reuben et al. 2015). Experimental evidence has so far consistently highlighted that men embrace competition while women shy away from it (Niederle and Vesterlund, 2007, for replications see the literature review in Clot et al., 2020 and the references therein).

So far, the analysis of gender differences in competitiveness has focused on situations where competitive payment schemes apply to subjects' performances in a "solo" task, like summing up numbers or throwing tennis balls into baskets (Niederle and Vesterlund, 2007; Gneezy et al., 2009). People in organizations instead do not perform "solo" tasks, but there is an interplay between subjects with specific roles. Roles define (dis)advantages in terms of strategies,

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payoffs etc. Games can better capture these situations by allowing strategic interactions and variety in the roles.

The aim of this paper is to analyse the effect that asymmetric roles in a strategic interaction have on the gender gap in competitiveness. In particular, it tests if having an advantageous role influences the willingness to enter the competition differently for men and women.

By assigning subjects randomly to the advantageous role in the game, it is possible to evaluate the effect of such a role (with more power, responsibilities and potentially higher earnings) in a controlled environment getting rid of issues of self-selection in the position and of confounding factors like culture.

Giving an advantage in the interaction can affect the differences in behaviour relative to competition of females and males. An advantaged position in a workplace can induce a change in preferences for competition, both by encouraging the ones who usually shy away from it (women who indeed have high ability) and by discouraging the ones who use to compete too much (men who have low ability). With more power and higher stakes, the decision makers should be more careful and therefore behave more rationally, following their capability.

Understanding how competitiveness is affected by the position subjects hold spreads light on the context dependence of this preference and clarifies the motivations behind the gender gap. Importantly, such a study provides insights on when competition is particularly harmful and therefore can help determining the timing for policy interventions. It also can underline the need of mechanisms to close the gender gap which modify the initial allocation in work positions.

In the experiment subjects play two players bargaining games having an advantaged role or not. They decide to compete against subjects who hold their same role. Competition is on the bargaining gains. The gender difference in competitiveness almost vanishes between the participants who have the advantage, while it remains consistent, and of a magnitude similar

to the other experiments, for the ones who do not have it. When subjects have the advantage, men with low payoffs compete less and females with high payoffs compete more. The result is robust considering not only the usual factors such as performances, self-confidence, risk and feedback aversion but also personality traits. Competition is harmful for gender parity and efficiency, but not for the subjects who have advantages.

Gender differences in competitiveness have been analysed at a length. In the classical laboratory experiment of Niederle and Vesterlund (2007) they find that 35% of women chose to compete compared to 73% of men, while there is no significant difference in performance. The difference persists controlling for factors like self-confidence and risk preferences. Moreover, they highlight that the high-performing women do not enter competition enough, while low-performing men do it too often. The gender gap in competitiveness represents therefore not only a problem of equity, but also of efficiency. Many works replicated their result in comparable conditions (about 20 experimental studies with the exception of Price, 2008). It has also been replicated with different pools of subjects, i.e., different ages, States and cultures (Booth, 2009; Dargnies, 2009; Sutter and Glätzle-Rützler, 2015) and in various contexts such as sports (Garratt et al., 2013) and academia (Bosquet et al. 2013; De Paola et al., 2015b) or with slightly different tasks such as throwing tennis balls into baskets (Gneezy et al., 2009), forecasting stock prices (Vandegrift and Yavas, 2009), using word and verbal exercises (Wozniak et al. 2010, Shurchkov, 2012) and solving mazes (Datta Gupta et al., 2013). Relevant exceptions are the experiments conducted in matrilineal societies (Gneezy et al., 2009; Andersen et al., 2013), with old subjects (Flory et al., 2018) and with professionals in consulting firms (Clot et al., 2020).

Numerous studies have looked for mediating factors, such as risk preferences and self-confidence (Niederle and Vesterlund, 2007), feedback (Ertac and Szentes, 2010), handedness (Buser et al., 2021), hormones (Wozniak et al., 2010), stress (Lowes, 2021), distributional

preferences (Balafoutas et al., 2012), information about other's gender (Datta Gupta et al., 2013), uncertainty and ambiguity (Balafoutas and Sutter, 2019). Personality (Müller and Schwieren, 2011), and in particular neuroticism, can explain the gender difference in competitiveness. This trait is more common among women (Feingold, 1994; Schmitt et al., 2008) and it influences negatively performance under a competitive payment scheme. Other studies have focused on tools that try to close the gap, like the use of quotas (Balafoutas and Sutter, 2010), priming subjects with empowering messages (Balafoutas et al. 2018) and the use of delegation for the decision to compete (Fornwagner et al., 2020). All the mentioned tools are found useful to eliminate the gender gap in competitiveness.

The idea that with an advantageous role subjects change behaviour and that this can influence the differences in the choice to compete however has never been tested. Some signals of the existence of this mechanism can be spotted in the literature. Clot et al. (2020) find that females consulting professionals do not shy away competition. This perhaps emerges because, differently from students, their subjects are already a selected sample of workers in a good position. Assigning subjects to the job positions randomly, this work can test if competitive preferences of the same pool of subjects[2] are affected by being on the privileged side of a work relationship, getting rid of self-selection problems. Studies on cultural differences (Gneezy et al., 2009; Andersen et al., 2013) suggest indeed that where women are in an advantageous position - matrilineal societies - there is no gender gap in competitiveness. Balafoutas et al. (2018) tested the usefulness of empowering. They study the effect that priming with power has on the competitiveness gap, finding that it leads to constrict it. Their study focuses on the effect of messages aimed to make subjects feel powerful or not in a design with a "solo" task. This study instead tests the effect on the gender gap in competitiveness of having an advantage, i.e.

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[2] University students. Since for competitive preferences age counts as much as sex (Flory et al., 2018), the experiment involves similarly young subjects, who also are the ones for which the gap is deeper. Moreover, they are the ones who more likely aspire to jobs in top positions.

more power than a counterpart, in a two-player game. Recently, Boneva et al. (2021) showed that being exposed to a successful female role model narrows the gender difference in competitiveness.

The present paper contributes to the growing literature on competitiveness testing the existence of gender differences in a situation with interplay and isolating the effect of holding a higher or lower position in a hierarchy. It provides evidence for the context dependence of the gender difference and isolates a possible mechanism that affects it. It also adds to the experimental design techniques by using a task that is also a priming strategy in the contest of competitive preferences analyses. Finally, it provides additional evidence on gender and bargaining.

The remainder of the paper is organized as follows: Section 2 describes the experimental design and protocol; Section 3 presents the main findings; Section 4 is for discussion and conclusions.

2.   Experimental design and procedure

At the beginning of the experiment the male subjects (68) are block randomly assigned to be Takers and Respondents and so are females (66). The experimental set-up follows the design of Niederle and Vesterlund (2007). This widely used design represents the ideal starting point to analyse differences in competitiveness as it allows to identify possible confounding factors. Also, the measure of competition of this design is a good predictor of students' future career (Buser et al., 2014, Reuben et al. 2015).

Subjects play two-person bargaining games with asymmetry in the participants' roles, Power-To-Take games (Bosman and van Winden, 2002), instead of the original tasks of adding up sets of two-digit numbers for five minutes. This modification has the aim of introducing asymmetry in the roles such that we will have subjects who have the advantage and subjects

who do not. Moreover, the game mimics the interaction present in the work environment and learning effects in this game are possibly lower than in the original math task.

In the game, payoffs of each participant depend on the actions of both. Subjects start with the same given endowment of 225 ECU (Experimental Currency Units, 100 ECU= 1 Euro). First movers, called Takers, can take any part they want from the partner's endowment, t (they are asked to report it as percentage, indicating an integer from 0 to 100 extremes included). Second movers, called Respondents, observe Takers' choice and decide whether to destroy any part of their own endowment before that Takers can pick what they decided to, d. A Respondent can at most have her/his whole endowment of 225 ECU (E_R) when the Taker takes nothing. A Taker can at least have her/his original endowment of 225 ECU (E_T) when the Respondent decides to destroy everything s/he has. The payoff functions are as follows.

Taker's payoff function: $\pi_T = E_T + t((1-d)E_R)$.

Respondent's payoff function: $\pi_R = (1-t)(1-d)E_R$.

This inequality in the possible actions and in the outcomes generates a situation that mimics the interaction between workers holding a top position and the others: in the top position there is a strategic advantage and the earnings are potentially higher, but they depend also on others' responses to own incentives, which are not perfectly predictable.

This game is suitable to analyse principal-agent relationships. The Taker can be seen as principal who decides the incentive scheme for the agent. The Respondent as the agent that, given the scheme, decides how much of the maximum possible effort exert.

Theoretically the game has a unique solution where the Taker takes all and the Respondent never destroys. However, when played in experiments, the outcome differs as other factors are at work: subjects do not behave rationally but are influenced also by emotions (Bosman & van Winden, 2002) and by the gender of the partner (Sutter et al., 2009). Anyway, there is no evidence of systematic differences in the behaviour in the game between males and females.

The experiment consists of four Stages: in the first three, subjects play the Power-To-Take game while in the last they just make a choice. Assignment of the subject to have the advantaged role (Taker) or not (Respondent) remained fixed for the whole experiment. Players are matched randomly to a partner of the opposed role in the first three stages. The procedure is repeated at the beginning of each stage within independent groups (Andreoni, 1988), in this way it is possible to account for the effect of facing specific partners.

The Stages differ in how incentives are structured. In Stage 1, subjects play the game and there is no competition. In Stage 2, they play the game and there is competition. After that subjects have practiced the two cases, there is Stage 3 where is the decision of interest takes place: before playing, participants have to choose the scheme they want between the aforementioned two. The choice is an individual decision since in case of tournament the payoff is compared with others' payoff obtained in the previous tournament. Nor Takers nor Respondents know which scheme the counterpart chooses. In Stage 4, subjects do not play but they choose how they want that the payoff they have obtained in Stage 1 will be paid. They can choose between the incentive scheme of Stage 1 or the one of Stage 2. This stage is needed to have a measure that reflects subject's reaction to everything that affects competition different from competition itself. Table 1 summarizes the main characteristics of each stage.

Table 1: Main stages' characteristics.

	Play the game	**Incentives**	**Measure**
Stage 1	Yes	No competition	Control
Stage 2	Yes	Competition	Control
Stage 3	Yes	Choice	Variable of Interest
Stage 4	No	Choice	Control

Notes. Indications for each stage of whatever the game is played, which incentive scheme applies and the nature of the measure generated.

For each participant only one of these four stages is randomly selected for payment, in addition to a show up fee of five Euro (Charness et al., 2016). During the experiment subjects are informed about their own payoff, and consequently of their partner's (the one in the

opposite role), but never have feedback about their relative position or about competitors' payoffs (the ones in their same role). Belief about the partner's action are separately asked.

When there is competition subjects face a winner takes it all tournament. Comparing the payoffs of groups of subjects who belong to the same role, the one who has the highest payoff receives four times the payoff while the others receive noting[3]. Groups are formed by four subjects holding the same role, are stable for all the experiment and gender composition is balanced. Even if never made salient, the balance of participants in the lab could be detected during the procedures of assignment to lab-stations.

In this experimental setup the choice whether to compete generates two different challenges for the Takers and for the Respondents. The firsts by choosing to enter in competition expose themselves to the risk of losing their endowment that otherwise would be the lower bound of their payment. For the second instead the risk of losing everything always exists. This can generate a situation in which Takers of both genders compete less due to the fear of losing everything. If females are more risk averse then males (see Charness and Gneezy, 2012), then the gender gap in competitiveness would be larger for Takers than for Respondents. Since it is the opposite of what the paper hypothesizes, that is that with the advantage the gender gap smooths, this peculiarity of the design corroborates the result: the effect found represents a lower bound for the true effect.

Beliefs about own relative position in the tournaments are elicited just at the end of the experiment. Subjects are also asked to indicate their perception of partner's gender, of the gender composition of the group and their opinion about the rationality of own and partner's choice. Subjects were not paid for the precision of their beliefs and for sharing their opinions since the objective was to elicit sincere answers (and not correct normative expectations) and also not to influence the main incentives in the game.

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[3] In case of tie, the winner is randomly picked between the ones with the highest payoff.

At the end of the experiment, the subjects completed a questionnaire that included socio-demographic questions, the short version of the Big-Five Personality Questionnaire (Gosling et al., 2003) and of the Oxford Happiness Questionnaire (Hills and Argyle, 2002). The first (15 elements) allows to define participants' scores in five dimensions of personality (Costa & McCrae, 1992): neuroticism, extraversion, openness to experience, agreeableness and conscientiousness. The second (8 questions) provides a measure of subjective wellbeing (Kahneman et al., 1999). Personality traits are relevant in the decision to compete (Müller and Schwieren, 2011), while subjective wellbeing matters in the bargaining game (Bosman & van Winden, 2002). Summary statistics are available in Appendix A.

The sample comprises of 136 observations (68 males, 66 females, 2 did not disclose gender; mean age 24). Power calculations reveals that this sample size is adequate to detect an effect similar to the result of Niederle and Vesterlund (2007) [4]. The experiment was run using z-tree (Fischbacher, 2007) at the Center for LabOratory Simulations and Experimental Research (CLOSER) of the University of Turin during spring and summer 2018. Recruitment happened via ORSEE (Greiner, 2004). Data analysis was made using STATA15. Two control questions about the understanding of the Power-To-Take game were asked and checked before the experiment started. In this occasion there was the possibility to ask for clarifications. Instructions were distributed in paper and read aloud, additional information on each stage was disclosed on screen just before the stage starts. Instructions are available in Appendix C. The participants were paid in private at the end of the experiment which took around 1 hour and 15 minutes. Mean payment was 8.29 Euro for Takers and 6.01 Euro for Respondents, with the highest payments of 23 and 14 Euro respectively. Payoffs are designed such that the maximum possible for a Taker did not exceed the legal limit of 25,82 Euro.

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[4] The experiment was pre-registered at https://osf.io/xem6z. Sample size is lower than targeted (144) due to low showing up in one session.

3. Results

3.1 Performance

Men and women do not differ in their behaviour in the game. As Table 2 illustrates, in Stage 1, males and females do not differ in their payoff nor for Takers (321.3 for males vs 313.51 for females, *p*-value 0.56) nor for Respondents (87.85 vs 87.91, *p*-value 0.99). In Stage 2 also there are no significant gender differences in payoffs either for Takers (304 vs 328.79, *p*-value 0.13) or for Respondents (73.79 vs 56.85, *p*-value 0.27)[5].

Table 2: Payoff distribution by role and gender in Stage 1 and Stage 2

	Takers		**Respondents**		**P-values**	
	Males	Females	Males	Females		
Stage 1 - No competition	321.38 (57.27)	313.51 (52.31)	87.85 (54.46)	87.91 (60.34)	0.56	0.99
Stage 2 - Competition	304 (65.35)	328.79 (67.5)	73.79 (59.47)	56.85 (66.18)	0.13	0.27
N Observations	34	33	34	33		

Notes. Mean payoff (and standard deviation) of male and female subjects assigned to be Taker or Respondent in the first and in the second stage, which differ by the presence of competition. *P*-values from two-sample t test comparing males and females in each situation.

When all subjects participate in the competition (Stage 2) there is no significant difference in the number of females and males who win for neither the two roles (8 males and 8 females of the 17 winners[6] for Takers, *p*-value 0.95; 10 males and 8 females of the 18 winners for Respondents, *p*-value 0.64).

In sum, there is confirmation that women and men do not differ in how they perform in the game, as in Sutter et al., 2009. Moreover, data indicate that, once in the competition, there are no gender differences in the chance of success. These similarities in the behaviour of the two

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[5] Payoff defines the amount obtained in the game, so before the eventual outcome of the tournament. Where not else stated, *p*-values are from two sample t-test.
[6] One winner did not specify gender.

sexes corroborate the suitability of the game for the analysis of gender differences in competitive preferences.

3.2 Choice, experience and believes

Choosing the competition in Stage 3 is related to having a higher past payoff in Stage 2 only for Takers. Takers who choose to compete have a slightly higher payoff in Stage 2 (337 vs. 306, p-value 0.07). Moreover, the competitive choice is related to believes about own ranking in the previous competition of Stage 2 only for Takers. Takers who chose the competitive setting are those who think to have performed better in Stage 2 (1.65 vs 2.44, p-value < 0.001, where 1 stays for first, 4 for last). There is no relation with payoffs in Stage 1, where there was no competition.

Looking at men and women separately the relation between the choice to compete and the past payoff in competition loses significance. Also, once separated by gender, the relation between the choice to compete and ranking believes remains statistically significant only between males (for males 1.45 vs 2.47, p-value < 0.005; for females 1.91 vs 2.41, p-value 0.36). Men and women in general do not differ in their assessment of the ranking in the competitions.

The decisions of Takers are more responsive to objective and subjective measures of their performance, their previous payoffs and their believes about their performance in competition.

3.3 Personality

The personality traits elicited in the questionnaire differ by gender. Females score higher in neuroticism (9.6 vs 8.6, p-value 0.37, on a scale from 3 to 15), consistently with the extant literature (Schmitt et al., 2008). Levels of happiness do not differ by gender.

Contrary to what expected (Müller and Schwieren, 2011), neuroticism does not play a role in the choice to compete, nor it influences the payoffs. This result may be due to the fact that

the game is more complex than the task (adding up numbers) and different factors can be involved, for example emotions. Moreover, also the scores in the remaining personality traits do not differ looking at the choice to compete or not and they are not correlated to the payoffs. The same applies for happiness levels.

By themselves personality and happiness do not influence the choice to compete, nor they are related to the payoffs obtained in the games.

3.4 Gender differences in competitiveness

Considering the gender difference in competitiveness, for Takers there is no difference between females and males in the percentage of who chooses to compete (33% vs 32%, *p*-value 0.93) while for Respondents the gap is considerably large (21% vs 53%, *p*-value 0.01). This result arises even if payoffs of males and females in the previous stages did not differ. The gender difference in competitiveness detected for Respondents is comparable to the works replicating the study of Niederle and Vesterlund (see Saccardo et al., 2017 for a summary of the entity of the gap in replications of Niederle and Vesterlund).

Between the ones with the advantaged role in the game, there is no evidence of a gender gap in the willingness to compete.

3.4.1 Gender gap in competitiveness and efficiency

How the decision of entering the competition correlates with previous payoffs in the game under the competitive payment scheme also differs by role played and gender.

Figure 1 reports the distributions and linear approximations of the percentage of subjects who choose the competition in Stage 3 over ranges of payoffs in Stage 2, separately for males or females and for the ones in the role of Takers or of Respondents.

Figure 1: Correlation of choice to compete with previous payoffs in competition
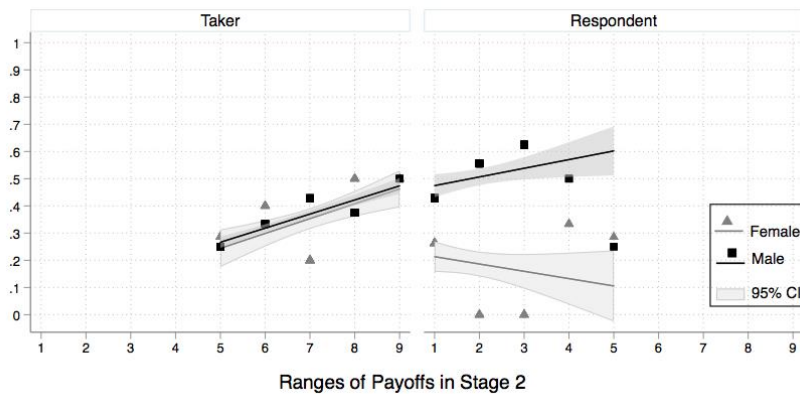
Notes. Distribution and linear approximation of the frequency of subjects choosing the competition in Stage 3 (vertical) in ranges of payoffs obtained in the competition of Stage 2 (horizontal). Estimation is distinguished by sex (females in grey, males in black) and role (Takers on the left, Respondents on the right).

When assigned to the role of Taker, males and females behave in the same way: if they have high payoffs compete more, if they have low ones they do it less. When assigned to the role of Respondent, behaviour differs. The frequency of males in low ranges of payoffs who choose to compete is high while the frequency of females in high ranges of payoffs is low. Respondents' choice to compete is not well correlated with subjects' payoff in previous competition.

The decision to compete of the ones with the advantaged role is, in sum, more rational and represents an improvement for efficiency.

3.4.2 Gender gap in competitiveness and other factors

Factors other than gender or the role assigned can influence the preferences for competition. The experimental design allows to control for the payoff obtained in Stage 1, the difference between the payoff of Stage 2 and of Stage 1, the level of self-confidence and other factors that characterize competitive environments that are not competition, like the presence of feedback and risk.

Table 3 shows marginal effects from Probit regressions of a dummy variable indicating choice to compete (1 if competition was chosen, 0 otherwise). As independent variables all the specifications include the gender (Female). The first specification adds as controls the payoff in Stage 1 (Payoff 1) and the difference between the payoff in Stage 2 and Stage 1 (Difference). This specification accounts for experience in the game. Note that feasible payoffs range from 225 to 450 ECU for Takers and from 0 to 225 ECU for Respondents. The second specification adds as control the belief about own position in Stage 2 (Believed Rank, 1 if first, 2 if second, 3 if third, 4 if fourth) and the choice to submit or not own payoff of Stage 1 to tournament compensation (Submit PR to T, 1 if yes, 0 otherwise). This accounts for self-confidence and other facets of competition that are not merely competition, for example risk and feedback aversion. The third specification adds the score (going from 3 to 15) in five personality domains: neuroticism, extraversion, openness to experience, agreeableness and conscientiousness. This accounts for subject's personality traits which can affect preferences for competition. All the specifications are run separately for observations of Takers and Respondents.

Table 3: Marginal effects from Probit regressions of the Choice to enter competition

	(1) Takers	(1) Respondents	(2) Takers	(2) Respondents	(3) Takers	(3) Respondents
Female	-0.0343 (-1.84)	-0.311*** (-4.25)	-0.0787** (-2.81)	-0.330*** (-5.83)	0.00757 (0.09)	-0.318*** (-4.94)
Payoff 1	0.00135 (1.17)	-0.000117 (-0.10)	0.000507 (0.50)	-0.0000950 (-0.07)	0.00199* (2.37)	-0.000270 (-0.20)
Difference	0.0016*** (4.12)	0.000473 (0.50)	0.00164** (3.17)	0.000220 (0.22)	0.00263* (2.53)	0.000240 (0.23)
Believed Rank			-0.164** (-2.69)	0.0202 (0.48)	-0.181** (-2.96)	0.0454* (2.26)
Submit PR to T			0.427*** (10.69)	0.286 (1.57)	0.516*** (3.94)	0.228 (1.69)
Neuroticism					-0.0379** (-2.80)	0.00983 (0.46)
Extraversion					0.0324 (0.58)	0.0118 (0.43)
Openness					-0.0104 (-0.29)	-0.0164 (-0.82)

	(1)	(2)	(3)	(4)	(5)	(6)
Agreeableness					0.0151 (0.37)	0.0461*** (6.37)
Conscientiousness					-0.0756 (-1.41)	-0.0241 (-0.93)
AIC	85.64	84.53	68.83	79.35	58.52	76.10
BIC	90.05	88.94	73.24	83.76	62.87	80.45
Observations	67	67	67	67	65	65

Notes. Table 3 shows marginal effects from Probit regressions of the choice to compete (1 if competition was chosen, 0 otherwise) on the sex of the subject (Female).

Control variables are: the payoff in the first stage (Payoff 1), the difference between the payoff of Stage 2 and Stage 1 (Difference), the belief about own ranking in Stage 2 (Believed Rank), the choice of submitting or not first stage payoff to tournament compensation (Submit PR to T) and personality traits: neuroticism, extraversion, openness to experience, agreeableness and conscientiousness.

T statistics in parentheses: *** $p<0.001$, ** $p<0.01$, * $p<0.05$. Akaike Information Criterion and Bayesian Information Criterion are reported. Standard errors clustered at group of independent observations level, which represent the minimum group of potential partners. Two observations lost in the last specification due to incomplete questionnaires.

Regression estimates confirm the fact that females are less likely to choose the competition, but only when assigned to the role of Respondent. For Takers the marginal effect of being female is statistically significative only in one specification and is very small (8% at most). For Respondents the marginal effect is high and statistically significative in all the specifications, indicating a 33% lower probability of choosing the competition for females. Moreover, different domains of personality prevail in affecting the choice for Takers and Respondents. For the first neuroticism reduces the probability to compete (as in Müller and Schwieren, 2011), while for the second agreeableness does increase it (as in Bartling et al., 2009). This is not surprising given that for Respondents being less agreeable is also a handicap in the game. Results are robust to the use of different specifications and various controls (reported in Appendix B).

The regression analysis confirms that when subjects hold the advantaged position, no gender difference in terms of competitiveness emerges. In all specifications the explanatory variables other than gender influence the choice to compete for Takers more than for Respondents, indicating that, when the decision is heavier, both sexes think more rationally and then gender counts less.

4. Discussion and conclusion

The paper analyses gender differences in competitiveness in an experiment where subjects are randomly allocated to two different roles in a bargaining game. One role has an advantaged position: has more power and potentially higher earnings. It finds that the gender gap in competitiveness is not substantial for the subjects in the advantaged role, but it is significative for the others. This result is robust considering subjects' performances and believes, but also other preferences and personality traits. Subjects assigned to the advantaged role behave more rationally, men with low payoff compete less and female with high payoff do it more, and therefore allocation to competition is overall more efficient.

The present study finds confirmation that, when gender is unknown, man's and women's behaviour in bargaining games does not differ (Solnick, 2001; Sutter 2009). While disclosing gender has a significant effect on bargaining outcomes (Stuhlmacher and Walters, 1999), gender itself does not have any influence.

It also poses new evidence in favour of the contextual dependence of the gender difference in competitiveness in the ever-growing debate on the innate or context-dependent origin of this gap. The fact that giving a specific role in a game can cut down the gap between sexes measured in a validated way is a strong signal against the innate hypotheses. Just a change in the environment for the limited time of the experiment shifts behaviour of men and women. Recently, Buser et al. (2021) has attempted to find correlation between competitiveness with also an other genetic factor, handedness, not reaching a robust conclusion. Boneva et al. (2021) instead has found clear correlation with environmental factors: the gap is deeper for subjects in a low economic status and is reduced by being exposed to female successful role models.

Last but not least, it explores an important mechanism behind how the context influences competitiveness. Subjects allocated to the advantaged side of the interaction in a game do not exhibit differences in choosing to compete according to their gender. Observing few women in

top positions therefore can be not only a consequence of gender differences in competitiveness but also a cause for them. The fact that being in an advantaged position closes the gender gap in competitiveness represents a common explanation to some patterns in the literature like why it is not present between professionals (Clot et al., 2020) or in matrilineal societies (Gneezy et al., 2009; Andersen et al., 2013).

This result provides additional evidence for the usefulness policy interventions that exogenously modify the assignment to work positions and redistribute the advantages. Importantly, the result suggests that using competitive procedures for evaluations or selections when candidates are at early stage of the career, or whenever they are on the disadvantaged side, can be detrimental for gender parity and also inefficient.

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APPENDIX

A. Descriptive Statistics and Randomization Test

Table A.1: Descriptive Statistics and Randomization Test

	N Takers	N Respondents	Mean Takers	Mean Respondents	Diff.	St. Err.	P-value
Female	67	67	.49	.49	0	.09	1
Age	68	68	24.46	23.82	.63	.66	.34
FemaleField	44	50	.3	.3	0	.1	.96
LivesFamily	68	68	.43	.5	-.07	.09	.39
Education	66	67	1.45	1.36	.1	.1	.35
Works	68	68	.71	.65	.06	.08	.47
TimeCare	67	68	16.5	18.8	-2.3	3.59	.52
InRelationship	68	65	.63	.42	.22	.09	.01
Hetero	67	64	.78	.78	-.01	.07	.94
Drinks	68	68	1.66	1.76	-.1	.18	.56
Prosocial	64	64	.9	.93	-.03	.05	.55
Envy	67	68	.73	.73	0	.08	1
Risk	68	68	5.54	5.37	.18	.43	.68
Happiness	67	67	35.67	35.4	.27	1.16	.82
Neuroticism	67	66	8.7	9.55	-.84	.5	.09
Extraversion	67	68	8.69	8.74	-.05	.39	.9
Openness	67	68	11.33	11.79	-.47	.33	.16
Agreeableness	66	68	10.35	10.35	0	.42	.99
Conscientiousness	67	67	10.85	10.88	-.03	.39	.94
Experience	68	68	.71	.68	.03	.08	.71

Notes. Table A.1 reports the number of answers and the mean value of the variables collected in the questionnaire, separately for subjects assigned to the role of Takers and Respondents. It also reports the difference between the two (Diff, value for Takers minus value for Respondents), standard errors and *P*-values from two-sample t-test with equal variances.

In all the pairwise tests there is no difference between subjects assigned to the role of Takers or Respondents, except for the fact of being in a sentimental relationship.

The sample is balanced for gender, by construction. Mean age is 24. Participants who reported to be enrolled in typically female dominated fields (FemaleField, 1 if Literature and Languages, 0 otherwise) are equally splitted, but not all subjects reported this piece of information. They also are similar for the level of degree they have (Education). Half of the subjects lives with the family (LivesFamily, 1 if they live with their family, 0 otherwise), around 70% work (Work, 1 if yes, 0 otherwise) and they spend around 17 minutes a week in (unpaid) work of care. About half are in a sentimental relationship, but Takers are more likely to (InRelationship, 1 if yes, 0 otherwise). 80% declares to be heterosexual (Hetero, 1 if yes, 0

otherwise). Takers and Respondents are comparable for social preferences (Prosocial and Envy) and risk preferences (Risk and Drinks). The first were elicited using non-incentivized version of Bartling et al. (2009), for the second Risk represents the answer to the general question on risk aversion (Dohmen et al., 2011) and Drinks is an indirect measure using self-reported drinking behaviour (number of days in which the subject usually drinks in a week). Scores in the 5 domains of personality (neuroticism, extraversion, openness to experience, agreeableness and conscientiousness) as in subjective well-being (happiness) do not differ significantly by role, even if neuroticism levels appear to be higher for Respondents.

B. Additional Analyses.

Table B.1: Marginal effects from Probit regressions of the Choice to enter competition - Robustness checks - Different specifications

	(1) Takers	(1) Respondents	(2) Takers	(2) Respondents	(3) Takers	(3) Respondents	(4) Takers	(4) Respondents
Female	0.00980 (0.19)	-0.317*** (-5.61)	0.00344 (0.17)	-0.313*** (-4.80)	-0.0995* (-2.47)	-0.326*** (-4.95)	-0.00897 (-0.06)	-0.285*** (-3.45)
Payoff 1			0.000329 (0.20)	-0.000102 (-0.09)	0.00140*** (3.34)	-0.000139 (-0.12)	0.00246 (1.65)	-0.000369 (-0.30)
Difference			0.000970** (2.87)	0.000498 (0.47)	0.00220*** (3.81)	0.000156 (0.18)	0.00236** (2.60)	0.000378 (0-36)
Believed Rank			-0.181*** (-3.95)	0.00815 (0.20)				
Submit PR to T					0.452*** (9.58)	0.283 (1.63)		
Neuroticism							0.0225 (0.31)	0.0174 (0.64)
Extraversion							0.0112 (0.42)	0.0502** (2.96)
Openness							-0.0278 (-0.60)	-0.0344 (-1.03)
Agreeableness							-0.0277 (-1.50)	0.0112 (0.52)
Conscientiousness							0.00465 (0.15)	-0.0128 (-0.89)
AIC	88.82	85.12	77.91	84.51	74.80	79.46	78.81	79.40
BIC	93.23	89.53	82.31	88.92	79.21	83.87	83.15	83.74
Observations	67	67	67	67	67	67	65	65

Notes. Table B.1 shows marginal effects from Probit regressions of the choice to compete (1 if competition was chosen, 0 otherwise) on the sex of the subject (Female).
Control variables are: the payoff in the first stage (Payoff 1), the difference between the payoff of Stage 2 and Stage 1 (Difference), the belief about own ranking in Stage 2 (Believed Rank), the choice of submitting or not first stage payoff to tournament compensation (Submit PR to T) and personality traits (Neuroticism, Extraversion, Openness to experience, Agreeableness and Conscientiousness).
T statistics in parentheses: *** $p<0.001$, ** $p<0.01$, * $p<0.05$. Akaike Information Criterion and Bayesian Information Criterion are reported. Standard errors clustered at group of independent observations level, which represent the minimum group of potential partners. Three observations lost in the last specification due to incomplete questionnaires.

Table B.1 reports estimated marginal effects of the regressions of the choice to compete. The first specification includes only the gender (Female). The other specifications add the payoff in Stage 1 (Payoff 1) and the difference between the payoff of Stage 2 and Stage 1 (Difference). The second controls for the belief about own position in Stage 2 tournament (BelievedRank, 1 if first, 2 if second, 3 if third, 4 if fourth). The third for the choice to submit or not own payoff of Stage 1 to tournament compensation (SubmitPRtoT, 1 if yes, 0 otherwise).

The fourth for the scores in the personality traits (Neuroticism, Extraversion, Openness, Agreeableness, Conscientiousness).

There are no effects due to interdependence of the control variables that alter the main result.

Table B.2: Marginal effects from Probit regressions of the Choice to enter competition – Robustness checks - Control for unbalanced variable.

	(1) Takers	(1) Respondents	(2) Takers	(2) Respondents	(3) Takers	(3) Respondents
Female	-0.0388 (-1.78)	-0.346*** (-3.38)	-0.0802* (-2.13)	-0.346*** (-4.43)	-0.00797 (-0.09)	-0.364*** (-3.58)
Payoff 1	0.00136 (1.16)	0.000412 (0.47)	0.000507 (0.50)	0.000371 (0.30)	0.00203* (2.16)	0.000704 (0.43)
Difference	0.00160*** (4.04)	0.000202 (0.20)	0.00164** (2.97)	0.0000261 (0.02)	0.00265* (2.43)	0.000378 (0.29)
Believed Rank			-0.164** (-2.75)	0.0270 (0.45)	-0.180** (-3.15)	0.0823 (1.29)
Submit PR to T			0.426*** (10.07)	0.257 (1.42)	0.528*** (4.55)	0.194 (1.44)
Neuroticism					-0.0415*** (-4.42)	0.0262 (0.55)
Extraversion					0.0370 (0.68)	0.0102 (0.37)
Openness					-0.0147 (-0.48)	0.00204 (0.08)
Agreeableness					0.0184 (0.50)	0.0600*** (5.32)
Conscientiousness					-0.0792 (-1.52)	-0.00112 (-0.03)
InRelationship	-0.0554 (-0.53)	-0.0761 (-0.59)	-0.0171 (-0.14)	-0.117 (-1.20)	-0.0977 (-1.37)	-0.185* (-2.19)
AIC	85.43	77.62	68.81	73.64	57.97	68.90
BIC	89.84	81.94	73.22	77.96	62.31	73.15
Observations	67	64	67	64	65	62

Notes. Table B.2 shows marginal effects from Probit regressions of the choice to compete (1 if competition was chosen, 0 otherwise) on the sex of the subject (Female).
Control variables are: the payoff in the first stage (Payoff 1), the difference between the payoff of Stage 2 and Stage 1 (Difference), the belief about own ranking in Stage 2 (Believed Rank), the choice of submitting or not first stage payoff to tournament compensation (Submit PR to T), personality traits (Neuroticism, Extraversion, Openness, Agreeableness and Conscientiousness) and the fact of being in a sentimental relationship (InRelationship)
T statistics in parentheses: *** $p<0.001$, ** $p<0.01$, * $p<0.05$. Akaike Information Criterion and Bayesian Information Criterion are reported. Standard errors clustered at group of independent observations level, which represent the minimum group of potential partners. Observation decrease is due to incomplete questionnaires.

Table B.2 reports estimated marginal effects of the regressions of the choice to compete in three specifications of paragraph 4.4.2 but controlling for a dummy variable indicating if the subject declared to be in a sentimental relationship (InRelationship). Only in the third

specification being in a sentimental relationship has a statistically significant effect on the probability of choosing the coopetition: it has the effect of reducing it for the Respondents.

The results on gender and other factors influencing willingness to compete in the two different roles are not affected by including as a control the fact of being in a sentimental relationship. Moreover, this a novel control that other studies about willingness to compete did not have and/or used.

Table B.3: Marginal effects from Probit regressions of the Choice to enter competition – Robustness checks - Other controls

	(1) Taker	(1) Respondent	(2) Taker	(2) Respondent	(3) Taker	(3) Respondent
Female	0.0147	-0.308***	-0.0536	-0.363***	-0.0710	-0.333***
	(0.39)	(-4.62)	(-0.79)	(-7.05)	(-1.63)	(-5.02)
Payoff 1	0.000534	-0.000133	0.000452	-0.000203	0.000596	-0.000186
	(0.45)	(-0.12)	(0.39)	(-0.15)	(0.73)	(-0.12)
Difference	0.00114	0.000540	0.00148***	0.000287	0.00168**	0.000223
	(1.96)	(0.50)	(3.59)	(0.28)	(2.89)	(0.21)
Believed Rank	-0.171***	0.0160	-0.172*	0.0246	-0.161**	0.0272
	(-5.16)	(0.33)	(-2.43)	(0.57)	(-2.85)	(0.85)
Submit PR to T			0.413***	0.259	0.431***	0.272
			(15.57)	(1.57)	(6.92)	(1.56)
Risk	0.0229	0.0175				
	(0.64)	(0.72)				
TimeCare			-0.00115	0.00317		
			(-0.28)	(1.21)		
Hetero					-0.0711	-0.0944
					(-0.33)	(-0.72)
AIC	77.03	84.04	68.44	77.82	68.61	78.95
BIC	81.44	88.45	72.82	82.23	73.02	83.36
Observations	67	67	66	67	67	67

Notes. Table B.3 shows marginal effects from Probit regressions of the choice to compete (1 if competition was chosen, 0 otherwise) on the sex of the subject (Female).
Control variables are: the payoff in the first stage (Payoff 1), the difference between the payoff of Stage 2 and Stage 1 (Difference), the belief about own ranking in Stage 2 (Believed Rank), the choice of submitting or not first stage payoff to tournament compensation (Submit PR to T), risk preference (Risk), weekly hours of unpaid care work (TimeCare), sexual orientation (Hetero).
T statistics in parentheses: *** $p<0.001$, ** $p<0.01$, * $p<0.05$. Akaike Information Criterion and Bayesian Information Criterion are reported. Standard errors clustered at group of independent observations level, which represent the minimum group of potential partners. Observation decrease is due to incomplete questionnaires.

Table B.3 reports estimated marginal effects of the regression of the choice to compete on gender (Female), payoff in Stage 1 (Payoff 1), the difference between the payoff of Stage 2 and Stage 1 (Difference), belief about own position in Stage 2 tournament (BelievedRank, 1 if

first, 2 if second, 3 if third, 4 if fourth) and the choice to submit or not own payoff of Stage 1 to tournament compensation (SubmitPRtoT, 1 if yes, 0 otherwise).

The first specification controls for the level of risk aversion (Risk, continuous variable from 0 to 10) instead of SubmitPRtoT. The second controls also for the time spent in unpaid care work (TimeCare, continuous variable). The third controls for sexual orientation (Hetero).

Using as control Risk or SubmitPRtoT gives qualitatively the same results but for the fact that Risk does not have a significant effect, while SubmitPRtoT had a positive effect on willingness to compete for Takers. Correlation of the two measures of riskiness elicited, Risk and Drinks, is low but anyway using the latter in the regressions gives similar result. Time spent in work of care (TimeCare) and sexual orientation (Hetero) do not influence results, nor have an effect on choosing the competition.

Table B.4: Marginal effects from Probit regressions of the Choice to enter competition – Robustness checks - Social preferences and happiness

	(1) Takers	(1) Respondents	(2) Takers	(2) Respondents
Female	-0.0977*** (-7.83)	-0.321*** (-4.61)	-0.0481* (-2.38)	-0.355*** (-5.10)
Payoff 1	0.000476 (0.48)	-0.000226 (-0.20)	0.00134 (0.82)	-0.000201 (-0.12)
Difference	0.00174*** (3.40)	0.000129 (0.15)	0.00194*** (4.38)	0.000220 (0.20)
Believed Rank	-0.166* (-2.52)	0.0208 (0.48)	-0.147* (-2.28)	0.00455 (0.11)
Submit PR to T	0.432*** (8.07)	0.278 (1.52)	0.449*** (15.55)	0.273 (1.65)
Envy	0.0611 (0.48)	-0.0679 (-0.69)		
Happiness			0.00125 (0.26)	-0.0119** (-2.90)
AIC	68.66	79.13	65.12	76.91
BIC	73.07	83.54	69.50	81.29
Observations	67	67	66	66

Notes. Table B.4 shows marginal effects from Probit regressions of the choice to compete (1 if competition was chosen, 0 otherwise) on the sex of the subject (Female).
Control variables are: the payoff in the first stage (Payoff 1), the difference between the payoff of Stage 2 and Stage 1 (Difference), the belief about own ranking in Stage 2 (Believed Rank), the choice of submitting or not first stage payoff to tournament compensation (Submit PR to T), being envy (Envy) and level of happiness (Happiness).
T statistics in parentheses: *** $p<0.001$, ** $p<0.01$, * $p<0.05$. Akaike Information Criterion and Bayesian Information Criterion are reported. Standard errors clustered at group of independent observations level,

which represent the minimum group of potential partners. Observation decrease is due to incomplete questionnaires.

Table B.4 reports estimated marginal effects of the regression of the choice to compete on gender (Female), payoff in Stage 1 (Payoff 1), the difference between the payoff of Stage 2 and Stage 1 (Difference), belief about own position in Stage 2 tournament (BelievedRank, 1 if first, 2 if second, 3 if third, 4 if fourth) and the choice to submit or not own payoff of Stage 1 to tournament compensation (SubmitPRtoT, 1 if yes, 0 otherwise).

The two specifications add two different controls: Envy, a dummy variable indicating if the subject is categorizable as envy, and Happiness, a continuous variable indicating the points in the happiness questionnaire, from 6 to 48 (higher scores, higher happiness).

Accounting for being envy, i.e. choosing unequal distributions over balanced ones without personal benefit from doing it, has no significant effect by itself, but including this as control increases the magnitude and the significance of the coefficients on female.

Levels of happiness, instead, influence the choice to compete, reducing its probability, for the Respondents. This result is in line with that on personality traits - happiness levels and the agreeableness trait are positively related.

C. Instructions (translated from Italian)

C.1 Paper instructions

Instructions

Welcome. Thank you for choosing to participate in this experiment during which you will be asked to make decisions following the instructions below. During the experiment, your earnings will be accounted in ECU, Experimental Currency Units, at the end of the experiment they will be paid in Euro according to a conversion rate of 100 ECU = 1 €. The payment you will get in this experiment will be disclosed to you only.

Show up fee

Each participant in this experiment receives a show up fee of 5 €. You will receive this payment regardless of the decisions made during the experiment and in addition to the one deriving from the latter.

Roles

At the beginning of the experiment, each participant is randomly assigned to one of two possible roles: A or B. The roles are randomly assigned and will remain fixed for the duration of the experiment. Therefore, for all periods of the experiment you will always have the same role (A or B) that will be communicated to you when the experiment begins.

Groups

Groups of 4 participants with the same role are also randomly formed. The composition of these groups remains constant throughout the experiment. So, for all periods of the experiment you will always belong to the same group which is made up of you and three other participants with the same role as you.

Activity

The activity to be carried out consists of two steps. In step 1 only Participant A has to decide while in step 2 only Participant B has to decide. Each participant therefore makes only one decision.

Each participant receives an initial amount of 225 ECU and is randomly matched with another participant of a different role.

The matching between the participants of the two roles is random. You will not be informed in any way about the identity of the person you have been paired with. Your decisions will remain anonymous.

Step 1: Participant A chooses a percentage

Participant A must choose a percentage. This percentage determines how much of the amount of Participant B (225 ECU) will be transferred to participant A after step 2. The percentage chosen by Participant A must be an integer in the range between 0 and 100, included.

Step 2: Participant B chooses a percentage

Participant B is informed of the decision taken by participant A with whom he is paired.

Participant B must choose a percentage. This percentage determines how much of your initial amount (225 ECU) will be destroyed. The percentage chosen by Participant B must be an integer in the range between 0 and 100, included.

The transfer from Participant B to Participant A will be based on the amount of Participant B that remained. Note that the transfer will be equal to the percentage chosen by Participant A of the amount of Participant B that remained after phase 2.

Example

Now we will provide an example of how the activity works. As you know, both players A and B have an initial amount of 225 ECU.

Now suppose that Participant A decides that 60% of the amount of Participant B will be transferred to himself / herself (Participant A). Let's also assume that Participant B decides to destroy 0% of its amount.

The transfer from B to A will therefore be equivalent to 135 ECU (60% of 225 ECU).

The result for A will be equal to 360 ECU (the initial amount of 225 ECU plus the transfer of 135 ECU).

The result for B will be equal to 90 ECU (the initial amount of 225 ECU minus the transfer of 135 ECU).

Now suppose that in the example Participant B has decided to destroy 50% of his/her amount.

In this case, the transfer from B to A would be 67.5 ECU (60% of the amount of participant B remaining after step 2, which is the 50% of 225 ECU, equal to 112.5 ECU).

The result for Participant A will be 292.5 ECU (the initial amount of 225 ECU plus the transfer of 67.5 ECU).

The result for Participant B will be 45 ECU (the remaining amount of 112.5 ECU minus the transfer of 67.5 ECU).

Periods

The experiment consists of four periods. One of these will be randomly selected and will be paid to you in cash at the end of the experiment.

In the first three periods you will be asked to carry out the activity described above.

In each of these three periods, participants A and B will receive the initial amount of 225 ECU and will be randomly matched.

Each period differs in how the payments will be determined:

- in the first period you will be paid only on the basis of your results obtained in the activity;

- in the second period you will be paid based on the comparison of your result obtained in the activity with that obtained in the activity by the other participants of the group to which you belong (consisting of you and three other people who play the same role in the activity as you);

- in the third period, before carrying out the activity you will have to make a decision that will determine the scheme according to which you will be paid.

- In the fourth and final period you will only be asked to decide.

    Before each period, detailed instructions will appear on your computer screen about how you will be paid for carrying out the specific activity and / or the other choices you will have to make in the period in question, read them carefully!

End of the experiment

At the end of the last period, each participant will be informed of their results achieved in each game period as well as which period was randomly selected for payment.

Other information

Paper and pen

If you need them to calculate or write down something, you have a pen and paper to use during the experiment.

Questionnaire

At the end of the experiment, you will be asked to answer a short questionnaire. You will not receive any payment based on the answers given in the questionnaire. The data provided will be used anonymously.

Payment procedure

You will receive the amount due to you as payment immediately at the end of the experiment and after completing the questionnaire. Payment will be in cash and will be disclosed to you only.

Exercises

Before starting we ask you to do some exercises to familiarize yourself with the procedure. In these exercises you will have to determine the results from the activity in fictitious situations. You are not really paired with another participant. The results in the exercises will not be paid to you. When the exercises are finished, you will have the opportunity to ask questions to the laboratory manager again. Then the experiment will begin.

Recommendations

During the experiment we ask you to remain silent, turn off your mobile phone, do not communicate with other participants or try to recognize others or to be recognized. Any violation of the rules of the laboratory involves the exclusion from payments.

C.2 Screen instructions

Each paragraph corresponds to one screen, subjects had the possibility to go back and forward.

C.2.1 Stage 1

During this period, you will be asked to carry out the activity as explained in the paper instructions which you can consult at any time.

If this period were the one that is randomly selected to determine the payments, these will correspond to the result you obtained in the activity with the partner carried out as explained in the paper instructions.

C.2.2 Stage 2

During this period you will be asked to carry out the activity as explained in the paper instructions which you can consult at any time. If this period will be the one randomly selected to determine the payments, these will be determined by comparing your result with those of the other participants within the group to which you belong in the following way:

If your result is the highest obtained in the group you belong to (made up of you and three other participants with the same role as you): your payment will be equal to 4 times the result you have obtained; that of the other three participants will be zero.

If your result is not the highest obtained in the group you belong to: your payment will be zero; the payment of one of the other participants will be 4 times its result and that of the remaining two participants will be zero.

If your result will be the highest obtained in the group you belong to but equal to N other participants: with probability $1 / (N + 1)$ your payment will be equal to 4 times the result you obtained, that of the other three participants will be zero; with probability $1 - (1 / (N + 1))$ your payment will be zero, that of one of the other participants will be 4 times its result and that of the remaining two participants will be zero.

C.2.3 Stage 3

Each participant will first have to choose whether to be paid according to a system similar to the first period or according to a system similar to the second period.

After that, you will be asked to carry out the activity as explained in the paper instructions that you can consult at any time.

If this period were the one that is randomly selected to determine the payments, these will depend on the choice initially expressed and the result of the interaction with the partner carrying out the activity.

If you have chosen to be paid as in the first period, your payment will correspond to the result you obtained in the interaction with the partner by carrying out the activity as explained in the paper instructions.

If you have chosen to be paid as in the second period, the payments will be determined by comparing your result obtained in the third period with those of the other participants within the group to which you belong, obtained in the previous (so the second) period as follows:

If your score in the third period will be higher than all the other (three) participants in your group have achieved in the second period: your payoff will be 4 times your third period result.

If your result in the third period will not be higher than all those that the other (three) participants of the group to which you belong have achieved in the second period: your payment will be zero.

If your result will be the highest but tied with N other participants, i.e. your result in the third period is equal to the highest obtained by one or more of the other three participants of the group to which you belong in the second period: with probability $1 / (N + 1)$ your payment will be equal to 4 times the result you obtained in the third period; with probability $1 - (1 / (N + 1))$ your payoff will be zero.

C.2.4 Stage 4

Each participant will only have to choose whether s/he wants that the result obtained from the interaction with the partner by carrying out the activity in the first period to be paid in this case according to the system of the first period or according to the system of the second period.

Therefore, you will not have to carry out the activity this time. To calculate the payment for this period, the same result obtained in the activity of the first period will be used.

If this period were the one that is randomly selected to determine the payments, these will depend on your current choice and the result of the past interaction.

If you have chosen to be paid as in the first period, your payment will correspond to the result you obtained in the interaction with the partner by carrying out the activity as explained in the paper instructions.

If you have chosen to be paid as in the second period, the payments will be determined by comparing your result obtained in the first period with those of the other participants within the group to which you belong obtained in the same first period in the following way:

If your result in the first period is the highest of all those obtained in the first period by the group you belong to: your payment will be equal to 4 times your result obtained in the first period; that of the other three participants will be zero.

If your first period result is not the highest of all those obtained in the first period by the group you belong to: your payment will be zero; that of one of the other participants will be equal to 4 times its result and those of the remaining two participants will be equal to zero.

If your result in the first period is the highest among those obtained in the first period by the group to which you belong but equal to other N participants of the group to which you belong: with probability equal to $1 / (N + 1)$ your payment will be equal to 4 times your result of the first period, that of the other three participants will be zero; with probability $1 - (1 / (N + 1))$ your payment will be zero, that of one of the other participants will be equal to 4 times his result in the first period, and that of the remaining two participants will be equal to zero.