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Gender of the Opponent and Reaction to
Competition Outcomes

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Abstract

We investigate how the competition outcome and the gender of the opponent affect the decision to compete again, using a lab experiment. Our experimental design adopts the strategy method to measure individuals' reactions to winning or losing. Subjects indicate their willingness to compete again based on performance gaps with their opponents. Furthermore, gender is inferred from participant-selected-names, allowing for an exploration of the role played by the opponent's gender. We find that all subjects are slightly more willing to compete after winning against a female opponent. Also, it is slightly more likely that they accept to re-compete against a male after winning. Males try significantly more to outperform a female after losing, and this is robust when controlling for gender stereotypes and age.

Gender of the Opponent
and Reaction to Competition Outcomes

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Abstract

We investigate how the competition outcome and the gender of the opponent affect the decision to compete again, using a lab experiment. Our experimental design adopts the strategy method to measure individuals' reactions to winning or losing. Subjects indicate their willingness to compete again based on performance gaps with their opponents. Furthermore, gender is inferred from participant-selected-names, allowing for an exploration of the role played by the opponent's gender. We find that all subjects are slightly more willing to compete after winning against a female opponent. Also, it is slightly more likely that they accept to re-compete against a male after winning. Males try significantly more to outperform a female after losing, and this is robust when controlling for gender stereotypes and age.

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"I'm out to prove that a guy 55 years old, with one foot in the grave, can play with the best woman in the world and maybe beat her." - Bobby Riggs (1973)

1   Introduction

According to the latest report of UN Women (2022), only 28.30% of women held managerial positions worldwide in 2020. Robust evidence from developed countries indicates that this enduring occupational segregation significantly contributes to wage disparities between men and women (Sorensen, 1990; Groshen, 1991; Blau and Kahn, 2017; Cortes and Pan, 2018). Women's access to high positions remains limited, as evidenced by the number of women at the head of a CAC40 company (i.e. only three in 2023).[1] It is well known that occupations are disproportionately distributed by gender, and occupations over-represented by women tend to pay lower wages than occupations over-represented by men (Goldin, 2014). Beyond horizontal segregation, vertical segregation—marked by the concentration of women and men in distinct grades, levels of responsibility, or positions—warrants considerable attention. Among OECD countries, we observe a 19.10% salary differential favoring men in the 9th decile of salary range, compared to a 10.60% difference for those in the bottom salary range (OECD, 2023). These figures give evidence of the existence of the "glass ceiling" effect (Arulampalam et al., 2007). There are several reasons why women do not advance in their career at the same pace as men do. Perceived or experienced discrimination (e.g., Hersch, 2007; Azmat and Petrongolo, 2014) and the trade-off between women's professional careers and personal lives (DiBenedetto and Tittle, 1990) are key factors that contribute to this gender gap. Women's aspirations may be hindered both by self-perception (Beaman et al., 2012), and by other external factors; for instance, their promotion opportunities decrease in contexts where male leaders dominate (De Paola and Scoppa, 2015). The under-representation of women in senior and high-paying positions fuels a vicious circle, discouraging younger women to aspire for similar roles (Ellingrud et al., 2016; Morais Maceira, 2017). People who want

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[1]CAC40 is the French stock market index that tracks the 40 largest French stocks.

to advance in their careers must confront competitive environments and situations, such as admission procedures, job applications, promotion tournaments, and competition between entrepreneurs. Therefore, individual attitude in competitive environments contributes to determine an individual's career trajectory, at least partially (Buser and Yuan, 2019).

An extensive literature in experimental economics provides evidence of gender differences in competitiveness, and this evidence has become a popular explanation for gender differences in labor market outcomes (e.g Gneezy and Rustichini, 2004; Niederle and Vesterlund, 2007; Balafoutas and Sutter, 2012).[2] Indeed, in the labor market, competitiveness is valuable for accessing promotions or high-paying (and highly competitive) positions. Once documented a relevant gender gap in competitiveness (Niederle and Vesterlund, 2007), several papers have analyzed how different features of the competition (high vs. low stakes, identity of the opponent, repeated vs. one-shot, feedback provision, etc.) or different individual attributes (i.e. family background, age, culture, race, etc.) play a role in it (Dreber et al., 2014; Sutter and Glätzle-Rützler, 2015; Almås et al., 2016; Nicholls, 2022; Hauge et al., 2023).

In this paper, we focus on the features of the competition, and more specifically, we investigate the effect of two of them combined: the effect of winning or losing in a previous competition and the gender of the opponent. We investigate how these two factors affect subsequent willingness to compete again. We consider this particularly relevant because both features are crucial characteristics of the competitive environment in real life. Indeed, career decisions are made sequentially (i.e. employees apply for promotions repeatedly), and at the end of each competition, candidates are typically informed about the outcome (i.e. whether they obtained the promotion) and are aware of the gender of the competitor. To achieve top positions, what matters is not only subjects' willingness to compete but their

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[2]A recent strand of literature has put the role of competitiveness under scrutiny. In particular, Gillen et al. (2019) show that measurement error in measures of risk attitudes and overconfidence might induce to overestimate the importance of competitiveness in lab experiments. Van Veldhuizen (2022a) re-examine this result using a novel experiment and claims that the entire gender gap is driven by gender differences in risk attitudes and self-confidence.

willingness to re-compete after losing a single competition. As empirical data show that women are more likely to drop out after experiencing setbacks, especially in male-dominated fields (Price, 2010; Ellis et al., 2016; Buser and Yuan, 2019), it becomes crucial to investigate how men and women react to losing or winning, and whether this is affected by the gender of the competitor, to shed light on mechanisms that rule labor market dynamics.

The milestone experimental study on gender differences in willingness to compete is Niederle and Vesterlund (2007). It documents, in a lab experiment, a large gender gap in tournament entry, driven by men being more overconfident and more willing to perform in a competition. After it, most of the literature on the topic has confirmed that men tend to be more confident and more competitive than women (Kamas and Preston, 2012; Dreber et al., 2014; Ludwig et al., 2017; Alan et al., 2020). The observed trend is generally an over-representation of low-performing men and an under-representation of high-performing women in competition. While in a lab setting, these sub-optimal choices directly impact the payment of subjects, at the macro level, a loss of efficiency is incurred if qualified women are not assigned to high positions (in favor of less able men). The analysis of public interventions, aimed at reducing the gender gap in competitiveness and in the labor market, shows that these differences are not irreversible (Balafoutas and Sutter, 2012; Beaman et al., 2012).

Moving from the individual characteristics to the features of the competition, Buser et al. (2023) test and confirm the validity of the result on gender difference in willingness to compete in a quasi-experimental real-world setting with exceptionally high stakes.[3] In this study, the authors analyze also how the willingness to compete is influenced by the gender of the opponent, finding that women tend to avoid competing against men. On the other hand, men seem to anticipate female behavior, and show a larger willingness to compete against women. As in many tasks, there are stereotypes regarding gender differences in performance, it is important to study how the gender of the opponent affects participants' behavior in a competition. In recent experiments in the US and China, He and Noussair

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[3]Cai et al. (2019) also report that compared to male students, females underperform on the most competitive and high-stakes China's entrance exam.

(2024) investigate whether men incur a psychological cost when they are outperformed by a female competitor. They find that in China men are willing to pay more to hide that they lost regardless of the gender of the competitor, while there is no gender difference in the US. In China, women are more ashamed to lose to another woman than to a man, while in the US, the opposite occurs. The identity of the opponent is also the focus of Apicella et al. (2017), who look at the competition against oneself versus against others and find no evidence of a gender difference in the willingness to self-compete. Both papers suggest the importance of the identity of the subject against whom an individual competes.

Another important feature of the competition is whether the decision to compete is or is not one-shot. To better mimic the labor market setting, it is crucial to study not only the willingness to compete in a single competition, but also how this willingness evolves in response to winning and losing in repeated competitions. Empirical evidence has shown that in male-dominated fields, women are more likely than men to drop out after experiencing setbacks (Katz et al., 2006; Goldin, 2015; Fischer, 2017). Some experimental studies test whether winning or losing in a competition affects subjects' behavior in a subsequent competition, and whether men and women react differently in ways that may enhance the gender gap. In a lab experiment, Buser (2016) studies the effect of a competition's outcome on the willingness to seek further challenges and they find gender differences in reaction to winning or losing. Men react to losing by picking a more challenging target while women lower their performance. Gill and Prowse (2014) investigate the effect of winning or losing on later performance and find that women's performance decreases after losing, while for men it does only for high-stakes.

Testing the effect of competition outcomes on behavior in a second competition raises the question of whether feedback induces belief updates. Evidence is inconclusive. Some studies (Ertac and Szentes, 2011; Wozniak et al., 2014) show that precise performance feedback reduces the gender gap in competitiveness. Others (Cason et al., 2010; Möbius et al., 2022) find that the gap persists, with men updating their beliefs less conservatively and being

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less feedback-averse. Research (Albrecht et al., 2013; Berlin and Dargnies, 2016; Buser et al., 2018; Coutts, 2019) consistently shows that women update beliefs more conservatively and react strongly to personal performance feedback. Baier et al. (2024) find that rank feedback encourages more women to compete. Buser and Yuan (2019) reveal that women are less likely than men to compete again after losing. Fang et al. (2021) link this gender difference to labor market disparities, noting girls are more likely to drop out after failing in previous competitions, especially in countries with larger labor market gender gaps.

Compared to previous studies, we are the first to combine two features of the competitive environment: the effect of winning or losing in a previous competition and the gender of the opponent. Our primary outcome is the subsequent willingness to compete again. We implement a novel design in which we use a strategy-elicitation method where subjects have to report whether they are willing to compete a second time, based on a sequence of different point gaps between their performance and their opponent's performance. Through this strategic method, we can identify the switching point in subjects' decisions to re-compete. This method provides a continuous and hence more nuanced measure of participants' (dis)taste for competition. At a secondary level, we examine how subjects perform after a winning or losing to investigate potential gender differences in the inclination to outperform an opponent of the opposite (same) gender. In addition to the willingness to re-compete and the performance, we elicit individuals beliefs to examine how they evolve throughout the competition. Indeed, if gender stereotypes are shared by men and women, beliefs about the opponent could play a role in their decision to compete.[4]

Our findings first reveal a gender gap in the taste for competition, with men exhibiting a higher willingness to compete compared to women, in line with previous studies. Both men and women show slightly, albeit statistically non-significant, preference for the tournament payment scheme when competing against female counterparts. After winning

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[4]In Mago and Razzolini (2019) and Geraldes (2020), women are discouraged to perform against males. In Datta Gupta et al. (2013), when men know that they will compete against a woman, they choose more the competition, but this trend is reversed when they think that the woman is abler than them.

against a woman, men are less willing to compete against her again, compared to after winning against a man. After losing against a woman, men are more willing to repeat the competition, compared to after losing against a man. This pattern is only significant for overconfident men.[5] Women compete more after winning and compete less when they are overconfident, regardless of their opponent's gender. This result suggests that the reaction to winning or losing does not necessarily operates through beliefs' updating. Regarding the evolution of performance, we observe significant differences after losing. Men, after losing and re-entering competition against women, substantially improve their performance. Women perform consistently in both stages, regardless the outcome and the gender of their opponent.

The rest of the paper is structured as follows. In Section 2, we present the experimental design. We report in Section 3 our testable hypotheses, and in Section 4 the main results. Finally, Section 5 concludes the paper.

2 Experimental Design

2.1 Task

We conduct an experiment in which participants solve a real task: they are asked to add up sets of five two-digit numbers and fill in the sum in the blank box (Niederle and Vesterlund, 2007). Each subject repeats this task for 3 minutes over four stages (see Subsection 2.2 for a detailed description of the stages). Participants can use paper and pens provided, but cannot use their telephone or calculator.[6]

At the beginning of the experiment, subjects fill in a questionnaire with socio-demographic questions (gender, age, and education). Then, they have to choose a name from a list of most given babies' names in 2020 in France (INSEE). Subjects choose from

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[5]Men who expect to win and end up loosing.

[6]Refer to Subsection 2.4 for a description of the procedure and to Appendix A.6 for the complete instructions of the experiment.

a list of female and male names according to the gender declared in the survey. A survey conducted prior to this experiment allows checking that the first names were unanimously perceived as female or male (see Appendix A.1).[7] At this point, subjects are randomly matched with an opponent. The matching is made in order to have a sufficient number of participants in each condition: Male vs. Male, Female vs. Female, Male vs. Female and Female vs. Male (henceforth respectively MM, FF, MF and FM). Subjects keep the same opponent all along the experiment. In Stage 2, participants are implicitly informed of the gender of their opponent by the disclosure of the name previously chosen by our subjects. Then, they are reminded of their opponent's name at each tournament stages.

2.2 Game Description - Part I

In this Section, we describe all stages of the game that participants play in the first part of the experiment (Part I). Figure 1 shows the timeline of the game. Refer to Appendix A.6 for the complete instructions of the experiment.

Stage 1: Piece rate

In Stage 1, participants perform the task for 3 minutes, under a piece rate payment scheme. They receive 0.50 Euro for each correct sum. Subjects are informed on their performance in this stage at the end of Part I of the experiment.

Stage 2: Tournament

In Stage 2, subjects perform the task for 3 minutes, under a tournament scheme. In this stage we disclose subjects' chosen names at the beginning of the stage. Subjects are randomly paired and compete against each other. In this form of tournament, the best performer receives 1.50 Euros for each correctly solved problem, while the other receives zero (winner-takes-all tournament). Ties are broken randomly. Subjects are informed on their performance in this stage at the end of the part I of the experiment. At the end of this

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[7]If the participant answered "Others", they are offered a list of male and female names. At the end of the experiment, 75.17% of participants correctly guessed the gender of their opponent.

Figure 1: Timeline of the experiment (Part I)

stage, we elicit subjects' beliefs about their status: subjects guess whether they won or lost. Correct beliefs are rewarded with 1.00 Euro (henceforth *Beliefs 2*).

Stage 3: Choice of payment-scheme

In Stage 3, subjects decide on their payment scheme, i.e. whether they want to be paid based on a tournament or based on a piece rate. If they opt for the piece rate (henceforth referred to as Stage 3PR), the compensation is determined by the number of correct answers, as in Stage 1. Alternatively, if participants choose the tournament option (henceforth referred to as Stage 3T), their performance is compared to their opponent's performance in Stage 2. If they solve more problems in Stage 3T than their opponent solved in Stage 2, they receive a payment of 1.50 Euros per correct answer, otherwise they receive 0.00 Euros. Subjects perform the task for 3 minutes and their remuneration is based on

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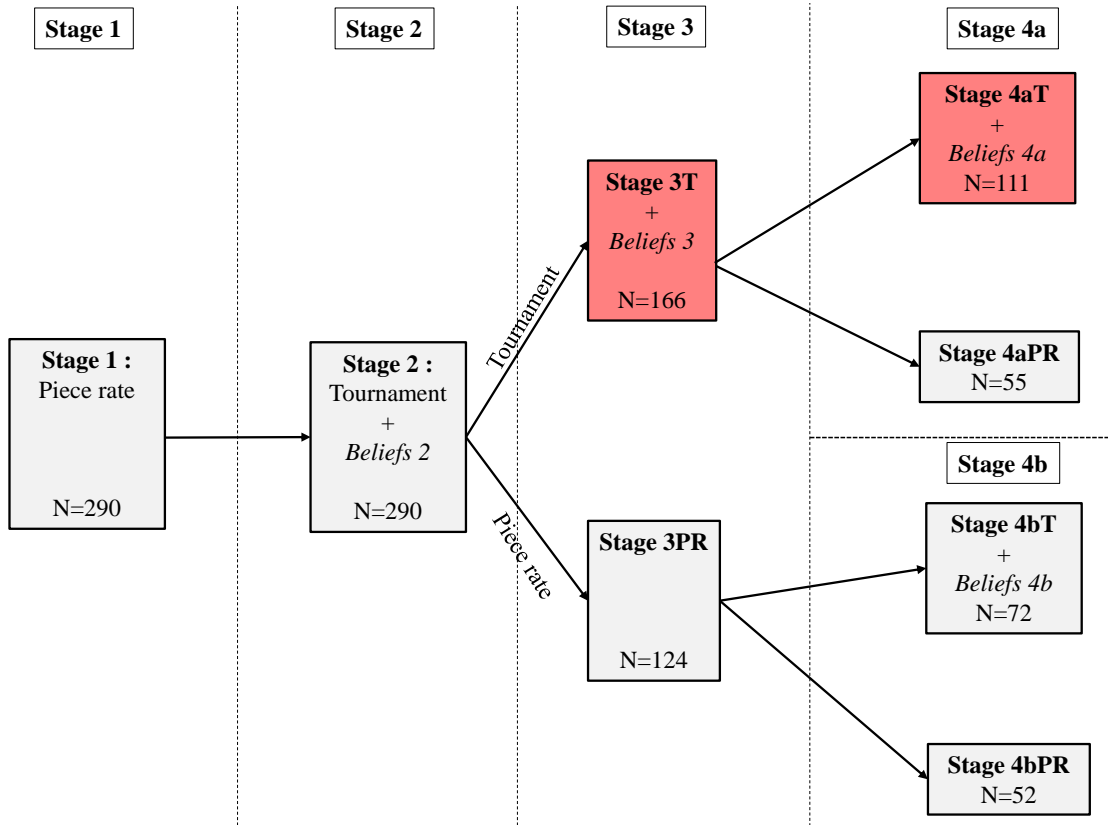the chosen payment scheme. At the end of this stage, we elicit subjects' beliefs about their status: subjects guess whether they won or lost. Correct beliefs are rewarded with 1.00 Euro (henceforth *Beliefs 3*). Subjects are informed on their status in this stage (i.e., whether they won or lost) at the end of this stage. Subjects who choose piece rate are informed about their performance at the end of Part I of the experiment.

After Stage 3, we split our sample based on the chosen payment scheme. Therefore, we can distinguish subjects who show a taste versus distaste for competition. In the subsequent stage, participants who opted for the tournament payment scheme in Stage 3 are assigned to Stage 4a, while those who chose the piece rate in Stage 3 are assigned to Stage 4b.

Stage 4a: Second entry into competition
After receiving feedback on their status (winner/loser) at the end of Stage 3, participants enter Stage 4a. Here, they are presented with the option to decide whether they want to compete again against the same opponent. We use strategy elicitation method by providing them with a sequence of hypothetical points gap between their and their opponent's performance. Subjects observe a scale displaying the performance gap and are given the option to accept the competition (or not) for each gap (see Figure 2). Once a decision is made, we disclose the actual point gap between the participant's performance and that of their opponent in Stage 3. If the participant's choice was to decline to compete for the actual point gap, they receive payment according to the piece rate (Stage 4aPR). Alternatively, if the participant's choice was to accept to compete, payment is determined by the tournament payment scheme (Stage 4aT). Subsequently, their performance in Stage 4 is compared to that of their opponent. At the end of this stage, we elicit subjects' beliefs about their status: subjects guess whether they won or lost (henceforth *Beliefs 4a*). Correct beliefs are rewarded with 1.00 Euro.

Would you "accept or "not accept" to compete again against Louis, according to the following different scenaria from the previous stage?

	I accept	I do not accept
You have solved correctly the same number of sums, so you are tied	o	o
You have solved correctly 1 more sum	o	o
You have solved correctly 2 more sum	o	o
You have solved correctly 3 more sum	o	o
You have solved correctly 4 more sum	o	o
You have solved correctly 5 more sum	o	o
You have solved correctly 6 more sum	o	o
You have solved correctly 7 more sum	o	o
You have solved correctly 8 more sum	o	o
You have solved correctly 9 more sum	o	o
You have solved correctly 10 more sum	o	o

(a) Winners

Would you "accept or "not accept" to compete again against Louis, according to the following different scenaria from the previous stage?

	I accept	I do not accept
You have solved correctly the same number of sums, so you are tied	o	o
Your opponent solved correctly 1 more sum	o	o
Your opponent solved correctly 2 more sum	o	o
Your opponent solved correctly 3 more sum	o	o
Your opponent solved correctly 4 more sum	o	o
Your opponent solved correctly 5 more sum	o	o
Your opponent solved correctly 6 more sum	o	o
Your opponent solved correctly 7 more sum	o	o
Your opponent solved correctly 8 more sum	o	o
Your opponent solved correctly 9 more sum	o	o
Your opponent solved correctly 10 more sum	o	o

(b) Losers

Figure 2: Example of the performance gap's scale

Stage 4b: WTP to avoid competition

Participants who choose the piece rate payment scheme in Stage 3 are forced to compete in Stage 4b. Participants can avoid the competition by giving up a certain amount of their total gain. This amount of money corresponds to their willingness to pay (WTP) to avoid the tournament. At the same time, an amount of money is picked randomly by the experimenter; we refer to it as the willingness to pay random (WTP_R). The amount randomly chosen is deducted from the participant's total gains. Based on the subject's choice and the random pick, there are two possibilities:

- If $WTP < WTP_R$ (i.e., the amount chosen by the subject is lower than the amount randomly chosen): subjects have to compete (Stage 4bT). After the tournament, we elicit their beliefs, and correct beliefs are rewarded with 1.00 Euro (henceforth *Beliefs 4b*).

- If $WTP \geq WTP_R$ (i.e., the amount chosen by the subject is higher than the amount randomly chosen): subjects avoid the tournament (Stage 4bPR).

Stage 4b is designed as an alternative to Stage 4a to further reveal competitive

preferences. It highlights the pronounced aversion to competing of some subjects who choose a high level of WTP and a nuanced taste (or even indifference) for those who choose a low level of WTP. As this stage falls outside the primary scope of our work, results from Stage 4b are not incorporated into the main text but are detailed in the Appendix A.3.

2.3   Risk Preferences and Gender Stereotypes - Part II

In the second part of the experiment (Part II), we elicit Risk Preferences and Gender Stereotypes of participants. We elicit Risk Preferences by using the Bomb Risk Elicitation Task (BRET), by Crosetto and Filippin (2013) and available on oTree[8]. In this game, there are 100 boxes with one containing a bomb. Subjects know that the bomb can be anywhere with the same probability. They simply have to choose how many boxes they want to collect. If they fall on the bomb they win a total of 0.00 Euro; otherwise they win 0.05 Euros per box collected. We elicit gender stereotypes through the Gender Role Attitudes Scale (GRAS) (García-Cueto et al., 2015). This survey includes questions that elicit Transcendence and questions that elicit Sexism. Sexism is defined as discriminatory attitudes or beliefs about gender. Transcendence is characterized by the breaking of gender norms (i.e., "defenders of equality" as defined by García-Cueto et al., 2015).

We also ask our subjects about the presumed topic of our study in order to rule out possible experimenter demand effect. Finally, in order to make sure that the gender of the opponent is salient enough, we ask participants to report the name chosen by their opponent during the experiment and the gender of their opponent. We conceal these questions by also asking two additional random questions (i.e., "why did you choose the tournament in Stage 3?" and "what was your final payment?").

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[8]Holzmeister and Pfurtscheller (2016)

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2.4 Procedure

The experiment was pre-registered at AEA RCT Registry[9], and approved by the Ethics Committee of the University of Paris Nanterre. We conducted the experimental sessions at the "Laboratoire d'Economie Expérimentale de la Défense" (Courbevoie, France) during the period from December 2022 to January 2023. The experiment was computerized using the oTree software (Chen et al., 2016).

The experimental sessions had an approximate duration of 45 min, and the average final payment was 13.70 Euros. For the final payment, we used the Random Incentive System. Subjects were aware that only one out of the four stages of the game was taken into account for the final payment. The final amount payed out to each subject was the sum of the following: the payoff of the randomly chosen stage from Part I, the payoff obtained in the BRET task (Part II), and the show-up fee of 9.00 Euros.

3 Hypotheses

In this study we investigate individual behavior in a competitive environment. In particular, we focus on the individuals' reaction to a previous competition's outcome (winning or losing), and whether this reaction is influenced by the gender of the opponent. The reaction is assessed by the identification of a subject's switching point for re-entering into the competition, which depends on the relative point difference between the subject themselves and the opponent in the previous stage (see Figure 2). A higher switching point indicates a higher inclination to repeat the competition. We formulate hypotheses related to how individual switching point is affected by the outcome of the previous tournament and by the gender of their opponent separately for men and women.

Buser et al. (2023) reveal that willingness to compete is influenced by the gender of the opponent: women tend to avoid competing against men, while men, anticipating

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this behavior, show a greater willingness to compete against women. Buser (2016) finds that men respond to losing by selecting more challenging targets. Similarly, Buser and Yuan (2019) report that men are more likely than women to re-enter competition after a loss. Moreover, men tend to be more overconfident than women, especially if the task is stereotypically masculine, such as mathematical tasks (Nosek et al., 2002; Guiso et al., 2008; Bordalo et al., 2019). According to Bordalo et al. (2019), beliefs about others are similar to beliefs about own performance. On the basis of this finding and the fact that men perform better in mathematical tasks (Nosek et al., 2002; Guiso et al., 2008), we believe that male subjects in our sample are confident about their performance and that of their male counterparts. Based on the aforementioned stereotypes, men expect women to perform worse in mathematics and consequently men are more likely to expect to win against a female opponent. Thus, we expect men's switching point after winning to be higher against a woman than against a man (Price, 2008). On the other hand, losing against a female opponent changes expectations leading to a lower switching point because men have an "additional disutility" after losing against a high-performing woman (Datta Gupta et al., 2013). We believe that this "disutility" lies in the belief that women perform poorly at mathematical tasks. This stereotype, as mentioned above, implies that men are more confident when competing against a female opponent. Therefore, negative feedback (i.e., learning that they lost) impedes men's willingness to recompete due to disappointment (as evidenced by Gill and Prowse, 2012). After losing, we predict that men's switching point is lower when they compete against women, compared to when they compete against men. This predicted outcome is similar to the one found by Datta Gupta et al. (2013): men refuse to compete in anticipation of the cost of losing to a woman. The notable difference in our study is that men choose to compete (or not) after being already defeated by a woman. We derive then our first hypothesis:

Hypothesis 1: Men's switching point is higher after winning against a woman than against a man. Men's switching point is lower after losing against a woman than

against a man.

Empirical studies have demonstrated that women are more likely than men to withdraw after encountering setbacks in fields dominated by males (Katz et al., 2006; Goldin, 2015; Fischer, 2017). Buser (2016) finds that women tend to lower their performance after loosing. Similarly, Gill and Prowse (2014) examine the effects of winning and losing on subsequent performance, discovering that women's performance decreases following a loss. Additionally, Buser and Yuan (2019) show that women are less inclined than men to re-enter competition after experiencing a loss. Fang et al. (2021) find that girls are more likely to withdraw after failures in previous competitions, particularly in countries with wider gender gaps in the labor market. Regardless of losing or wining, female players are more reluctant to compete against men (Geraldes, 2020). Therefore, we conjecture that also women's switching point depends on the gender of their opponent, and not only on the outcome of their previous performance. Furthermore, since women are generally more risk averse and underconfident than men, we expect women to shy away from competition after losing. Women's decision to compete is positively influenced by previously winning in Stage 3T because of the increase in their confidence and because the feedback helps to reduce uncertainty. However, we believe that this pattern is only observed when competing against female counterparts. Against a man, women may refuse to compete even if they won previously. With larger point gaps in their favor, women choose the piece rate scheme against men because of self-restraint or the female modesty effect (Heatherington et al., 1993).

Hypothesis 2: Women's switching point is lower when competing with a man compared to when competing with a woman. Additionally women's switching point is lower after loosing than after winning, regardless of the gender of the opponent.

4 Results

Our sample is composed of 290 participants: 58.28% of them are females, 41.38% are males, and 0.34% of the participants do not report their gender.[10] Subjects are, on average, 35.34 years old. Table 1 presents a summary of descriptive statistics. It includes information on competitiveness, performance in the different stages of the game, percentage of winners, risk preferences, gender stereotypes, age, and education. We show the statistics for the full sample, splitting by gender (male/female), and by condition (MM, FF, MF-FM). The variable competitiveness corresponds to the choice of payment-scheme at Stage 3 (0 = piece rate and 1 = tournament). The variables Sexism and Transcendence correspond to the sum of the Likert scale score. A lower score in Sexism corresponds to milder sexist beliefs although a higher score in Transcendence is associated with a lower compliance with sexist norms.

Subjects collect an average of 43.20 boxes out of 100 in the BRET. Women are significantly more risk-averse than men (Mann-Whitney, henceforth MWU, $p = 0.00$). Men show a significantly higher level of sexism than women (MWU, $p = 0.00$) and a lower level of transcendence (MWU, $p = 0.04$).

Overall, we do not find gender differences in performance in the task (4.88 vs. 4.37) (MWU, $p = 0.09$).[11] Under competition, women solve slightly fewer problems than men (Stage 3T and Stage 4aT; respectively MWU, $p = 0.05$ and $p = 0.02$). Nevertheless, there is an equal distribution of male and female winners in each tournament. Indeed, we find no significant differences between men and women in the proportion of winning, in any tournament (Stage 2, Stage 3T, Stage 4aT, Stage 4bT, respectively χ^2, $p = 0.60$; $p = 0.53$; $p = 0.44$; $p = 0.88$). We do not find significant differences in performance in Stage 1 (4.12 vs. 3.60, MWU, $p = 0.11$) and in Stage 2 (4.77 vs. 4.34, MWU, $p = 0.28$).

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[10] Only one participant answered "Others" and we excluded this observation from the analysis. Nevertheless, we kept the gender information communicated (through their chosen name) to their opponent.

[11] See Figure A2 (Appendix A.2) for the performance evolution across the stages, based on the chosen payment scheme.

	Gender			Condition			
	Female	Male	*p*	All	MM	FF	MF-FM
Competitiveness (%)	49.70	67.75	*0.00*	57.24	60.71	53.85	58.46
Average performance	4.37	4.88	*0.09*	4.61	4.75	4.35	4.71
(s.d.)	(2.10)	(2.58)		(2.33)	(2.58)	(2.19)	(2.32)
Stage 1	3.60	4.12	*0.11*	3.84	4.07	3.65	3.89
Stage 2	4.34	4.77	*0.28*	4.53	4.66	4.30	4.64
Stage 3PR	4.34	3.82	*0.14*	4.18	4.14	3.96	4.39
Stage 3T	5.21	5.83	*0.06*	5.56	5.65	5.23	5.67
Stage 4aT	5.20	6.48	*0.02*	5.91	6.33	5.24	5.98
Stage 4aPR	4.75	5.56	*0.27*	5.15	5.46	5.30	4.74
Stage 4bT	4.64	4.53	*0.94*	4.61	4.55	4.23	4.97
Stage 4bPR	4.30	3.59	*0.09*	4.00	3.69	4.22	4.00
Distribution of winners (%)							
Stage 2	56.94	43.05	*0.60*	-	-	-	-
Stage 3T	49.01	50.98	*0.54*	-	-	-	-
Stage 4aT	48.78	51.21	*0.44*	-	-	-	-
Stage 4bT	77.14	22.86	*0.88*	-	-	-	-
Risk preferences							
Number of boxes (BRET)	38.70	49.85	*0.00*	43.20	51.60	39.03	43.20
Gender stereotypes							
Sexism	26.75	32.63	*0.00*	29.15	32.77	27.32	29.15
Transcendence	26.35	25.12	*0.04*	25.85	25.62	26.10	25.76
Age	37.82	31.88	*0.02*	35.34	30.84	39.12	34.10
Education (%)							
- Arts, Letters and Languages	10.65	6.67	*0.24*	8.97	8.93	15.38	3.88
- Law, Politics, Economics	37.28	41.67	*0.45*	38.97	35.71	28.85	48.84
- Social and Human Sciences	13.02	13.33	*0.94*	13.45	16.07	14.42	10.85
- Techno, Health and Engineering	10.65	23.33	*0.00*	15.86	28.57	11.54	13.95
- Other	28.40	15.00	*0.01*	22.76	10.71	29.81	22.48
N	169	120		290	56	104	129
	(58.28 %)	(41.38 %)			(19.38 %)	(35.99 %)	(44.64 %)

Table 1: Summary of descriptive statistics

4.1 First entry into competition: Stage 3

In Stage 3, 49.70% of women and 67.75% of men choose the tournament payment scheme (χ^2, $p = 0.00$). This finding is in line with results from previous studies that report gender differences in competitiveness (Niederle and Vesterlund, 2007; Balafoutas and Sutter, 2012; Van Veldhuizen, 2022b). Figure 3 illustrates the percentage of subjects who decide to enter into the competition in Stage 3, across conditions. On the left, we present the bars representing males (MM and MF conditions), while on the right, we depict the bars for females (FM and FF conditions). We observe a non-significant pattern where both men and women are slightly more willing to compete against female opponents (χ^2, respectively $p = 0.14$ and $p = 0.17$). This result aligns with findings from previous studies (Datta Gupta et al., 2013; Burow et al., 2017). The elicitation of beliefs that we conduct after the task shows that men are significantly more confident than women: 75.21% of men expect to win versus 55.03% of women (χ^2, $p = 0.00$). For both men and women, confidence is not affected by the gender of the opponent (χ^2, respectively $p = 0.20$ and $p = 0.23$).
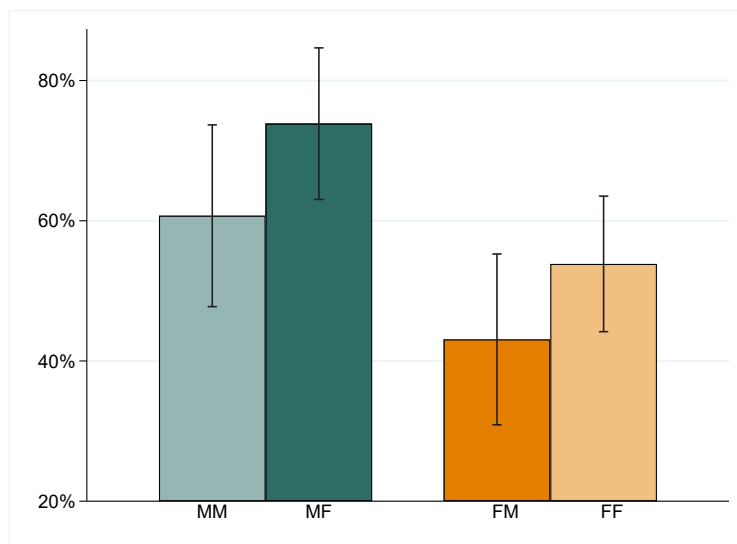

Figure 3: Percentage of subjects choosing the competition in Stage 3, by gender and condition

In Table 2, we conduct four specifications using a Probit model to understand the driving factors of deciding on the choice of payment-scheme in Stage 3. The dependent

variable takes the value 1 if the subject chooses the tournament, and 0 otherwise. Columns (1) and (2) refer to male observations, and columns (3) and (4) to female observations. In all specifications the explanatory variables are: Female opponent (takes value 1 if the opponent is a female, and 0 otherwise), Risk aversion (takes value 1 if the subject collects less than 50 boxes at the BRET task, and 0 otherwise), Age, Sexism, Transcendence, and *Beliefs 2* (takes value 1 when the participant expects to win in Stage 2, and 0 otherwise). In columns (2) and (4), we add the interaction between the gender of the opponent and the beliefs on Stage 2 (Female opponent × *Beliefs 2*).

Entry into the competition seems to be mainly influenced by *Beliefs 2*: men and women who expect to win in Stage 2 are significantly more likely to choose the tournament payment scheme than the piece rate in Stage 3. We observe a significant and positive effect of Transcendence for males (columns 1 and 2), suggesting that lower gender stereotypes (i.e., being more transcendent) significantly increase the probability to choose the tournament in Stage 3. We do not find any significant coefficient for Female opponent[12], Risk aversion[13], Age, or Sexism on the decision to compete. Our interaction term is insignificant for males and females, indicating that confident participants are indifferent to the gender of their opponent when deciding whether to compete in Stage 3. In fact, the main driver to decide whether to compete or not are beliefs, meaning that participants who expect to win in Stage 2 are more likely to enter into competition in Stage 3, irrespective of their own gender or that of their opponents.

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[12]Even if the gender of the opponent does not seem to have, on average, an impact on the decision to compete, two subjects reported that they took this variable into account when choosing the tournament. Indeed, to the question "why did you choose the tournament?", the participants' answer was: "my opponent's name was female" and "because I thought I had a good chance of winning against a girl, girls are generally less good at maths than boys".

[13]On average, competitive participants collect 44.22 boxes, and non-competitive collect 41.84 boxes (MWU, $p = 0.25$).

| | Entry competition | | | |
| | Males | | Females | |
	(1)	(2)	(3)	(4)
Female opponent	0.40	0.71	0.24	0.27
	(1.50)	(1.36)	(1.14)	(0.88)
Risk aversion	0.22	0.22	0.01	0.01
	(0.84)	(0.82)	(0.04)	(0.04)
Age	0.00	0.00	-0.00	-0.00
	(0.21)	(0.18)	(-0.69)	(-0.67)
Sexism	0.00	0.00	-0.01	-0.01
	(0.00)	(0.08)	(-0.57)	(-0.57)
Transcendence	0.10**	0.10**	-0.01	-0.01
	(2.66)	(2.69)	(-0.27)	(-0.27)
Beliefs 2	1.04***	1.25**	0.78***	0.82*
	(3.48)	(2.95)	(3.79)	(2.47)
Female opponent X *Beliefs 2*		-0.44		-0.06
		(-0.73)		(-0.15)
Constant	-3.05*	-3.23*	0.01	-0.02
	(-2.31)	(-2.37)	(0.01)	(-0.01)
Observations	120	120	169	169

Notes: Probit model regressions. t statistics in parentheses and standard errors are robust.
Dependent variable in (1) - (4): Entry competition.
Specifications (1) - (2): Only males. Specifications (3) - (4): Only females.
Independent variables described in text. *, **, *** indicate significance at the 5%, 1%, 0.1% level, respectively.

Table 2: Determinants of entry into competition in Stage 3.

4.2 Second entry into competition: Stage 4a

In this section, the analysis focuses on the second choice of payment-scheme, i.e., choice of tournament at Stage 4a.[14] In this stage, we measure subjects' competitiveness based on their switching point. The switching point is defined as the performance difference at which individuals opt to switch from engaging in competition to refraining, or conversely. The advantage of the switching point is that it provides a continuous measure of subjects' level of competitiveness. After losing, participants switch from accepting to compete for smaller points gaps to refusing to compete for larger points gaps.[15] Reversely, after winning, the switching point goes in the opposite direction: participants switch from refusing to accepting.[16] To facilitate the interpretation of the results, we standardize the switching point to ensure that it points always in the same direction. Therefore, the higher the value of the switching point, the more willing is a participant to compete again.

Figure 4 illustrates the distribution of the switching points, conditional on the outcome of Stage 3T (winning, in panel (a), and losing, in panel (b)) and the gender of the participant (green bars for males, and orange bars for females). Overall, we observe similar patterns in the distribution of the switching points for men and women (Two-sample Kolmogorov–Smirnov, $p = 0.81$). After winning (Figure 4a), the distribution is skewed to the right with a peak in the upper limit (i.e., a switching point of 11), while after losing (Figure 4b), the distribution is skewed to the left with a mild peak in a switching point of 2 for men and 3 for women. After losing, men and women are equally willing to accept the

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[14]In Appendix A.3, we analyze the data corresponding to the subjects that choose the piece rate payment scheme in Stage 3. Moreover, Appendix A.4 includes additional analyses.

[15]For example, after losing, a switching point of 8 means that the subject accepts to compete for a point gap inferior at 8. If the opponent solved 8 problems (or more) than the subject, the subject refuses to compete. This approach to coding the variable excludes by default participants who have switched more than once although our results are robust when including them. Table A5 in Appendix A.5 presents four specifications using a Tobit model with switching point as dependent variable ranging from 0 to 11. In this robustness check, the switching point of those who switch more than once (7 men and 7 women) are taking into account. However, we always exclude from the analysis those who only accept to compete for one point gap (N = 2) and those who switch in the opposite direction for the switching point after winning (N = 15).

[16]For example, after winning, a switching point of 5 means that the participant does not want to compete for point gaps inferiors (or equal) to 5. We code the switching point after winning following the same logic as after losing. Only a minority of the subjects (N = 15) switch from accepting to refusing to compete.

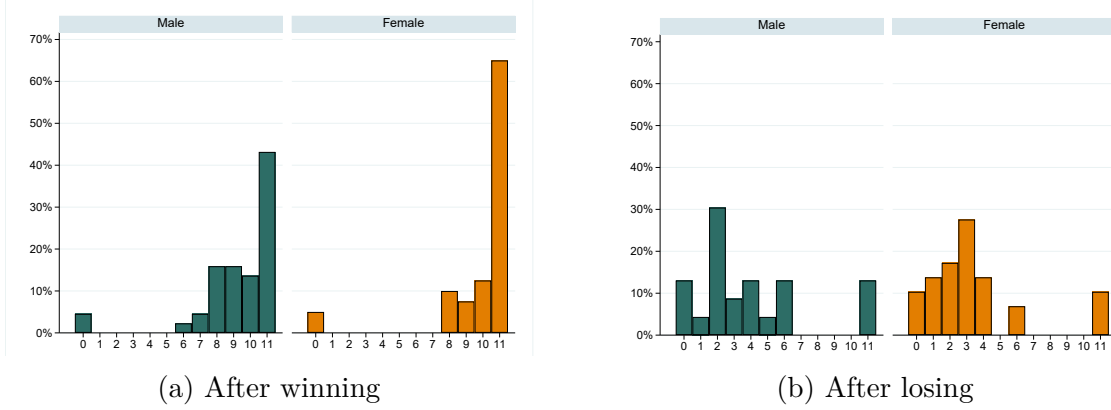(a) After winning   (b) After losing

Figure 4: Distribution of the switching point, by outcome in Stage 3T and gender of the subject.

competition for any points gap, i.e., a switching point equals to 11 (13.04% vs. 10.34%, χ^2, p = 0.51). Nevertheless, after winning, women are more likely to compete again for any points gap, compared to men (65.00% vs. 43.18%, χ^2, p = 0.04). The findings suggest that both men and women exhibit increased levels of competitiveness after winning, with this trend being particularly pronounced among women.

We further investigate whether the gender of the opponent affects the decision to compete again. Figure 5 shows the average switching point for men and women, conditional on the outcome of Stage 3T (winning or losing) and the condition they were allocated to (MM, FF, MF and FM). Overall, we find no significant differences in the average switching point between men and women (respectively 7.36 vs. 7.10, MWU, p = 0.83).[17] After losing, both men and women are slightly more willing to play against females, although the difference is not significant. The average switching point in MM is 3.23 and 4.70 in MF (MWU, p = 0.06). Defeated females' switching point is also slightly (but not significantly) higher in FF than in FM (respectively 3.67 vs. 3.00, MWU, p = 0.94). However, we find the opposite pattern after winning: both men and women accept slightly (but not significantly) more to compete against a defeated male player. The average switching point in MM is 9.62 vs. 9.04

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[17]The decline of gender differences in competition could be explained by the absence of gender differences in confidence after Stage 3T. When we elicit their beliefs, men and women equally expect to win in Stage 4aT (χ^2, p = 0.19).
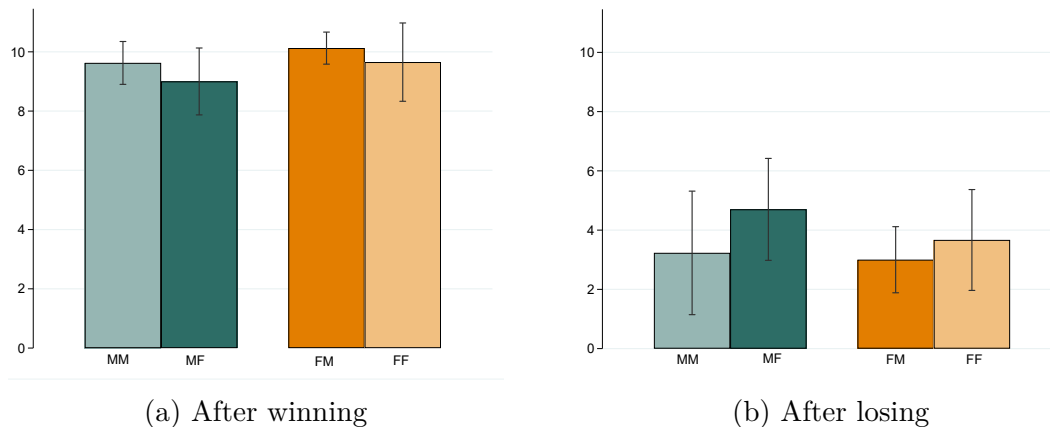
(a) After winning   (b) After losing

Figure 5: Average switching point, by outcome in Stage 3T and condition

in MF (MWU, $p = 0.95$). The average switching point in FM is 10.12 vs. 9.71 in FF (MWU, $p = 0.25$).

In Table 3, we explore the determinants of the switching point. We conduct Tobit estimations with switching point as dependent variable ranging from 0 to 11. Our explanatory variables are: Female opponent, Risk aversion, Age, Sexism, Transcendence. In specifications (1-2) and (5-6) we include the variable Winner Stage 3T which takes value 1 if the subject wins in Stage 3, and 0 otherwise. We also include in specifications (3-4) and (7-8) the variable Overconfidence Stage 3T that takes value 1 when a participant expects to win at Stage 3T but actually loses. It takes value 0 in either of the three following cases: 1-expects to win and actually wins, 2-expects to loose and actually loses, or 3-expects to loose and actually wins. In columns (2) and (6), we add the interaction term: Female opponent $\times$ Winner Stage 3T. In columns (4) and (8) we include the interaction between the gender of the opponent and the overconfidence in Stage 3T (Female opponent $\times$ Overconfidence Stage 3T).[18]

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[18]We test the robustness of our results to a specification that includes a variable for confidence instead of overconfidence. This variable takes the value 1 if the subject is overconfident, 0 if the beliefs are accurate, and -1 if the subject is underconfident. Results of our Tobit estimations on the switching point incorporating this new measure as an explanatory variable are presented in Table A6 (Appendix A.5). Furthermore, we conduct an additional robustness check by removing subjects who do not correctly report the gender of their opponent at the end of the experiment. Table A7 in Appendix A.5 presents results of Tobit estimations on the switching point of those who correctly guess the gender of their opponent. We perform this robustness check to ensure that our results are valid for those who identify which gender they are competing against.

In line with our descriptive results, we find a significant and positive coefficient of Winner Stage 3T in our specifications (1-2) and (5-6) indicating that winning in the previous competition (in Stage 3) significantly increases the switching point of both males and females. In our second specification, the interaction term Female opponent × Winner Stage 3T has a negative and significant effect, indicating that male winners lower significantly their switching point when winning against a female compared to when winning against a male. In other words, after winning, men have a lower willingness to compete again against a woman than against a man. The interaction term is not significant for females in column (6), indicating that, after winning, women are not influenced by the gender of their opponent when deciding whether to repeat the competition.

We find a significant and negative coefficient of Overconfidence Stage 3T in our four specifications where the variable Overconfidence Stage 3T is present (columns 3-4 and 7-8), meaning that when participants are disappointed, i.e. they expect to win but end up losing, they tend to lower their switching point. This result goes in line with Gill and Prowse (2012)'s findings on disappointment aversion. In other words, participants are discouraged to repeat the competition when they learn that their outcome is not the one expected. In column 4, a positive and statistically significant effect emerges within the interaction term Female opponent × Overconfidence Stage 3T for males, indicating that the switching point is significantly higher when they are disappointed against women compared to when they are disappointed against men. In other words, the disappointment effect is less intense when a male engages in competition with a female as opposed to a male counterpart. This observation implies that, disappointed men are more eager to repeat the competition against a woman than against a man. Again, the interaction term Female opponent × Overconfidence Stage 3T is not significant for women, indicating that women do not make difference between having a male or a female opponent.

To summarize our findings, we observe a deviation from Hypothesis 1 in men's reactions after winning. After losing, men exhibit a behavioral shift, contrary to our hy-

| | Switching point | | | | | | | |
| | Males | | | | Females | | | |
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Female opponent	0.31	2.42	0.14	-0.66	-0.13	0.92	0.13	-0.10
	(0.43)	(1.93)	(0.18)	(-0.76)	(-0.19)	(0.83)	(0.16)	(-0.11)
Risk aversion	-0.92	-0.98	-1.06	-0.96	-0.42	-0.53	-0.16	-0.19
	(-1.23)	(-1.35)	(-1.33)	(-1.23)	(-0.58)	(-0.74)	(-0.20)	(-0.24)
Age	-0.04	-0.04	-0.06*	-0.06*	0.03	0.04	0.02	0.02
	(-1.61)	(-1.64)	(-2.05)	(-2.15)	(1.50)	(1.77)	(0.79)	(0.87)
Sexism	0.03	0.06	0.07	0.09	0.05	0.04	0.06	0.06
	(0.78)	(1.40)	(1.48)	(1.99)	(1.06)	(0.85)	(1.02)	(0.99)
Transcendence	0.01	0.06	0.10	0.16	0.16	0.17	0.15	0.16
	(0.08)	(0.56)	(0.82)	(1.28)	(1.12)	(1.26)	(0.95)	(1.00)
Winner Stage 3T	5.31***	7.02***			6.30***	7.37***		
	(6.79)	(6.21)			(9.10)	(6.64)		
Female opponent × Winner Stage 3T		-3.25*				-1.79		
		(-2.06)				(-1.22)		
Overconfidence Stage 3T			-6.10***	-7.98***			-6.06***	-6.51***
			(-5.74)	(-5.83)			(-7.23)	(-4.84)
Female opponent × Overconfidence Stage 3T				4.53*				0.73
				(2.14)				(0.42)
Constant	4.05	0.78	5.67	3.89	-2.87	-3.89	2.92	2.81
	(0.95)	(0.17)	(1.24)	(0.86)	(-0.65)	(-0.87)	(0.57)	(0.55)
Observations	66	66	66	66	69	69	69	69

Notes: Tobit model regressions. *t* statistics in parentheses and standard errors are robust.

Dependent variable in (1) - (8): Switching point.

Specifications (1) - (4): Only males. Specifications (5) - (8): Only females.

Independent variables described in text. *, **, *** indicate significance at the 5%, 1%, 0.1% level, respectively.

Table 3: Determinants of Switching point

pothesis. Winning against a female opponent decreases the switching point. Additionally, when we consider only overconfident men, we observe that disappointment diminishes the inclination to compete against a male opponent. On the other hand, overconfident and hence disappointed men, when outperformed by a female, appear more inclined to re-enter the competition. Therefore, we reject our first hypothesis and we present our first key result:

Result 1: *After winning against women, men exhibit a decrease in their switching point, whereas disappointment for losing against women (i.e. when men expect to win but they lose) leads to an increase in their switching point.*

In contrast to our second hypothesis, the gender of the opponent does not significantly influence women's switching points. Remarkably, women do not demonstrate increased hesitancy to re-enter competition when facing men as opposed to women. One plausible explanation is that non-competitive women, who opt for the piece rate in Stage 3 and are subsequently excluded from our sample, might be the ones avoiding competition against men. This nuanced perspective aligns with the insights from Geraldes (2020), suggesting that women's reluctance to compete might be more directed towards competing against men specifically, rather than a general aversion to competition.[19] We confirm the second part of our hypothesis, since women's (and men's) switching point is lower after loosing than after winning, regardless of the gender of their opponent. This leads us to formulate our second key result:

Result 2: *After winning women are more willing to repeat a competition. Disappointed women (i.e. when they expect to win but they lose) are less likely to repeat the competition. However, on average, women exhibit indifference to the gender of the opponent when deciding to re-enter competition.*

4.3   Other analysis: Performance

We are further interested in analyzing the performance in the tournament and its evolution over the stages. Men perform significantly better in Stage 4aT after losing in Stage 3T against a woman (MF) than against a man (MM). As shown in Figure 6 panel (b), men significantly improve their performance between Stage 3T and Stage 4aT against a female opponent (Wilcoxon signed-rank, $p = 0.02$): they solve on average 2.00 more problems in Stage 4aT, compared to Stage 3T. When re-facing a male opponent after losing (MM), men solve slightly (but not significantly) fewer problems (i.e., difference of -0.80; Wilcoxon signed-rank, $p = 0.25$). After winning, differences in performance are not significant (panel (a)). We do not find any significant results in women's performance.

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[19]We test the robustness of our results by replicating Table 3 in Table A8 (Appendix A.5) using OLS estimations and we find qualitatively the same results.
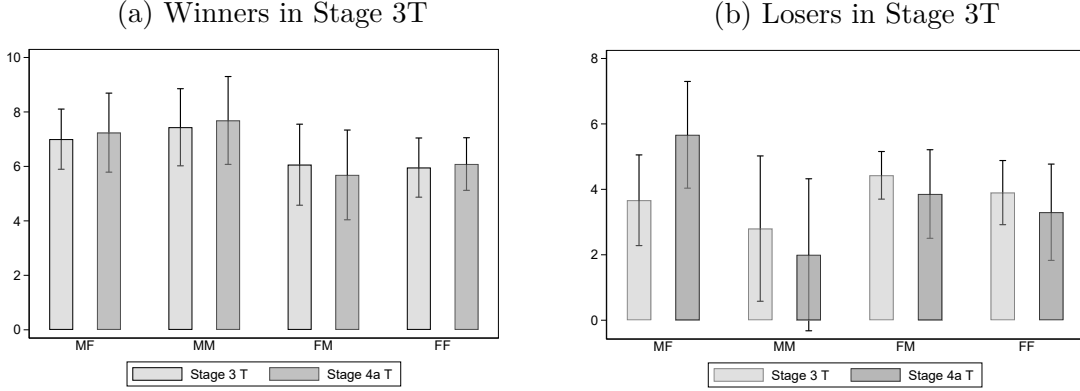
Figure 6: Performance in Stage 3T and Stage 4aT, by outcome in Stage 3T and condition

In Table 4, we run an OLS estimation with performance in Stage 4aT as dependent variable. We break down our sample and we include only males in columns (1) and (2) and only females in columns (3) and (4). The explanatory variables included in the models are: Female opponent, Loser Stage 3T (=1 if the participant lost in Stage 3T, 0 otherwise), and the interaction term Female opponent × Loser Stage 3T, and Performance in Stage 3T. In columns (2) and (4), we add the following control variables: Age, Sexism, and Transcendence. We observe a positive and significant coefficient for Performance in Stage 3T, indicating that the higher the performance in Stage 3T, the higher the performance in Stage 4aT. The interaction term in columns (1) and (2) also exhibits a positive and significant coefficient, confirming that, after losing, men enhance their performance against a female opponent compared to a male opponent. However, a similar effect is not observed for women. These results remain robust even with the inclusion of control variables.

Consistent with Result 1, we observe that after losing, men exhibit an increased determination to succeed against female opponents. This is evident in two dimensions: a higher switching point and an increase in performance after losing against women.

	Performance in Stage 4aT			
	Males		Females	
	(1)	(2)	(3)	(4)
Female opponent	-0.12	-0.35	0.31	0.57
	(-0.19)	(-0.52)	(0.58)	(1.00)
Age		-0.01		-0.02
		(-0.30)		(-1.48)
Sexism		0.06		0.03
		(1.76)		(0.93)
Transcendence		0.12		0.11
		(1.14)		(1.12)
Loser Stage 3T	-1.48	-2.57*	-0.50	-0.33
	(-1.89)	(-2.58)	(-0.78)	(-0.50)
Female opponent × Loser Stage 3T	3.12**	4.61***	-0.11	-0.39
	(3.40)	(3.82)	(-0.12)	(-0.42)
Performance in Stage 3T	0.91***	0.92***	0.81***	0.80***
	(7.52)	(7.89)	(7.43)	(6.31)
Constant	0.93	-3.67	0.75	-2.46
	(0.96)	(-1.00)	(0.97)	(-0.74)
Observations	54	54	56	56

Notes: OLS model regressions. t statistics in parentheses and standard errors are robust.

Dependent variable in (1) - (4): Performance in Stage 4aT.

Specifications (1) - (2): Only males. Specifications (3) - (4): Only females.

Independent variables described in text. *, **, *** indicate significance at the 5%, 1%, 0.1% level, respectively.

Table 4: Determinants of performance in Stage 4aT

5   Conclusions

We conduct an experiment in which participants have to perform in a simple task consisting of adding two digits. They face two main decisions: First, choosing between being paid for the task based on a piece rate or a tournament. After observing the outcome (winning or losing), they made a decision on payment scheme for repeating the task. Our primary interest lies in understanding people's preferences for competition and their reactions after winning versus losing. Specifically, we aim to examine whether individuals are more likely to repeat the competition or refrain from it, focusing on how the preference for competition is influenced by the prior competition's outcome, and if the gender of the opponent plays a role in this decision-making process. Additionally, we introduce a novel design that obtains a continuous measure of subjects' willingness to compete, deviating from the standard binary decision framework.

Our data shows that in the first choice, men are more willing to compete than women, consistent with previous studies. Participants, however, show indifference to the gender of their opponent, and their decision to compete is mainly based on their expectation to win in previous stages where the task is performed. In the second choice to compete (or not), regardless of their opponent's gender, both men and women exhibit increased levels of competitiveness after winning, with this trend being particularly pronounced among women. Nevertheless, we observe that men decrease their willingness to repeat the competition after winning against women. One plausible explanation for these findings could be that men may previously have built a reputation for prevailing over women. Consequently, they may be inclined to avoid the potential risk of losing a competition against a woman, as doing so could jeopardize their established reputation. In essence, men might be motivated to uphold their perceived dominance, thereby preventing women from outperforming them and hence avoiding potential disutility (He and Noussair, 2021).

We further observe that overconfidence is a crucial driver in the choice to avoid competition for a second time. Overall, participants compete less when they are disappointed

with their outcome, i.e., they expect to win and end up loosing. Males are less affected by disappointment when they loose against women, and they are more eager to repeat the competition. In line with this, we find significant results regarding the reaction after losing, in terms of performance. Men's performance significantly improves after losing against females, revealing that males have a significantly higher drive to win over their female opponents compared to male opponents. This result suggests that the losers are indeed stimulated by the challenger option, i.e., winning over a woman who has previously outperformed them (Buser, 2016). Men's willingness to outperform their female opponent in the next round might be driven by possible factors such as shame, revenge, or pride. On the other hand, women are not affected in any case by the gender of their opponent: they are more likely to compete after winning and less likely to compete when they are disappointed, regardless of their opponent's gender. Overall, men seem to be reluctant to be outperformed by women which can explain the underrepresentation of women in senior and high-paying positions (De Paola and Scoppa, 2015).

This work contributes substantially to the existing literature and provides insightful findings to better understand gender differences in competition. We confirm previous findings showing that men are generally more sensitive to feedback and the gender of the opponent, compared to women. For example, Dilmaghani (2022) find that in super-elite chess games, males are quicker to quit when facing a female opponent compared to a male, while female players exhibit consistent behavior regardless of the opponent's gender. Furthermore, Berlin and Dargnies (2016) indicate that women are more focused on their performance level, while men are more influenced by the skill level of their competitors. Additionally, Wozniak et al. (2009) show that feedback diminishes gender differences by reducing men's reluctance to participate. Finally, Baier et al. (2018) conclude that men are more responsive to feedback in task choice, whereas women display greater stability in task selection across different information.

Our experiment concludes the game at Stage 4 without providing participants with

information regarding the decisions or performances of their opponents in Stage 4a. This feature could serve as promising for future research, offering the opportunity to investigate potential renunciation effects when such information is revealed. Additionally, it could provide further evidence regarding whether high-performing women exert less effort when facing a persistent male opponent.

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A   Appendix

A.1   Perception of Names

	Adam	**Arthur**	**Louis**	**Lucas**	**Raphaël**	Gabriel	Léo	Jules	Maël	Noah
Male	**99.11**%	**99.11**%	**98.21**%	**100.00**%	**99.11**%	96.43%	97.32%	98.21%	70.54%	91.07%
Female	0.89%	0.89%	1.29%	0.00%	0.89%	3.57%	2.68%	1.79%	29.46%	8.93%

	Alice	**Anne**	**Louise**	**Mia**	**Rose**	Jade	Emma	Ambre	Alba	Romy
Male	0.00%	0.89%	0.89%	0.00%	0.00%	4.47%	1.79%	1.79%	6.25%	16.07%
Female	**100.00**%	**99.11**%	**99.11**%	**100.00**%	**100.00**%	95.53%	98.21%	98.21%	93.75%	83.93%

Table A1: Answers to the question: "How do you perceive these names?" (N=112)

Notes: In bold, the names chosen for our experiment: Adam, Arthur, Louis, Lucas and Raphaël for males; Alice, Anne, Louise, Mia and Rose for females.

A.2   Performance across Stages

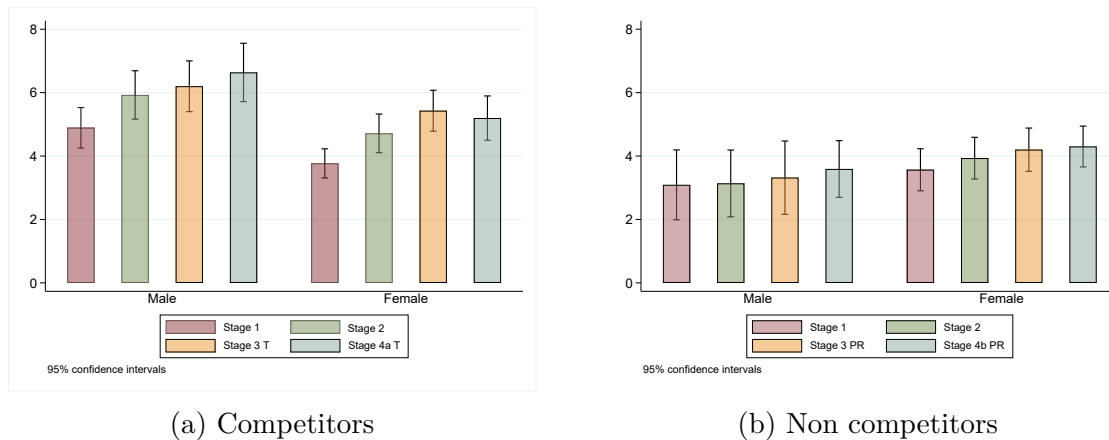(a) Competitors

(b) Non competitors

Figure A2: Average performance in each stage of the game, by gender and conditional on the decision to compete made at Stage 3

A.3 Stage 4b: WTP to Avoid Competition

Subjects who choose the piece rate in Stage 3 are assigned to Stage 4b, in which we elicit their willingness to pay to avoid being forced to compete. From the data collected in Stage 4b, subjects show a relatively low aversion to compete. Indeed, 44.35% choose a *WTP* inferior to 0.75 Euros (the maximum amount being 2.00 Euros). As shown in Figure A3, women's and men's distribution of *WTP* is similar (Two-sample Kolmogorov-Smirnov, $p = 0.24$). In line with the literature, we previously demonstrate that women are less competitive than men in Stage 3. Although, when offered the opportunity to reconsider their choice, women do not manifest a strong aversion, compared to men. Their *WTP* is not significantly different (MWU, $p = 0.07$).
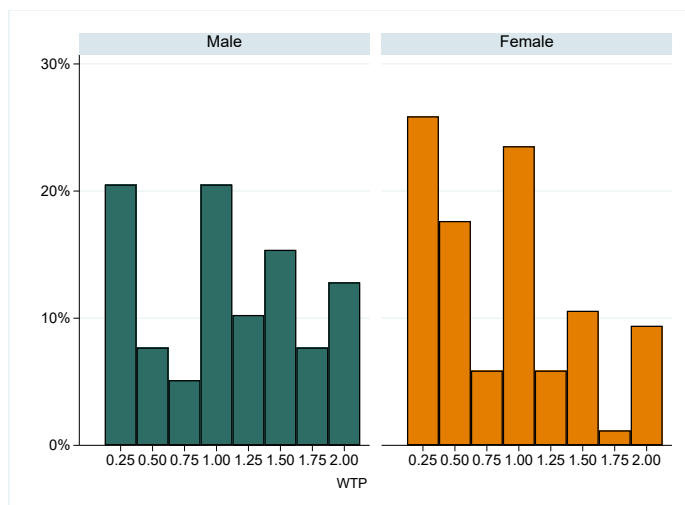
Figure A3: Distribution of the WTP at Stage 4b, by gender

Figure A4 presents the evolution of performance from Stage 3PR and Stage 4bT by condition. Both men and women perform slightly better against females than males in Stage 4b (compared to Stage 3PR), but this difference is not significant (Wilcoxon signed-rank, respectively $p = 0.66$ for MF; $p = 0.69$ for MM; $p = 0.14$ for FF; $p = 0.70$ for FM). In Stage 4bT women solve on average 4.64 problems and men 4.53 (MWU, $p = 0.94$). Compared to Gill and Prowse (2014), women in our sample do not perform worse than men when forced

to compete.

We investigate the factors contributing to determine the *WTP* (min=0.25, max=2.00), by using a Tobit model. Table A2 presents the results. Our explanatory variables are: Female opponent, Risk aversion, and *Beliefs 2*. In columns (2) and (4) we add control variables. We do not find any significant effect of the variables on the *WTP*.
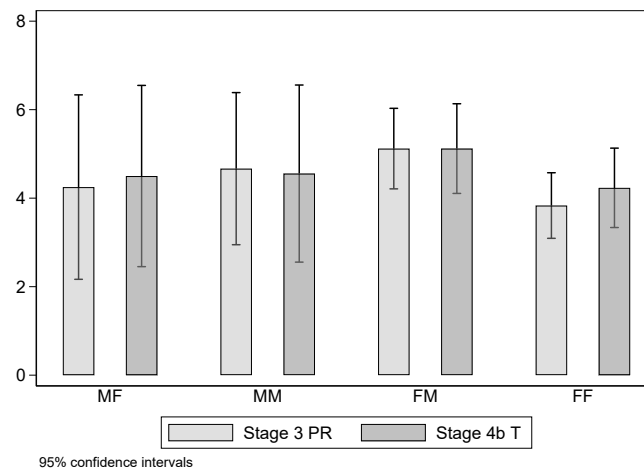
Figure A4: Average performance in Stage 3PR and Stage 4bT, by condition

40

	WTP			
	Males		Females	
	(1)	(2)	(3)	(4)
Female opponent	-0.16	-0.19	-0.04	-0.05
	(-0.79)	(-0.96)	(-0.37)	(-0.41)
Risk aversion	-0.13	-0.11	-0.05	-0.05
	(-0.63)	(-0.56)	(-0.36)	(-0.42)
Beliefs 2	-0.13	-0.19	0.22	0.23
	(-0.66)	(-0.94)	(1.78)	(1.89)
Age		0.00		-0.01*
		(0.34)		(-2.02)
Sexism		-0.00		0.01
		(-0.38)		(1.51)
Transcendence		-0.02		0.01
		(-1.14)		(0.72)
Constant	1.27***	1.96*	0.84***	0.46
	(7.13)	(2.29)	(5.80)	(0.74)
Observations	39	39	85	85

Notes: Tobit model regressions. t statistics in parentheses and standard errors are robust.

Dependent variable in (1) - (4): WTP in Stage 4b.

Specifications (1) - (2): Only males. Specifications (3) - (4): Only females.

Independent variables described in text. *, **, *** indicate significance at the 5%, 1%, 0.1% level, respectively.

Table A2: Willingness to pay to avoid competition in Stage 4b

A.4 Additional Analyses

At the end of the experiment, subjects were asked about their opponent, the presumed topic of our study, and their motivations to choose (or not) the tournament at Stage 3. This Section presents the textual analysis of participants' responses, which complements the econometric analysis.

When asked about the presumed topic, 30.64% of participants mention "risk" or even "risk aversion" with subjects comparing the risk of choosing the tournament with the risk of running into the bomb during the BRET task (Table A3). "Competition" is cited by 4.80% of the subjects and "gender" is only mentioned by 4 participants.[20]

The main reason given by participants for their choice to enter (or avoid) the tournament is confidence (Table A4). Indeed, 36.90% of subjects mention confidence in their own performances (73.83%) or regarding their opponent (26.17%) when choosing the compensation scheme at Stage 3.[21] Furthermore, women integrate the idea that they are not good in mathematical tasks, as 21.89% of female participants report a lack of confidence in their calculation skills (against 7.44% of men). 32.23% of men emphasize their confidence in their abilities when asked "why did you choose the tournament" against 13.02% of women. Female participants are significantly more likely to expose their under-confidence in their response, compared to men (χ^2, $p = 0.00$). Some participants also demonstrate a payoff maximization strategy when they made their choice in Stage 3. Indeed, 15.86% of subjects mention the term "payoff". Finally, 4.83% mention their willingness to seek challenges and 4.13% refer to their competitiveness.[22]

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[20]Besides, "gender" was mentioned as a measure that our study would take into account to evaluate the skills in mathematics among the French population.

[21]For example, confidence in themselves corresponds to answers such as "I am good at mental arithmetic" or "I think I'm bad at mental arithmetic". While confidence about each others' skills is reflected in responses such as "I feared that my opponent was good" or "I have a more literary profile and I didn't want to try the tournament with someone I thought was definitely stronger". We do not observe gender differences in the reference point for confidence.

[22]In this experiment, it is interesting to note that competitiveness is indeed perceived as "assertive and uncooperative" behaviors by some participants. "Altruism" is mentioned 3 times (2 are women) as an argument to not enter into the competition. It is presented as the opposite of competitiveness. For example: "*I am not competitive, I prefer to help each other and encourage pedagogy.*"

Answers	Frequency (%)
Others	54.22
Risk	30.64
Mathematical capacities	7.24
Competition	4.80
Reaction to pressure	1.72
Gender	1.38

Table A3: Answers to the question: "What is the presumed topic of our study?"

Answers	Frequency (%)
Confidence	36.90
Others	27.26
Payoff	15.86
Risk	8.96
Challenge	4.83
Competitiveness	4.13
Altruism	1.03
Fear of losing	1.03

Table A4: Answers to the question: "Why did you (not) choose the tournament at Stage 3?"

A.5   Robustness Checks

	Switching point			
	Males		Females	
	(1)	(2)	(3)	(4)
Female opponent	0.13	-0.73	0.41	0.38
	(0.17)	(-0.87)	(0.53)	(0.41)
Risk aversion	-0.83	-0.71	-0.03	-0.03
	(-1.07)	(-0.94)	(-0.04)	(-0.04)
Age	-0.06*	-0.06*	0.01	0.01
	(-2.23)	(-2.28)	(0.50)	(0.50)
Sexism	0.05	0.08	0.02	0.02
	(1.07)	(1.74)	(0.50)	(0.49)
Transcendence	0.06	0.15	0.03	0.04
	(0.49)	(1.25)	(0.25)	(0.26)
Overconfidence Stage 3T	-5.98***	-8.03***	-6.08***	-6.14***
	(-6.04)	(-6.10)	(-7.51)	(-4.55)
Female opponent $\times$ Overconfidence Stage 3T		4.66*		0.09
		(2.31)		(0.06)
Constant	7.56	4.73	6.80	6.78
	(1.83)	(1.13)	(1.50)	(1.49)
Observations	73	73	76	76

Notes: Tobit model regressions. t statistics in parentheses and standard errors are robust.

Dependent variable in (1) - (4): Switching point.

Specifications (1) - (2): Only males. Specifications (3) - (4): Only females.

Independent variables described in text. *, **, *** indicate significance at the 5%, 1%, 0.1% level, respectively.

Table A5: Switching point (including subjects who switch more than once)

| | Switching point | | | |
| | Males | | Females | |
	(1)	(2)	(3)	(4)
Female opponent	-0.15	-0.52	-0.15	-0.58
	(-0.17)	(-0.62)	(-0.18)	(-0.62)
Risk aversion	-1.59	-1.26	-0.03	-0.14
	(-1.96)	(-1.56)	(-0.03)	(-0.16)
Age	-0.05	-0.05	0.03	0.04
	(-1.92)	(-1.95)	(1.39)	(1.66)
Sexism	0.03	0.06	0.06	0.04
	(0.72)	(1.26)	(0.92)	(0.69)
Transcendence	0.01	0.09	0.24	0.27
	(0.11)	(0.67)	(1.40)	(1.60)
Confidence Stage 3T	-4.05***	-6.03***	-4.15***	-5.35***
	(-5.32)	(-4.95)	(-5.94)	(-4.48)
Female opponent × Confidence Stage 3T		3.26*		1.88
		(2.07)		(1.23)
Constant	8.60	6.24	-0.87	-1.38
	(1.86)	(1.34)	(-0.16)	(-0.26)
Observations	66	66	69	69

Notes: Tobit model regressions. t statistics in parentheses and standard errors are robust.

Dependent variable in (1) - (4): Switching point.

Specifications (1) - (2): Only males. Specifications (3) - (4): Only females.

Independent variables described in text. *, **, *** indicate significance at the 5%, 1%, 0.1% level, respectively.

Table A6: Switching point with with confidence

	Switching point			
---	Males		Females	
	(1)	(2)	(3)	(4)
Female opponent	0.07	-1.12	0.91	1.25
	(0.08)	(-1.09)	(1.26)	(1.35)
Risk aversion	-1.49	-1.25	0.26	0.32
	(-1.63)	(-1.43)	(0.35)	(0.41)
Age	-0.04	-0.04	0.01	0.01
	(-1.43)	(-1.48)	(0.58)	(0.38)
Sexism	-0.00	0.01	-0.00	-0.00
	(-0.07)	(0.20)	(-0.05)	(-0.03)
Transcendence	-0.05	0.01	0.19	0.18
	(-0.29)	(0.05)	(1.18)	(1.12)
Overconfidence St 3T	-6.32***	-9.73***	-7.11***	-6.63***
	(-5.10)	(-5.32)	(-9.15)	(-5.87)
Female opponent × Overconfidence St 3T		6.23*		-0.90
		(2.57)		(-0.59)
Constant	11.85	10.60	3.15	3.32
	(1.94)	(1.82)	(0.60)	(0.63)
Observations	51	51	51	51

Notes: Tobit model regressions. t statistics in parentheses and standard errors are robust.

Dependent variable in (1) - (4): Switching point.

Specifications (1) - (2): Only males. Specifications (3) - (4): Only females.

Independent variables described in text. *, **, *** indicate significance at the 5%, 1%, 0.1% level, respectively.

Table A7: Switching point (only subjects who correctly guess the gender of their opponent)

			Switching point					
		Males				Females		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Female opponent	0.22	1.98	0.06	-0.60	-0.12	0.84	0.14	-0.05
	(0.35)	(1.62)	(0.09)	(-0.69)	(-0.21)	(0.87)	(0.20)	(-0.06)
Risk aversion	-0.72	-0.77	-0.83	-0.73	-0.31	-0.41	-0.04	-0.06
	(-0.97)	(-1.05)	(-1.05)	(-0.98)	(-0.41)	(-0.56)	(-0.05)	(-0.07)
Age	-0.04	-0.04	-0.05	-0.06	0.03	0.04	0.02	0.02
	(-1.55)	(-1.52)	(-1.79)	(-1.84)	(1.17)	(1.33)	(0.68)	(0.70)
Sexism	0.03	0.05	0.06	0.08	0.05	0.04	0.06	0.06
	(0.54)	(0.95)	(1.16)	(1.44)	(1.41)	(1.17)	(1.04)	(0.99)
Transcendence	0.00	0.05	0.09	0.14	0.13	0.15	0.12	0.13
	(0.03)	(0.35)	(0.57)	(0.83)	(1.45)	(1.53)	(0.86)	(0.86)
Winner Stage 3T	5.20***	6.62***			6.20***	7.18***		
	(6.48)	(6.58)			(8.52)	(12.29)		
Female opponent $\times$ Winner Stage 3T		-2.72				-1.65		
		(-1.88)				(-1.32)		
Overconfidence Stage 3T			-5.72***	-7.17***			-5.89***	-6.24***
			(-6.82)	(-7.96)			(-6.91)	(-7.13)
Female opponent $\times$ Overconfidence Stage 3T				3.63**				0.58
				(2.86)				(0.38)
Constant	4.32	1.62	6.18	4.83	-2.14	-3.06	3.62	3.55
	(0.76)	(0.29)	(1.10)	(0.85)	(-0.79)	(-0.99)	(0.75)	(0.72)
Observations	66	66	66	66	69	69	69	69

Notes: OLS model regressions. t statistics in parentheses and standard errors are robust.

Dependent variable in (1) - (8): Switching point.

Specifications (1) - (4): Only males. Specifications (5) - (8): Only females.

Independent variables described in text. *, **, *** indicate significance at the 5%, 1%, 0.1% level, respectively.

Table A8: Switching point (OLS estimation)

A.6 Instructions (translated from French)

Hello everyone, welcome to this experimental session!

Thank you for participating in this session, your decisions are very important for this research. Please find on your desk an information note, two consent forms and two payment receipts -one for you and one for the experimenter. Please fill in the consent form before the session starts; the gratification receipt will be filled in at the end of the session. The consent form specifies that you agree to share your data for research purposes; your data will surely be processed anonymously and only for research purposes.

During the session, you will be asked to perform mental arithmetic. The use of any electronic device is forbidden but you can use the piece of paper provided on your desk. Please put away your mobile phone and/or calculator. If you fail to comply with this rule, your data will be scientifically unusable, and a great loss to our research. Besides, you won't be paid.

Please read the instructions carefully. Communication with other participants is not allowed during the whole session. If you have any question, please raise your hand and the experimenter will come to your cubicle and answer you privately.

Instructions for Part 1

This experimental session is divided into two parts: Part 1 and Part 2. In Part 1, you will be asked to perform the same specific task during 4 stages. Before the start of each stage, specific instructions will be given to you. In Part 2, you will play a game and answer some questions.

Once you have completed the 4 stages of Part 1, a random draw will determine which

stage will be chosen for your payment.

Your total payment in cash at the end of the session includes: a participation fee of 9€ + the earnings obtained in Part 1 (i.e. the earnings corresponding to the randomly chosen stage) + the earnings obtained in Part 2 (that will depend on your decision and the others' in a game). Your total earnings will be paid to you by bank transfer -we will ask you to enter your bank details just before the session ends.

. . . . *Screen 1* . . . .

Please answer the following questions:

- How old are you? _____

- What is your gender?

    o Female

    o Male

    o Other

- What is/was your field of study?

    o Arts, Letters and Languages

    o Law, Politics, Economics and Business

    o Social and Human Sciences

    o Techno, Health and Engineering Sciences

    o Other _____

. . . . *Screen 2* . . . .

Choose a new first name that you will keep throughout the session.

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- *For those who previously answered "Female":*

  Choices: Rose, Louise, Mia, Alice, Anne

- *For those who previously answered "Male":*

  Choices: Lucas, Raphaël, Adam, Louis, Arthur

- *For those who previously answered "Other":*

  Choices: Rose, Lucas, Louise, Raphaël, Mia, Adam, Alice, Louis, Anne, Arthur

. . . . *Screen 3* . . . .

Task instructions

In this part, at each stage, you will have to solve the sum of five randomly drawn two-digit numbers during 3 minutes. Only the paper provided is allowed. Please submit your answers by clicking on the "**Next**" button with your computer mouse, or by pressing the "**Enter**" key. No feedback about the correctness of your answers will be given. Stage 1 is about to start.

. . . . *Screen 4* . . . .

Stage 1: Piece-rate instructions

You will earn 0.50€ for each sum correctly solved during the 3'. Your payment does not decrease if you submit an incorrect answer. We will refer to this payment as the "**piece-rate payment scheme**". Your performance in this stage will be revealed to you at the end of Part 1, after completing all stages.

Example 1: If no answer is correct, your payment at this stage will be 0.00€.

If you correctly solve 1 sum, your payment at this stage will be 0.50€.

If you correctly 2 sums, your payment at this stage will be 1.00€.

And so on and so forth.

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Reminder: Only one of the four stages will be drawn to determine your final payment.

Temps restant (en secondes) : **2:54**

Veuillez résoudre le plus d'équations possibles.
Après avoir saisi le résultat, cliquez sur le bouton "SUIVANT" pour que votre saisie soit enregistrée.

85 + 62 + 66 + 65 + 92 =

SUIVANT

. . . . *New screen* . . . .

Stage 2: Tournament instructions

You perform the same kind of task during 3'. Now your payment will depend on your performance compared to the performance of a randomly chosen opponent. You will keep the **same opponent** until the end of the session. For this Stage 2, your earnings will depend on the number of sums you have correctly solved compared to your opponent. The one that has more correct answers receive 1.50€ per correct answer, and the opponent receives nothing. In the case of a tie, the winner will be randomly chosen. We refer to this payment as the "**tournament payment scheme**".

Example 2.1: If you have 4 correct answer and your opponent 3, you win 6.00€ and your opponent wins 0.00€ at Stage 2.

Example 2.2: If you have 3 correct answers and your opponent 6, your opponent wins 9.00€ and you win 0.00€ at Stage 2.

Your performance in this stage will be revealed to you at the end of Part 1, after completing all the stages. **Please note:** you will have to guess whether you won or lost in this stage. If your guess is correct, you win an extra 1.00€.

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Example 2.3: If you answer "Yes, I think I have won" and you actually have won, you win 1.00€ in addition to your earnings for the game.

Example 2.4: If you answer "Yes, I think I have won" and you have actually lost, you win 0.00 €.

Reminder: Only one of the four stages will be drawn to determine your final payment.

. . . . *New screen* . . . .

Your opponent "***opponent's name***" has made a choice. You can now start the tournament.

. . . . *New screen* . . . .

You have to guess whether you lost or won. A correct guess will give you an extra 1.00€. Do you think you have won the tournament at Stage 2?

- Yes

- No

. . . . *New screen* . . . .

Stage 3: Choice of payment method

At this stage, you have to perform the same task during 3'. However, at this stage, you have to choose the method in which you would like to be paid, either the one used in Stage 1 or that of Stage 2. Therefore, you have to choose between these two options:

Option 1: Piece-rate

If you choose this option, you will receive 0.50€ per correct answer in the task.

Option 2: Tournament

By choosing this option, your performance will be compared to the performance of your

opponent in the previous Stage 2 you just performed. This ensures that, if you choose tournament, you can play even if your opponent chooses the piece-rate. If you win the tournament you will earn 1.50€ for each sum correctly solved. If you choose this option and you do not win, your earnings in this stage will be zero. In the case of a tie, the winner will be randomly chosen. Again, also at this stage, you will have to guess whether you were the winner or the loser in this stage; a correct guess will ensure you an additional 1.00€. Immediately after, you will be informed of your performance in this Stage 3.

Example 3.1: If you choose the piece-rate and solve 3 sums correctly, you earn 1.50€ at Stage 3.

Example 3.2: If you choose the tournament and solve 3 sums correctly while your opponent solved 6 sums correctly in Stage 2, you earn 0.00€ at Stage 3.

Example 3.3: If you choose the tournament and solve 6 sums correctly while your opponent has solved 3 in Stage 2, you earn 9.00€ at Stage 3.

....*New screen* ....

Stage 4: specific instructions [Stage 4.a: Switching point instructions]

At this stage, you will be asked whether you "accept" or "not accept" to compete again against the same opponent for various point gaps. We will show you several examples of the different ways of determining your earnings.

You will then have 3 minutes to perform the task of two-digit numbers sum.

Reminder: Only one of the four stages will be drawn to determine your final payment.

Would you "accept" or "not accept" to compete again against **Louis**, according to the following scenaria from the previous stage?

	I accept	I do not accept
You have solved correctly the same number of sums, so you are tied	●	○
You have solved correctly 1 more sum	●	○
You have solved correctly 2 more sums	●	○
You have solved correctly 3 more sums	●	○
You have solved correctly 4 more sums	●	○
You have solved correctly 5 more sums	●	○
You have solved correctly 6 more sums	●	○
You have solved correctly 7 more sums	●	○
You have solved correctly 8 more sums	●	○
You have solved correctly 9 more sums	●	○
You have solved correctly 10 more sums	●	○

For winners:

Would you "accept" or "not accept" to compete again against **Louis**, according to the following scenaria from the previous stage?

	I accept	I do not accept
You have solved correctly the same number of sums, so you are tied	●	○
Your opponent solved correctly 1 more sum	●	○
Your opponent solved correctly 2 more sums	●	○
Your opponent solved correctly 3 more sums	●	○
Your opponent solved correctly 4 more sums	●	○
Your opponent solved correctly 5 more sums	●	○
Your opponent solved correctly 6 more sums	●	○
Your opponent solved correctly 7 more sums	●	○
Your opponent solved correctly 8 more sums	●	○
Your opponent solved correctly 9 more sums	●	○
Your opponent solved correctly 10 more sums	●	○

For losers:

Example 4.1: If you choose "I accept" for every possible point gaps your performance in this Stage 4 will be compared to the performance of your opponent in Stage 2. If you win the tournament (i.e. you perform more correct sums than your opponent in Stage 2), you will receive 1.50€ per correct sum. If you do not win, you will receive nothing at this Stage

4. In the case of a tie, the winner will be randomly chosen. Also, you will have to guess whether you won or lost in this stage. If your guess is correct, you will win an extra 1.00€. Immediately after, you will be informed of your performance in this tournament.

Would you "accept" or "not accept" to compete again against **Louis**, according to the following scenaria from the previous stage?

	I accept	I do not accept
You have solved correctly the same number of sums, so you are tied	○	●
You have solved correctly 1 more sum	○	●
You have solved correctly 2 more sums	○	●
You have solved correctly 3 more sums	○	●
You have solved correctly 4 more sums	○	●
You have solved correctly 5 more sums	○	●
You have solved correctly 6 more sums	○	●
You have solved correctly 7 more sums	○	●
You have solved correctly 8 more sums	○	●
You have solved correctly 9 more sums	○	●
You have solved correctly 10 more sums	○	●

For winners:

Would you "accept" or "not accept" to compete again against **Louis**, according to the following scenaria from the previous stage?

	I accept	I do not accept
You have solved correctly the same number of sums, so you are tied	○	●
Your opponent solved correctly 1 more sum	○	●
Your opponent solved correctly 2 more sums	○	●
Your opponent solved correctly 3 more sums	○	●
Your opponent solved correctly 4 more sums	○	●
Your opponent solved correctly 5 more sums	○	●
Your opponent solved correctly 6 more sums	○	●
Your opponent solved correctly 7 more sums	○	●
Your opponent solved correctly 8 more sums	○	●
Your opponent solved correctly 9 more sums	○	●
Your opponent solved correctly 10 more sums	○	●

For losers:

Example 4.2: If your choice is "I do not accept" for any possible point gap, you will

be paid according to the piece-rate payment scheme in this Stage 4. You will receive 0.50€ per correct answer.

Would you "accept" or "not accept" to compete again against **Louis**, according to the following scenaria from the previous stage?

	I accept	I do not accept
You have solved correctly the same number of sums, so you are tied	○	●
You have solved correctly 1 more sum	○	●
You have solved correctly 2 more sums	●	○
You have solved correctly 3 more sums	●	○
You have solved correctly 4 more sums	●	○
You have solved correctly 5 more sums	●	○
You have solved correctly 6 more sums	●	○
You have solved correctly 7 more sums	●	○
You have solved correctly 8 more sums	●	○
You have solved correctly 9 more sums	●	○
You have solved correctly 10 more sums	●	○

For winners:

Example 4.3: If you choose "I do not accept" for a 1-point gap and you have actually solved correctly 1 more sum than your opponent in Stage 3, you will be paid according to a piece-rate payment scheme in Stage 4.

Example 4.4: If you choose "I accept" for a 2-points gap and you have actually solved correctly 2 more sums than your opponent in Stage 3, you will be paid according to a tournament payment scheme in Stage 4.

Example 4.5: If you choose "I do not accept" for a 3-points gap and your opponent has actually solved correctly 3 more sums than you in Stage 3, you will be paid according to a piece-rate payment scheme in Stage 4.

Example 4.6: If you choose "I accept" for a 2-points gap and your opponent has actually solved correctly 2 more sums than you in Stage 3, you will be paid according to a tournament payment scheme in Stage 4.

Would you "accept" or "not accept" to compete again against **Louis**, according to the following scenaria from the previous stage?

	I accept	I do not accept
You have solved correctly the same number of sums, so you are tied	●	○
Your opponent solved correctly 1 more sum	●	○
Your opponent solved correctly 2 more sums	●	○
Your opponent solved correctly 3 more sums	○	●
Your opponent solved correctly 4 more sums	○	●
Your opponent solved correctly 5 more sums	○	●
Your opponent solved correctly 6 more sums	○	●
Your opponent solved correctly 7 more sums	○	●
Your opponent solved correctly 8 more sums	○	●
Your opponent solved correctly 9 more sums	○	●
Your opponent solved correctly 10 more sums	○	●

For losers:

.... *New screen* ....

Would you "accept" or "not accept" to compete again against **Louis**, according to the following scenaria from the previous stage?

	I accept	I do not accept
You have solved correctly the same number of sums, so you are tied	○	○
You have solved correctly 1 more sum	○	○
You have solved correctly 2 more sums	○	○
You have solved correctly 3 more sums	○	○
You have solved correctly 4 more sums	○	○
You have solved correctly 5 more sums	○	○
You have solved correctly 6 more sums	○	○
You have solved correctly 7 more sums	○	○
You have solved correctly 8 more sums	○	○
You have solved correctly 9 more sums	○	○
You have solved correctly 10 more sums	○	○

Decision screen for winners :

Would you "accept" or "not accept" to compete again against Louis, according to the following scenaria from the previous stage?

	I accept	I do not accept
You have solved correctly the same number of sums, so you are tied	○	○
Your opponent solved correctly 1 more sum	○	○
Your opponent solved correctly 2 more sums	○	○
Your opponent solved correctly 3 more sums	○	○
Your opponent solved correctly 4 more sums	○	○
Your opponent solved correctly 5 more sums	○	○
Your opponent solved correctly 6 more sums	○	○
Your opponent solved correctly 7 more sums	○	○
Your opponent solved correctly 8 more sums	○	○
Your opponent solved correctly 9 more sums	○	○
Your opponent solved correctly 10 more sums	○	○

Decision screen for losers :

[For those who chose "I accept" for the actual point gap

....*New screen* ....

In Stage 3, the points gap with your opponent was x point(s). For this gap, your answer was: "I accept". Therefore, at Stage 4 you will perform the task under the tournament payment.

As a reminder, you have 3 minutes to perform the task. Your earnings will depend on the number of correct sums you have solved compared to your opponent at Stage 2. The participant who solves correctly more sums will win the tournament and receive 1.50€ per correct answer, while the loser receives nothing. In the case of a tie, the winner will be randomly chosen. Also, you will have to guess whether you won or lost in this stage. If your guess is correct, you will win an extra 1.00€. Immediately after you will be informed of your performance in the tournament.

Reminder: Only one of the four stages will be drawn to determine your final payment.

....*New screen* ....

Your opponent "***opponent's name***" has made a choice.

. . . . *New screen* . . . .

You have to guess whether you lost or won. A correct guess will give you an extra 1.00€. Do you think you have won the tournament at Stage 2?

- Yes

- No

. . . . *New screen* . . . .

"*You have won*" or "*You have lost*"   ]

[For those who chose "I do not accept" for the actual point gap

. . . . *New screen* . . . .

In Stage 3, the points gap with your opponent was x point(s). For this gap, your answer was: "I do not accept" to compete." Therefore, you will perform the task under the piece-rate payment.

As a reminder, you have 3 minutes to perform the task. You earn 0.50€ per correct answer.

Reminder: Only one of the four stages will be drawn to determine your final payment.

]

_____

[For the ones that chose option 1 in Stage 3]

. . . . *New screen* . . . .

You have chosen the piece-rate. As a reminder, you have 3 minutes to perform the task.

You will get 0.50€ per correct sum.

Reminder: Only one of the four stages will be drawn to determine your final payment.

. . . . *New screen* . . . .

Stage 4: Specific instructions   [Stage 4b WTP instructions]

At Stage 3 you chose the piece-rate payment scheme. However, you will be asked to perform the same task under a tournament payment scheme, having the possibility to avoid the competition by giving up an amount of your total gains. The next screen will ask you to choose the **maximum** amount you are willing to pay to avoid the tournament from the interval [0.25€, 2€] in steps of 0.25. Simultaneously, an amount of money within the same interval [0.25€, 2€] will be randomly drawn. That amount will determine your real payment scheme at Stage 4, as follows: two outcomes are possible:

Outcome 1

If the amount you have chosen is <u>smaller than</u> the amount randomly drawn, you will not avoid to compete and, therefore, be paid according to the tournament payment scheme. Your performance will be compared with your opponent's performance, "***opponent's name***", in Stage 2. If your correct answers are higher than your opponent at Stage 2, you will receive 1.50€ per correct answer. You will get nothing otherwise. In the case of a tie, the winner will be randomly chosen. Also, you will have to guess whether you won or lost in this stage. If your guess is correct, you will win an extra 1.00€. Immediately after, you will be informed of your performance in the tournament at Stage 4.

Example 4.7: You choose 0.25€ and the amount drawn is 2.00€. Therefore, you enter the tournament at Stage 4. At this stage, you solve correctly 6 sums while your opponent correctly solved 10 in Stage 2. You get 0.00 € in Stage 4. If, on the contrary, your correct answers were 11 and those of your opponent are 10, then you win the tournament and get

11x1.50 = 16.50 €.

Outcome 2

If the amount you have chosen is <u>higher or equal than</u> the amount randomly drawn, you will avoid the competition and, therefore, you will be paid according to the piece-rate payment scheme. You will earn 0.50€ per correct answer.

Example 4.8: You choose 1.25€ and the amount drawn is 0.50€. If you have 10 correct answers, you get 0.50x10= 5.00€.

In both cases, the amount drawn will be deducted from your earnings for that part of the experiment. Once you have made your choice, you will have to repeat the same task as before. You will have 3 minutes to perform the task.

Reminder: Only one of the four stages will be drawn to determine your final payment.

....*New screen* ....
What is the maximum amount (of your earnings) that you are willing to give up to avoid competition?

- 0.50 | 0.75 | 1.00 | 1.25 | 1.50 | 1.75 | 2.00

      [For those who chose a WTP < WTP random

....*New screen* ....
The amount randomly drawn is Y €. The maximum amount you are willing to pay to avoid competition is X €.

The amount you have chosen is lower than Y. You have to play under a tournament payment scheme at Stage 4. The conditions are the same as in previous stages with tournament.

Your opponent "***opponent's name***" has made a choice.

You have to guess whether you lost or won. A correct guess will give you an extra 1.00€. Do you think you have won the tournament?

- Yes

- No

"*You have won*" or "*You have lost*"]

[**For those who chose a WTP $\geq$ WTP random**

The amount randomly drawn was Y €. The maximum amount you are willing to pay to avoid competition is x €.

The amount you have chosen is higher than Y. You will play under a piece-rate payment scheme in Stage 4. The conditions are the same as in previous stages with piece-rate payment.]

Instructions for Part 2

[Subjects perform first the Bomb Risk Elicitation Task (BRET)]

. . . . *New screen* . . . .

In the last part of the experiment, you will have to answer a few questions about the presumed subject of our study and the games you have just played. You will then be asked to answer a questionnaire.

. . . . *New screen* . . . .

What do you think this study is about?

_____

. . . . *New screen* . . . .

Why did you (or did not) choose the tournament in Stage 3?

_____

What was the gender of your opponent?

- Female

- Male

- I do not know

What was the name of your opponent?

_____

What was your final payoff?

_____

[Subjects now perform the Gender Role Attitudes Scale (GRAS)]