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## She Could Not Agree More: The Role of Failure Attribution in Shaping the Gender Gap in Competition Persistence

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**CEBI WORKING PAPER SERIES**

Working Paper 25/20

SHE COULD NOT AGREE MORE: THE ROLE OF  
FAILURE ATTRIBUTION IN SHAPING THE  
GENDER GAP IN COMPETITION PERSISTENCE

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# 1 She Could Not Agree More: The Role of Failure Attribution 2 in Shaping the Gender Gap in Competition Persistence

3  
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## 11 **Abstract**

12 In competitive and high-reward domains such as corporate leadership and entrepreneurship,  
13 women are not only underrepresented but they are also more likely to drop-out after failure. In  
14 this study, we conducted a laboratory experiment to investigate the influence of attributing  
15 failure to one of the three causal attributions - luck, effort, and ability - on the gender difference  
16 in competition persistence. Participants compete in a real effort task and then their success or  
17 failure is attributed to one of three causal attributions. We find significant gender differences  
18 in competition persistence when failure is attributed to a lack of ability, with women dropping  
19 out more. On the contrary, when suggested that failure was due to lack of luck, women's  
20 competition persistence after failure increases relative to men. We find no gender difference  
21 when failure is attributed to a lack of effort. Our findings have important implications for  
22 designing feedback mechanisms to reduce the gender gap in competitive domains.

23  
24 *Keywords:* decision analysis; competition; gender gap; performance feedback; laboratory  
25 experiment

26 *JEL:* C91, D03, M50, J24

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<sup>3</sup> This study has been approved by the UCL Research Ethics Committee (Project ID number: 9287/003).

## 27 **1. Introduction**

28           Despite the growth in female labor market participation, women remain  
29 underrepresented in competitive and high-reward domains such as corporate senior  
30 leadership, STEM jobs, innovation, and entrepreneurship. The share of female physicians and  
31 financial managers climbed to 41% and 54% respectively in 2019 from 13% and 24% in the  
32 mid-70s, yet the share of female CEOs in Fortune 500 is far from these figures hovering at  
33 less than 8% (Hinchliffe 2020, Wootton 1997). In such competitive domains, women are not  
34 only heavily underrepresented but they are also more likely to drop-out. Women rejected in  
35 the recruitment process for senior executive roles in the past are less likely to consider another  
36 position in the same firm relative to men (Brands and Fernandez-Mateo 2017). In  
37 entrepreneurship, the odds of reentry after a business failure of the already underrepresented  
38 female entrepreneurs are significantly lower compared to their male counterparts (Simmons  
39 et al. 2019). Also besides the fact that only 8% of all patents had a woman as the primary  
40 inventor, teams led by women are 4%-7% less likely to continue the patent process after an  
41 early rejection (Aneja et al. 2020). Failure and setbacks are organic and fundamental elements  
42 of these competitive domains, thus, the endurance of setbacks and persistence in competing  
43 are keys to “make it” in these domains. Be it successfully receiving an offer for an executive  
44 position after a series of interviews, establishing a successful business after multiple  
45 entrepreneurial exits, securing venture capital for a start-up after many failed fundraising  
46 attempts, being awarded a patent after appealing to rejected categories and negotiating patent  
47 rights, winning a grant for scientific research after several rejections, or publishing an  
48 academic paper after a series of rejections, reviews, and revisions.

49           In this study, we examine the impact of failure and failure attribution on men and  
50 women’s persistence in competition. We unfold the gender differences in the impact of losing  
51 a competition and attributing the loss to one of the three causal attributions - luck, effort, and  
52 ability - on the subsequent willingness to compete. To address our research question, we

53 conduct a laboratory experiment, with 667 subjects. In the experiment, subjects perform a real  
54 effort task of calculating the sum of five two-digit numbers in two rounds. In two rounds,  
55 subjects choose their compensation scheme of either to receive a piece-rate payment or enter  
56 a winner-takes-all competition. The performance of subjects of both compensation schemes  
57 is compared to the performance of a randomly matched opponent from the same  
58 compensation scheme. A hypothetical, in the case of the piece rate, or an actual, in the case  
59 of the competition, win or a loss is then announced to the participants. Conditional on the  
60 score, winning and losing can be seen as exogenous. Participants then decide whether they  
61 want to compete or work for a piece rate in the next round. Our design builds on the experiment  
62 in Buser and Yuan (2019). In their design, participants only receive objective performance  
63 feedback about whether they won or lost before they can decide to compete again. This  
64 specification is identical to our control group. In our experiment, we add three treatments in  
65 which we randomly assigned casual attribution statements that attribute the win/loss to either  
66 luck, effort, or ability.

67           Several interesting findings emerge that contribute to our understanding of the  
68 gender differences in competition persistence and how such differences might shape the  
69 gender differences in career choices and labor market participation. First, confirming previous  
70 findings in the literature, we find that losing a competition, which entitles learning about  
71 absolute and relative performance only, has a significant negative effect on subsequent  
72 willingness to compete. This negative effect of losing is experienced by both those who have  
73 initial preferences for competition and those who do not have such preferences. Second,  
74 looking at those who have initial competition preferences, we find no significant gender  
75 difference in the effect of losing and receiving performance feedback on the subsequent  
76 willingness to compete. Compared to their male counterparts, females, who chose to compete,  
77 are as likely to compete again after losing and learning about their performance. These  
78 findings are inconsistent with the recent work of Buser and Yuan (2019), which suggests that  
79 losing a competition negatively influence females' subsequent willingness to compete. Third,

80 for those who have initial competition preferences, there are significant gender differences in  
81 the effect of attributing a loss to a lack of luck and ability. Compared to males, females are  
82 more likely to compete if their loss is attributed to a lack of luck. On the contrary, females are  
83 significantly less likely to compete after losing if their loss is attributed to a lack of ability relative  
84 to their male counterparts. Fourth, for those who have initial competition preferences, there  
85 are no gender differences in the effect of effort attribution. Females are just as likely as males  
86 to compete after losing when their loss is attributed to a lack of effort. Fifth, we find that for  
87 women attributing failure to lack of luck has no significant effect on their *confidence (beliefs)*  
88 while still having a significant positive effect on their *re-entry into competition (action)*, while  
89 attributing it to lack of ability has both an effect on beliefs and actions. Finally, the significant  
90 gender differences in the effect of luck and ability loss attributions are especially pronounced  
91 on highly confident (top 25<sup>th</sup> percentile) and high in ability (above median) individuals who  
92 choose to compete in the initial round. These findings highlight how an individual's reactions  
93 to negative feedback can be strongly affected by the way the negative feedback is attributed  
94 regardless of how accurate and reliable the feedback is. In our study, ability was purposely  
95 ambiguously measured via a task that required ability, effort, and some luck. Further, the  
96 feedback was given by a faceless computer. Yet it led to significant changes in behavior.  
97 Interestingly, ability attribution only had an effect after a loss, not after winning. This result  
98 signals the role of vulnerability in receiving negative feedback and hints at possible pre-  
99 existing internal self-attribution of failure among women. These findings may have important  
100 implications for workplaces and educational settings in which negative feedback needs to be  
101 communicated to individuals by managers, teachers, and superiors. By emphasizing objective  
102 performance measures, the role of luck, or the role of effort in an individual's failures, rather  
103 than the role of ability, some of the gender gap in persistence after a failure might be alleviated.

104           Although the literature has empirically addressed the issue of women's  
105 persistence in multiple competitive environments such as patenting (Aneja et al. 2020) and  
106 entrepreneurial crowdfunding (Kuppuswamy and Mollick 2016), to our knowledge,

107 experimental analysis of competition preferences and persistence after a failure has been only  
108 addressed before by Buser (2016) and Buser and Yuan (2019). Buser and Yuan (2019)  
109 investigated the gender differences in the subsequent willingness to compete after losing in a  
110 lab experiment and using field data and found that women are less likely to select themselves  
111 into a competition again after experiencing a loss. Unlike in observational data settings, our  
112 experimental design, like Buser and Yuan (2019), allows us to elicit beliefs and exert control  
113 by exclusively manipulating the competition outcomes and attributional feedback while holding  
114 everything else constant including the domain's masculinity, opponents' gender visibility, and  
115 visibility of failure. Furthermore, unlike other experiments, where all subjects are forced to  
116 enter the competition, our experiment is designed to mimic the reality of competition entry by  
117 enabling both males and females to make a decision that reflects their true initial competition  
118 preferences. This design allows for greater external validity for situations in which individuals  
119 self-select into competitive environments. Therefore, our results can contribute to designing  
120 better policies that aim to achieve gender equality in labor participation.

121 Our work contributes to several strands of the literature. First, this paper builds  
122 on and extends the gender gap in competition preferences literature, which examines the  
123 gender differences in competition preferences and the underlying mechanisms shaping these  
124 preferences. The literature suggests that there are gender differences in competition entry  
125 where women are less willing to enter competitive environments relative to men (e.g., Croson  
126 & Gneezy, 2009; Niederle & Vesterlund, 2007, 2011), which account for a significant  
127 proportion of the gender gap in career choice (Buser et al. 2014). It also addresses the age  
128 origin of this gap (Sutter and Glätzle-Rützler 2015) and the role of socioeconomic background  
129 in shaping the competition preferences among men and women (Almås et al. 2016). Second,  
130 this work speaks to the established performance feedback literature and the growing literature  
131 on the gender gap in competition persistence. The literature provides evidence that there are  
132 gender differences in processing performance feedback and belief updating, however, the  
133 evidence is inconsistent about the impact of such differences in competition preferences

134 (Berlin and Dargnies 2016, Buser et al. 2018). While Cason, Masters, and Sheremeta's (2010)  
135 shows that prior knowledge about relative performance does not eliminate the gender gap in  
136 the competition entry, Wozniak, Harbaugh, and Mayr's (2014) claims that such feedback has  
137 a significant effect on closing that gap. Moreover, the literature claims that negative  
138 performance feedback has an impact on, first, the subsequent willingness to seek challenges,  
139 where losers seek more challenging targets (Buser 2016) second, women's subsequent  
140 willingness to compete again, where they are more likely to drop out relative to men (Buser  
141 and Yuan 2019). We show no gender differences in competition persistence after receiving  
142 negative performance feedback. Second, by showing how attributional feedback using causal  
143 attributions of luck, effort, and ability (Weiner 1985, Weiner et al. 1987) plays a significant role  
144 in shaping the gender difference in competition persistence, which as a result would shape  
145 the gender composition of competitive and high-reward domains, we contribute to the  
146 attribution literature. Third, this study is also related to the growing body of work which  
147 examines whether preferences and skills are malleable (Alan et al. 2012; Heckman and Kautz  
148 2014; Alan, Boneva and Ertac 2015; Kosse et al. 2016; Alan and Ertac forthcoming). Andersen  
149 et al. (2012) provide compelling evidence from matrilineal and patriarchal societies that  
150 socialization at a young age plays an important role in shaping competitiveness preferences.  
151 In recent work, Alan and Ertac (2017) show that exposing students to a grit intervention, which  
152 emphasizes the role of effort in achievement can mitigate the gender gap in competitiveness.  
153 We show that a seemingly small intervention in which we randomize the way the negative  
154 feedback is conveyed can have sizeable impacts on individual behavior and the gender gap  
155 in competitiveness. Finally, this paper contributes to the understanding of how beliefs map into  
156 actions (Barron and Gravert 2020, Costa-Gomes and Weizsäcker 2008, Duffy and Tavits  
157 2008, Settele 2020).

158           The remainder of this paper is structured into five sections. Section 2 introduces  
159 the related literature on women's underrepresentation in competitive domains and gender  
160 differences in competition preferences. Section 3 illustrates the experimental design and



161 general procedure. Section 4 introduces the data. Section 5 reports the results. Section 6  
162 discusses the study findings and implications. Finally, Section 7 summarizes the study  
163 conclusions.

164

## 165 **2. Related Literature**

166 The literature's sustained interest in the phenomenon of women's  
167 underrepresentation in domains associated with high-competition and high-reward highlights  
168 the persistence of the phenomenon and the yet to be unfolded underlying mechanisms.  
169 Women underrepresentation in such domains compared to men are argued to be partially  
170 explained by factors and barriers originated from the demand-side actors, such as companies'  
171 hiring and promotion practices, stock market investors, venture capital investors in startups,  
172 and colleagues and team members, as well as from the supply side in terms of preferences  
173 for competition and beliefs.

174 On the demand side, preferences, and unconscious bias, as well as outright  
175 discrimination by organizations, have been investigated the most. The literature provides  
176 evidence that organizations exhibit gender preferences in the hiring processes and promotion  
177 practices, where women are often at a disadvantage (Barnett et al. 2000, Fernandez-Mateo  
178 and King 2011). Companies that increase women's representation in their boards are  
179 penalized by the stock market via a drop in their market value (Solal & Snellman, 2019).  
180 Venture capital investors not only ask female entrepreneurs different types of questions during  
181 a startup pitch and prefer pitches presented by males compared to identical ones presented  
182 by females, but they also eventually invest less than 3% in startups founded by only women  
183 compared to 83% to start-up founded by only men (Brooks, Huang, Kearney, & Murray, n.d.;  
184 Kanze, Huang, Conley, & Tory Higgins, 2018; PitchBook, 2019). Team members, both men  
185 and women, are more likely to override women's opinions when vocalized, which highlights  
186 female-specific challenges within an organization that negatively influence talent recognition

187 and career advancement (Guo and Recalde 2020). To counteract these institutional  
188 drawbacks, several initiatives have been put in place and evaluated. Examples are the  
189 promotion of voluntary gender targets for the expected percentage of leadership positions  
190 occupied by women and the introduction of legislated gender quotas for corporate boards  
191 (Klettner, Clarke, & Boersma, 2016; Meier & Lombardo, 2013). The entrepreneurial domain  
192 shows the establishment of women-focused incubators and accelerator programs to support  
193 female entrepreneurs via training, mentorship, funding, and networking. Nevertheless, the  
194 dilemma of women's underrepresentation persists despite the increase in women's entry into  
195 these fields.

196           On the supply-side, the literature has investigated the importance of  
197 preferences and beliefs on women's underrepresentation. The experimental economics  
198 literature has largely established that women are significantly less willing to compete  
199 compared to men (see among others, Croson & Gneezy, 2009; Niederle & Vesterlund,  
200 2007). This documented gender gap in competition preferences has been shown by a  
201 growing body of work to be relevant for labor market outcomes by predicting career choices  
202 and partially explained by individual's confidence and risk attitude (Bertrand, 2011; Buser et  
203 al., 2014; Niederle & Vesterlund, 2007; Reuben, Wiswall, & Zafar, 2017). Building on the  
204 initial literature on competitive preferences, several studies investigated the role of success  
205 and failure in shaping the subsequent likelihood to persist and compete again. Combining a  
206 survey, field, and experimental data, Brands and Fernandez-Mateo's (2017) shows that  
207 rejection in the executive recruitment process negatively influences women's subsequent  
208 willingness to compete by triggering their belonging uncertainty and confirming their lack of  
209 belonging to this domain. More recently, Buser and Yuan's (2019) addressed this  
210 phenomenon in a laboratory experiment and using field data from the Dutch Math Olympiad.  
211 They investigated the gender differences in the individual's willingness to compete after  
212 losing in a competition. They found that women are less likely to select themselves into a  
213 competition again after experiencing a loss. This negative impact of loss is not explained by

214 gender differences in risk attitude or initial or updated beliefs about the competition outcome,  
215 but by a change in women's preference for competition. The Dutch Math Olympiad field data  
216 also shows that not only there is a negative effect of experiencing loss on girls' willingness to  
217 compete but also the effect persists for a long-term period. These findings highlight the  
218 evolving and cumulative nature of the gender gap in competitive domains and that a win or  
219 loss is not merely an absolute outcome, but it also serves as a tool or a signal to  
220 communicate information about ability.

221 In addition to differences in preferences, differences in beliefs, and belief  
222 updating can be highly influential in gender differences in outcomes. Processing information  
223 and belief updating about own ability exhibit have been shown to be prone to several biases.  
224 These biases can lead to costly economic decisions, such as over-confident CEOs  
225 overestimating their ability to generate returns leading to costly decisions of overinvestment  
226 of internal funds and overpaying for the acquired company (Malmendier and Tate 2005,  
227 2008). There is also evidence that high-ability managers are reluctant to correct strategic  
228 decisions made by them when internal information and measures indicate that they seem to  
229 be failing (Sliwka 2007). According to Mobius et al. (2014), individuals exhibit two types of  
230 biases in feedback interpretations. First, they are asymmetric in updating existing beliefs in  
231 response to feedback, where they over-weigh positive feedback relative to negative.  
232 Second, they are conservative in updating existing beliefs in response to both positive and  
233 negative feedback. They also document gender differences in belief updating biases, where  
234 women are more conservative than men in response to all feedback. Such a difference lead  
235 high-ability women to be underconfident as a result of conservatively updating their belief in  
236 response to positive feedback, which could explain the gender gap in entry and persistence  
237 in competitive domains.

238 Taken together, we do not yet know why women, especially those who have  
239 shown an initial preference for competition, by entering highly competitive domains are more

240 likely to drop-out after experiencing failure or a setback and how we can design institutional  
241 mechanisms that reduce the drop-out rate of highly qualified women.

242

### 243 **3. The Experiment**

#### 244 **3.1 Experimental Design and Procedure**

245 In this section, we first introduce the experimental design and procedure and  
246 then discuss the employed treatments. Our experimental design is based on Niederle and  
247 Vesterlund (2007) and Buser and Yuan (2019). Participants earn money based on their  
248 performance in a real effort task of adding up sets of five two-digit numbers. The real effort  
249 task is selected intentionally as it has a component of luck, effort, and ability. Luck lies in the  
250 random combination of numbers and the random assignment of opponents. Effort lies in the  
251 time and attempts invested in performing the task. Finally, the ability component in the  
252 selected task lies in the skill to quickly add up numbers. The experiment was created in z-Tree  
253 (Fischbacher 2007) and consists of two rounds. First, participants are presented with  
254 instructions and given three minutes to practice the task. After the practice task, they learn  
255 about their absolute performance (score), but they receive no feedback on their relative  
256 performance. Then, they are informed about the number of participants present in the same  
257 session and that they are randomly assigned to an anonymous opponent from the same  
258 session. At the beginning of each round, participants decided on the compensation scheme  
259 for their performance. They can choose between a noncompetitive piece-rate compensation  
260 scheme (PPR), which pays *one* point per correct answer without regards to the performance  
261 of the assigned opponent, or a competitive compensation scheme (C), which pays *two* points  
262 per correct answer if the participant's score is higher than the opponent's and zero otherwise.  
263 In case of a tie, winning or losing is randomly determined. One point is worth 50 Euro cents  
264 (50 pence) and one round out of the two rounds is randomly drawn for payment. Randomly  
265 selecting one round to be paid out eliminates income effects as a potential confounding factor

266 and prevents hedging. Enabling subjects to decide about their competition entry, rather than  
267 forcing everyone to compete allows us to create a setting that mimics the reality of competition  
268 entry, which as a result allows us to obtain more accurate results and draw a more meaningful  
269 conclusion about the gender difference in competition persistence. In each round, participants  
270 are given three minutes to solve as many sets of five two-digit numbers as they can. In both  
271 rounds, the participant's performance is compared to their opponent's performance in round  
272 one. This fact is clearly communicated to the participants. After each round, all participants  
273 receive feedback on their absolute and relative performance regardless of their compensation  
274 scheme choice. In other words, they learn their score (absolute performance) and then  
275 whether they have (would have) won or lost against their randomly assigned opponent  
276 (relative performance). We denote this type of feedback that includes both absolute and  
277 relative performance as "performance feedback". For participants who choose the competitive  
278 compensation scheme, the feedback reads "You scored X correct answers. You scored higher  
279 (lower) than your opponent. You therefore won (lost) against your opponent.", while for  
280 participants who choose the piece rate payment scheme the feedback says "You scored X  
281 correct answers. You scored higher (lower) than your opponent. You therefore would have  
282 won (lost) against your opponent."

283           To investigate how individuals respond to feedback regarding outcome's causal  
284 attributions, we provided feedback using the three of the main perceived causes of  
285 achievement outcomes presented by Weiner and colleagues (1987) and Weiner (1985) in the  
286 psychology literature that are luck, effort, and ability. We denote this second type of feedback  
287 as "attributional feedback". In the experiment, subjects are randomized into one of four  
288 treatment groups: (i) the Luck Treatment group, (ii) the Effort Treatment group, (iii) the Ability  
289 Treatment group, and the (iv) the Control group. While the control group receives no further  
290 feedback after the first round of performance feedback, the other three groups see an  
291 additional attributional feedback statement that attributes their outcome in round one to luck,  
292 ability, or effort. Subjects in each of the three treatment groups view the following statements

293 in addition to the performance feedback (absolute and relative performance) they receive after  
294 completing the task.

295 ***Luck Treatment:***

296 "You (would have) lost! You must have been unlucky when solving the task. OR You  
297 (would have) won! You must have been lucky when solving the task."

298 ***Ability Treatment:***

299 "You (would have) lost! You must not be that good at this task. OR You (would have) won!  
300 You must be good at this task."

301 ***Effort Treatment:***

302 "You (would have) lost! You must not have worked hard solving the task. OR You (would  
303 have) won! You must have worked hard solving the task. "

304 To summarize, the timeline of the experiment is as follows:

305 1. Practice round:

- 306 • Perform the task of solving as many sets of five two-digit numbers as they can for three  
307 minutes

308 2. Round One:

- 309 • Predict how one's own performance in round one will rank compared to other  
310 participants' performance in round one
- 311 • Choose a compensation scheme (piece rate or competitive compensation scheme)
- 312 • Perform the task for three minutes
- 313 • Receive feedback on absolute and relative performance "performance feedback"
- 314 • Receive feedback on outcome attribution "Attributional feedback" (depending on  
315 treatment group and except for control group)

316 3. Round Two:

- 317 • Predict how one's own performance in round two will rank compared to other
- 318 participants' performance in round one
- 319 • Choose a compensation scheme (piece rate or competitive compensation scheme)
- 320 • Perform the task for three minutes
- 321 • Receive feedback on absolute and relative performance "performance feedback"

322 4. Exit questionnaire

### 323 **3.2 Measures**

#### 324 ***Willingness to Compete***

325 We elicited the subject's willingness to compete using a binary choice between  
326 a non-competitive piece-rate compensation scheme (PR) and a competitive compensation  
327 scheme (C). The non-competitive piece-rate compensation scheme (PR) is based on the  
328 subjects' performance alone, where they are paid *one* point per correct answer. On the other  
329 hand, the competitive compensation scheme (C) is based on subjects' performance being  
330 higher than their anonymous and randomly assigned opponent. They are paid *two* points per  
331 correct answer if the participant's score is higher than the opponent's and zero otherwise.  
332 Noting that one point is worth 50 Euro cents (50 pence).

#### 333 ***Confidence***

334 Confidence measures the subject's perceived chance of winning in each round  
335 by calculating the difference between the number of participants in the session and the  
336 subject's belief about his/her rank. Before the start of each round, we elicit subjective beliefs  
337 about their relative performance in the upcoming round. In particular, we ask subjects to  
338 predict how their performance will rank relative to the other participants' performance in round  
339 one. In round one, the question reads "*Before we start, we would like you to guess how well*  
340 *you think you will do in comparison to the other participants who are in the lab with you. There*  
341 *are N people in the lab today including yourself. What do you think your rank will be in the*  
342 *upcoming round?*". In round two, the question reads: "*There are N people in the lab today*

343 *including yourself. What do you think your rank will be in the next round compared to the*  
344 *performance of the other participants in the previous round? Please choose a value between*  
345 *1 and N, where 1 means that you think your performance will be the best and N means that*  
346 *you think your performance will be the worst".* By comparing their performance to their peers'  
347 performance in round one in both rounds, subjects do not need to consider how others will  
348 react to the feedback they were given. They only need to consider their own performance and  
349 whether that led to success or failure. The belief elicitation was incentivized, where a  
350 participant received a bonus payment of 2 points if the prediction was within plus-minus one  
351 of the actual rank. The variable is calculated as  $(\text{number of participants per session} - \text{Predicted}$   
352  $\text{Rank}) / (\text{number of participants per session} - 1)$  and range in value from 0 (low) to 1 (high).

### 353 **Score and Additional Measures**

354 The score is calculated for each round and measured by the number of tasks  
355 solved correctly. After the experimental task, participants were asked to fill out a short  
356 questionnaire before they received their payments. The questionnaire elicited their perception  
357 of the task, their perceived attribution of success and failure as well as several personality  
358 traits. We measure impatience, risk willingness, competitiveness, and persistence based on  
359 the survey questions by Falk, Becker, Dohmen, Huffman, & Sunde, (2016). For example, to  
360 elicit risk willingness, we asked the subjects to answer the following question "Are you  
361 generally a person who is fully prepared to take risks or do you try to avoid taking risks?",  
362 using a scale from 0 = (completely unwilling to take risks) to 10 (very willing to take risks). To  
363 elicit competitiveness, we asked participants to answer the following question "In general, how  
364 competitive do you consider yourself to be?" using a scale from 0 (not competitive at all) to 10  
365 (very competitive). Further, we measured the subjects' optimism, grit, growth mindset, and  
366 locus of control. Finally, subjects' sociodemographic and personal characteristics such as age,  
367 gender, degree of education, the field of study, and parents' level of education.

368



369 **4. Data**

370 The laboratory experiment was conducted at the University of Hamburg and  
371 University College London. Subjects were recruited via the laboratories' online recruiting  
372 websites from a subject pool of students from all faculties. In total, 676 subjects participated  
373 in 34 sessions. We excluded 9 subjects with missing gender. This resulted in a total sample  
374 of 667 subjects. The number of participants per session ranges from 9 to 30. On average, 22  
375 participants participated in each session. Female subjects account for 56% of the participants  
376 in our sample. Participants' average age was 25 years old and around 34% of the sample's  
377 field of study is in science and technology. By design, half of the participants were residents  
378 of the United Kingdom and half in Germany (see Online Appendix A; online appendices are  
379 available as supplemental material at @). Table 1 presents descriptive statistics of average  
380 scores in the practice round, average total earnings, average choice and outcomes in round  
381 one, and treatment groups for the overall sample (column 1) and separately for each gender  
382 (column 2-3). The table also shows p-values from t-tests of the gender difference (column 4).  
383 During the practice round of the experiment, subjects solved on average 5 addition problems  
384 correctly. Total earnings varied between 5 and 22.5 Euro/GBP and the average total earning  
385 was 9.77 Euros/GBP including a 5 Euro/GBP show-up fee. Approximately 37% of the subjects  
386 in our sample chose to compete in the first round rather than take the piece rate. On average,  
387 subjects solved 6.52 problems correctly, resulting in average earnings of 3.77 Euro/GBP in  
388 the first round. Conditional on choosing the competitive compensation scheme in the first  
389 round, 41% of all subjects lost the competition and as a result received zero earnings in the  
390 round.

391 [[Insert Table 1 about here]]

392 The statistical differences between the two genders are consistent with the  
393 literature, females in our sample were less likely to be associated with science and technology  
394 fields of education (Kahn and Ginther 2017) and were less willing to accept risk (Croson and

395 Gneezy 2009) (see Online Appendix A). Moreover, Column 4 in Table 1 reports significant  
396 gender differences in average choices and outcomes. On average, females' total earnings  
397 were significantly lower by 1 Euro/GBP relative to their male counterparts. Compared to males,  
398 females on average scored significantly lower in the practice round and were significantly less  
399 likely to enter the competition. Their perception of winning in the first round was significantly  
400 lower and they on average scored significantly lower by less than one correct task (0.73)  
401 compared to males. In our experimental design, we chose not to force everyone into  
402 competition, as we are interested in the causal effect of failure attribution on those who chose  
403 to compete. Therefore, these initial differences are not problematic for our estimation.  
404 Nevertheless, we control for these differences in all our regressions. There is no significant  
405 difference in losing in round one. Importantly for our estimation, the control variables are  
406 balanced across treatments. Column (4) shows that there are no significant gender  
407 differences within each treatment group. Finally, using ANOVA test of equality of all four  
408 treatment groups means we find that gender, risk willingness, choice of the compensation  
409 scheme, score, confidence, rank, the rate of loss, and earnings in round one are all balanced  
410 across the four treatment groups (see Online Appendix A).

411

## 412 **5. Results**

### 413 **5.1 The Effect of Negative Performance Feedback and Attributional Feedback on the** 414 **Subsequent Willingness to Compete, Confidence, and Score**

415 As a first step, we replicate the analysis of Buser and Yuan (2019) on whether  
416 losing in a competition decreases the willingness to compete. We also extended the analysis  
417 to investigate the effect of competition loss (would-be loss) on the subsequent confidence and  
418 score. At the end of round one and before choosing the compensation scheme for round two,  
419 subjects receive the "performance feedback". They learn their absolute score as well as the  
420 relative performance of whether they (would have) won/lost against their randomly matched

421 opponent. Note that all subjects receive this feedback, irrespective of whether they chose the  
422 piece rate or competitive compensation scheme at the beginning of the round. Conditional on  
423 a participant's own score, round one's outcome of win or loss is a random treatment as it  
424 depends on the score of a randomly assigned match. The reported results in this paper are  
425 ordinary least squares (OLS) regressions. All regressions are clustered at the subject level  
426 and controlling for score fixed effects (following the estimation strategy by Buser and Yuan  
427 (2019)). Furthermore, all regressions control for the standard variables of gender, age, risk  
428 willingness, optimism, confidence in R1, normalized rank, session fixed effects, and country  
429 fixed effects. Note that the normalized rank of each individual within the session is included to  
430 allow for differences in session size.

431 [[Insert Table 2 about here]]

432 To investigate the effect of competition loss (would-be loss) on subjects receiving  
433 performance feedback only (control group), table 2 reports ordinary least squares (OLS)  
434 regressions of willingness to compete in round two (Column 1-2), confidence before round two  
435 (Column 3-4), and score in round two (Column 5-6) on attributional feedback dummies (luck,  
436 effort, and ability), loss dummy, gender dummy, and interaction terms. The results are  
437 presented for the whole sample, as well as separately for those who choose to compete and  
438 those who choose the piece-rate compensation in round one. As reported in columns 2 and  
439 3, losing a competition and receiving performance feedback for both those who choose to  
440 compete in the initial round and those who do not compete have a statistically negative effect  
441 on the willingness to compete in the following round. The estimate is larger for those who  
442 choose to compete previously. Those who choose the piece rate compensation are 31  
443 percentage points less likely to start competing after losing compared to would-be winners.  
444 Those who choose to compete in the first round are 53 percentage points less likely to  
445 compete than winners. For both groups, confidence is significantly reduced after losing. Here

446 the effect sizes are identical for both groups (columns 5 and 6). Unsurprisingly, there is no  
447 effect of losing on the subsequent score for either group (columns 8 and 9).

448 [[Insert Table 3 about here]]

449 To study the effect of negative performance and attributional feedback on  
450 competition persistence, we narrow our investigation of the effect of our experimental  
451 treatments on those who competed in round 1. We analyze the effect of providing attributional  
452 feedback that attributes the loss to lack of luck, effort, or ability on the loser's subsequent  
453 willingness to compete, confidence, and score. Table 3 presents the regressions for each of  
454 the treatments and their interaction effects. As illustrated in Table 3, we do not find a significant  
455 effect of attributing a loss to lack of luck, lack of effort, and lack of ability on loser's willingness  
456 to compete in R2 (column 1-3), their confidence on R2 (column 4-6), or their subsequent score  
457 (column 7-9). Compared to those who receive performance feedback alone, those who also  
458 receive attributional feedback attributing their loss to their lack of luck, effort, or ability are just  
459 as likely to compete in the subsequent round.

460 [[Insert Table 4 about here]]

#### 461 **4.2 Gender Differences in the Effect of Negative Performance Feedback and** 462 **Attributional Feedback on the Subsequent Willingness to Compete, Confidence, and** 463 **Score**

464 In the following section, we turn to our main research question. Are there gender  
465 differences in the response to attributional feedback? We replicate the analysis of the previous  
466 section by gender to investigate gender differences in competition persistence, confidence,  
467 and score in round 2. Tables 4 presents ordinary least squares (OLS) regressions of  
468 willingness to compete (Column 1-3), confidence before round two (Column 4-6), and score  
469 in round two (Column 7-9) on attributional feedback treatment dummies, loss dummy,  
470 competed in round one dummy, gender dummy, and interaction terms. The results are



497 in round 1, and their loss is attributed to lack of ability. We find a significant positive effect on  
498 the willingness to compete after losing and being exposed to the lack of ability feedback for  
499 males who choose to compete in the initial round. Males who competed and lost are 41  
500 percentage points more likely to compete (column 3). On the contrary, females who choose  
501 to compete and are receiving the same attributional feedback are significantly less likely to  
502 compete in the following round by 57 percentage points compared to males (column 3). In  
503 regards to the subsequent confidence after receiving the ability attributional feedback, we find  
504 that females who choose to compete in round one experience a significant decrease in their  
505 confidence of 13 percentage points (column 6). There is no effect on scores in round 2.

506 To evaluate the extent to which the subsequent confidence is influencing the  
507 decision to not drop out and compete in the following round, we conducted a causal mediation  
508 analysis. Following Hicks and Tingley (2011), we use the *medeff* command in STATA to test  
509 how the updated confidence is explaining the relationship between females and their decision  
510 to remain in the competition in round two. Confidence in R1 has a significant mediation effect  
511 in females' subsequent willingness to compete after attributing their loss to lack of ability. The  
512 ACME (average causal mediated effect) of confidence in R1 is (-0.058) with a 95% confidence  
513 interval ranging from -0.13 to -0.01. The ADE (average direct effect) is -0.37 with a 95%  
514 confidence interval ranging from -0.63 to -0.09. The total effect of the mediation analysis of  
515 confidence in R2 is -0.42 with a 95% confidence interval ranging from -0.68 to -0.16. Thus,  
516 the updated confidence of females who choose to compete after attributing their loss to lack  
517 of ability explains 14% of the decrease in their willingness to compete in the following round.

## 518 **5.2 Gender Differences in the Effect of Negative Performance Feedback and** 519 **Attributional Feedback on the Subsequent Willingness to Compete, Confidence,** 520 **and Score of the Highly Confident.**

521 The mediating effect of confidence on the willingness to compete again raises  
522 the question about the role of the level of confidence. Would the individuals characterized by

523 high confidence react differently to attributing their loss to their lack of ability? We re-run our  
524 analyses focusing only on high confidence individuals. First, we conducted an independent-  
525 samples t-test to compare the initial willingness to compete between females with high  
526 confidence and those who are not high in confidence. We classify individuals based on their  
527 confidence in round one. A subject is highly confident when his/her confidence in round one  
528 is in the top 25<sup>th</sup> percentile. We find a significant difference in the willingness to compete for  
529 the highly confident females (M=0.5, SD=0.07) and those with lower confidence (M=0.21,  
530 SD=0.02;  $t(374) = -4.88, p = 0.000$ ). Highly confident females have a higher willingness to  
531 compete in the initial round.

532 [[Insert Table 6 about here]]

533 Table 6 presents identical analyses to table 5, but only for the highly confident individuals.  
534 When we consider all treatments together, we fail to find significant gender differences in the  
535 effect of negative performance feedback on the subsequent willingness to compete,  
536 confidence, and score of those who choose to compete in the initial round (see Online  
537 Appendix B). Highly confident females who choose to compete are just as likely as their male  
538 counterparts to compete after losing and receiving performance feedback. Table 6 column (1)  
539 shows a marginally significant negative effect of attributing a loss to the lack of luck on the  
540 subsequent willingness to compete for males who choose to compete in the initial round.  
541 Highly confident males who choose to compete in round one are 50 percentage points less  
542 likely to compete when their loss is attributed to luck compared to losing in the control group.  
543 On the contrary, highly confident females who choose to compete in round one are  
544 significantly more likely to compete in the following round by 77 percentage points compared  
545 to males when they are in the luck treatment. Column (4) shows that the confidence of high  
546 confidence men is significantly lower by 11 percentage points when they lose in the luck  
547 treatment compared to the control treatment. There is no significant effect on high confidence

548 women. Finally, attributing a competition loss to lack of luck has no significant effect on the  
549 scores of highly confident males and females.

550           As in the estimations with the whole sample, there are no effects of the effort  
551 treatment on willingness to compete, confidence, and score for the highly confident individuals  
552 (see Table 6). Again, the most interesting results are found for the ability treatment. As  
553 reported in column (3), for men who choose to compete in the initial round, the estimates of  
554 receiving negative feedback after a loss are positive, but no longer significant. This suggests  
555 that the effect we found with the whole sample comes from men with different levels of  
556 confidence. However, when we look at women, we find a highly significant negative effect of  
557 competition loss and ability attribution on high-confidence women (column 3). The estimate is  
558 approximately twice as high as in the whole sample (0.57 vs 1.16 percentage points). This  
559 suggests that it is the initially highly confident women for whom the negative feedback  
560 regarding their ability has the strongest effect. Compared to males, highly confident females  
561 who chose to compete in the initial round and lost are 116 percentage points less likely to  
562 continue to compete when their loss is attributed to a lack of ability(column 3). The reduction  
563 in competition entry does not carry over in stated confidence before round two or scores in  
564 round 2 (see column 6 and 9). As a robustness check, we repeat the analysis for high-ability  
565 individuals (scored above the median) and confirm all our results.

566 **5.3 Gender Differences in the Effect of Negative Performance Feedback and**  
567 **Attributional Feedback on the Subsequent Willingness to Compete, Confidence,**  
568 **and Score of the High-ability Subjects**

569           In this section, we look at the gender differences in subsequent willingness to  
570 compete, confidence, and score for those who are high in ability. We define a subject to be  
571 high in ability if his/her score in round 1 is above the sample's median. We also find that high-  
572 ability females are more likely to select themselves into a competition in round 1. Conducting  
573 an independent-samples t-test to compare the initial willingness to compete, we find a



574 significant difference in the willingness to compete between high-ability females (M=0.33,  
575 SD=0.04) and those with scores in round 1 below the median ((M=0.20, SD=0.02);  $t(374) = -$   
576 4.88,  $p = 0.004$ ).

577 [[Insert Table 7 about here]]

578 Looking at the effect of negative performance feedback on the subsequent  
579 willingness to compete, confidence, and score of those who choose to compete in the initial  
580 round, we fail to find significant gender differences in the effect (see Online Appendix C). High-  
581 ability females who choose to compete are just as likely as their male counterparts to compete  
582 after losing and receiving performance feedback. Table 7 presents identical analyses to tables  
583 5 and 6 that investigate the gender differences in the effect of loss attribution but only for high-  
584 ability individuals. Table 7 column (1) shows a marginally significant negative effect of  
585 attributing a loss to the lack of luck on the subsequent willingness to compete for males who  
586 chose to compete in the initial round. High-ability males who choose to compete in round one  
587 are 80 percentage points less likely to compete when their loss is attributed to luck compared  
588 to losing in the control group. On the other hand, high-ability females who choose to compete  
589 in round one are significantly more likely to compete in the following round by 80 percentage  
590 points compared to their male counterparts. Table 7 also shows that the confidence and the  
591 scores of high-ability men are not significantly lower when they lose in the luck treatment  
592 compared to the control treatment. Finally, loss attribution to lack of luck has no significant  
593 effect on the subsequent confidence and score of high-ability women compared to men.

594 In regards to loss attribution to lack of effort, column (2) presents that attributing  
595 the loss to a lack of effort has no significant on the subsequent willingness to compete for  
596 high-ability males. We also find no significant effect on high-ability women compared to their  
597 male counterparts. As for the subsequent confidence after receiving the effort attributional  
598 feedback, we find that while the treatment has a negative effect on men who choose to  
599 compete in round 1 (column 5), it has no significant effect on high-ability women compared to

600 their male counterparts. Men who choose to compete in the initial round and had a decreased  
601 confidence of 13 percentage points. However, the confidence of high-ability men in the effort  
602 treatment compared to men who only received performance feedback is significantly lower by  
603 13 percentage points. Finally, the subsequent performance of high-ability men suffered  
604 significantly from attributing the loss to a lack of effort. Column 8 shows a negative and strongly  
605 significant result for our interaction term. The subsequent score of high-ability men in the effort  
606 treatment is significantly lower by 170 points compared to high-ability men in the control  
607 treatment. However, we find no significant gender difference in the subsequent score between  
608 high-ability males and females.

609 Again, the most interesting results are found for the ability treatment. As reported in Table 7  
610 column (3), the estimates of receiving the ability attribution are positive but not significant for  
611 high-ability men who choose to compete in the initial round compared to the control  
612 treatment. However, when we look at women, we find a highly significant negative effect of  
613 competing for high-ability women. Compared to males, high-ability women who choose to  
614 compete are 84 percentage points less likely to compete in the following round. The  
615 reduction in competition persistence is only carried over in stated confidence before round  
616 two (column 6) but not in scores in round 2 (column 9). Compared to men, the subsequent  
617 confidence of high-ability women is decreased by 13 percentage points as a result of loss  
618 attribution to lack of ability.

## 619 **6. Discussion**

620 Failure is a fundamental element of competitive and high-reward domains such  
621 as STEM fields, innovation, corporate senior leadership, and entrepreneurship. Thus, the  
622 endurance of failure and persistence in competing are keys to success in such environments.  
623 This paper investigates the gender difference in the willingness to compete after losing. It  
624 unfolds the role of attributing the outcome of loss to luck, effort, and ability on women's  
625 likelihood to persist and continue to compete. The results indicate that losing a competition

626 and receiving feedback about the absolute and relative performance has a significant negative  
627 effect on the likelihood to persist in the competition and subsequent confidence. Although  
628 women are less likely to enter a competition, we found no gender differences in the willingness  
629 to persist in a competition after losing. These findings are consistent with Wozniak et al. (2014)  
630 who investigate the effect of performance feedback on competition entry. However, our  
631 replication of Buser and Yuan (2019) does not replicate their result. In a sample of 188  
632 individuals, they find evidence that losing a competition negatively influences females'  
633 subsequent willingness to compete. We carried out the experiment in both the UK and  
634 Germany and find no difference between the countries. The experiment in Buser and Yuan  
635 (2019) was conducted in the Netherlands. There is no reason to believe that German and  
636 British women would be less discouraged by losing compared to Dutch women, so the  
637 difference is unlikely to stem from cultural differences. We show that attributing the loss to a  
638 lack of ability produces the gender gap found in Buser and Yuan (2019). Thus, it is plausible,  
639 that within the sample of women, both in the lab experiment as well as in the Math Olympiad,  
640 a high share of women self-attributed their loss to a lack in their ability rather than to a lack of  
641 luck or effort. Especially, in the Math Olympiad sample, this seems plausible given evidence  
642 of a stereotype threat of women being of lower mathematical ability than men. Gender  
643 differences in the likelihood to persist after losing emerge when we analyze responses to  
644 attributional feedback. Women are more likely than men to compete again if their loss is  
645 attributed to a lack of luck. There are no gender effects when losing is attributed to a lack of  
646 effort. Most interestingly, the largest gender differences appear in the case where losing is  
647 attributed to a lack of ability. Compared to men, women are significantly less likely to persist  
648 and select into a competition again after losing. These results are confirmed and slightly larger  
649 for a sub-sample of highly confident individuals. We argue that such disparity between men  
650 and women in receiving ability feedback indicates a confirmation bias in women's over-  
651 weighting the ability feedback as it confirms previously held negative views about their ability  
652 (for a review see Rabin and Schrag (1999)).

653 To date the evidence in the literature is inconclusive about the nature of of the  
654 gender differences in attributing success and failure (e.g. Basow & Medcalf, 1988; Fox & Ferri,  
655 1992; Stipek, 1984) Supporting this line of arguments, attributing a competition loss to a lack  
656 of luck has a positive effect on women's persistence in a competition. We believe that  
657 attributing an outcome of failure to an external cause such as luck had an opposite effect on  
658 their pre-existing internal self-attribution of failure. To confirm our arguments about the  
659 confirmation and opposition effect on loss attributions, we examined the answers to a question  
660 in our survey after the experiment that asked subjects to rate how much they think luck, as  
661 opposed to ability, contributed to their outcome in the task using a scale from 0% to 100%.  
662 The results indicate that females who choose to compete, lose, and only receive performance  
663 feedback (control group) attribute their outcome to luck versus their own performance at a  
664 lower rate compared to males (see Appendix D). Generally, the addition of attributional  
665 feedback provides insights into why we might see differences in persistence after losing in a  
666 competition. These insights are necessary if we want to design better feedback institutions. In  
667 our design, the experimental task was purposely ambiguous about the source of attributions  
668 (luck, effort, and ability). Further, it was only a computer program that gave the feedback, not  
669 a teacher or peer. Yet subjects, especially women, did internalize and update their behavior  
670 according to this subjective and possibly inaccurate feedback.

671

## 672 **7. Conclusion**

673 Our research highlights the role of the gender difference in competition  
674 persistence in driving women underrepresentation in competitive and high-reward domains.  
675 In this paper, we examine the impact of failure and failure attribution on men and women's  
676 persistence in competition. In a laboratory experiment, we unfolded the gender differences in  
677 the impact of losing a competition and attributing the loss to one of the three causal attributions  
678 - luck, effort, and ability - on the subsequent willingness to compete. Several interesting

679 findings emerge that contribute to our understanding of what drives gender differences in  
680 response to different attributional feedback and how such differences shape the gender gap  
681 in competition. Overall, we find no gender differences in the willingness to compete after  
682 losing. However, when the loss is randomly attributed to a lack of luck, women increase their  
683 willingness to compete, while they are less likely to compete when their loss is randomly  
684 attributed to a lack of ability. There is no gender difference when a loss is randomly attributed  
685 to a lack of effort. The positive effect of luck loss attribution and the negative effect of ability  
686 loss attribution is also observed on the highly confident and high-ability women whom we  
687 found to be more likely to select themselves into a competition. Developing a deeper  
688 understanding of the circumstance under which women have a negative reaction to losing in  
689 a competition could help to design better feedback mechanisms. The negative effect of  
690 attributing a loss to a lack of ability is driving women in general and more importantly those  
691 who are high-ability and high in confidence away from competitive and high-reward domains  
692 costing a significant economic loss in a form of growth, job creation, and innovation. To prevent  
693 such loss, it is crucial to maintain those women who have preferences for competition and at  
694 the same time are high in ability. Nevertheless, it is impossible to avert them from experiencing  
695 failure in competitive workplaces or entrepreneurial settings. Therefore, emphasizing  
696 performance measures, the role of luck, or the role of effort in the outcome of failure rather  
697 than the role of ability would create gender equality in competition persistence, which as a  
698 result would positively contribute to female underrepresentation in competitive and high-  
699 reward domains.

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703

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709

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800

801 **Table 1. Descriptive Statistics by Gender**

	(1) All	(2) Male	(3) Female	(4) p-value
Score in practice round	5.058 (2.260)	5.275 (2.441)	4.891 (2.098)	0.384** 0.029
Total earnings	9.766 (3.543)	10.34 (4.178)	9.322 (2.889)	1.019*** 0.000
Compete in R1	0.366 (0.482)	0.509 (0.501)	0.255 (0.437)	0.253*** 0.000
Score in R1	6.517 (2.563)	6.928 (2.744)	6.199 (2.369)	0.728*** 0.000
Confidence in R1	0.607 (0.233)	0.674 (0.224)	0.555 (0.227)	0.119*** 0.000
Rank in R1	0.517 (0.286)	0.486 (0.291)	0.541 (0.280)	-0.0546** 0.015
Lost in R1	0.477 (0.500)	0.460 (0.499)	0.489 (0.501)	-0.0289 0.460
Earnings in R1	3.774 (3.122)	4.258 (3.725)	3.399 (2.501)	0.859*** 0.000
Luck Feedback Group	0.267 (0.443)	0.296 (0.457)	0.245 (0.430)	0.384** 0.029
Effort Feedback Group	0.274 (0.447)	0.265 (0.442)	0.282 (0.451)	1.019*** 0.000
Ability Feedback Group	0.228 (0.420)	0.216 (0.413)	0.237 (0.426)	0.253*** 0.000
Control Feedback Group	0.231 (0.422)	0.223 (0.417)	0.237 (0.426)	0.728*** 0.000
Observations	667	291	376	

802 Note: This table presents the full sample means as well as the means of each  
803 gender group for the score on the practice round, the total earnings, the  
804 choice to compete in R1, the average score in R1, confidence in R1,  
805 normalized within-session rank in R1, losing against the opponent in R1,  
806 earnings in Euros/GBP in R1, as well as treatment groups. Standard  
807 decisions are in parentheses. Column (4) presents p-values from t-tests of  
808 the gender difference.

809 **Table 2. Multiple Regression Analysis: The Effect of Negative Performance Feedback**  
810 **on Subsequent Willingness to Compete, Confidence, and Score**

	Compete in R2			Confidence in R2			Score in R2		
	(1) All	(2) C R1	(3) PR R1	(4) All	(5) C R1	(6) PR R1	(7) All	(8) C R1	(9) PR R1
Luck Feedback	-0.008 (0.056)	-0.066 (0.055)	0.021 (0.084)	0.027* (0.014)	-0.003 (0.017)	0.050** (0.022)	0.447* (0.243)	0.074 (0.412)	0.758** (0.298)
Effort Feedback	0.029 (0.059)	-0.055 (0.042)	0.089 (0.082)	0.020 (0.012)	-0.018 (0.016)	0.042** (0.017)	0.180 (0.261)	0.321 (0.468)	0.045 (0.284)
Ability Feedback	0.010 (0.077)	-0.029 (0.052)	0.043 (0.111)	0.031* (0.016)	-0.006 (0.020)	0.060** (0.024)	0.158 (0.242)	0.489 (0.336)	-0.043 (0.308)
Lost in R1	-0.411*** (0.060)	-0.533*** (0.120)	-0.314*** (0.091)	-0.130*** (0.017)	-0.129*** (0.030)	-0.123*** (0.023)	0.404 (0.274)	0.000 (0.618)	0.528 (0.366)
Confidence in R1	0.335*** (0.070)	0.366* (0.193)	0.351*** (0.090)	0.644*** (0.034)	0.646*** (0.060)	0.645*** (0.049)	1.228*** (0.290)	2.157*** (0.654)	0.876** (0.357)
_cons	-0.058 (0.149)	0.712*** (0.240)	-0.320* (0.187)	0.298*** (0.053)	0.355*** (0.100)	0.263*** (0.087)	-0.416 (0.902)	-1.037 (1.674)	0.231 (1.032)
Score FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Session FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	667	244	423	667	244	423	667	244	423

811 Note. This table presents the results from least squares regressions of willingness to compete in R2 (columns 1-3), confidence  
812 in R2 (Column 4-6), score in R2 (7-9) on dummies for luck, effort, and ability attributional feedback treatment dummies, a  
813 dummy for whether the individual lost in the previous round, confidence in R1, as well as interaction terms. Results are  
814 presented for the whole sample, those who competed in R1, and those who chose piece-rate compensation in R1 respectively.  
815 All regression control for gender, age, risk willingness, optimism, normalized rank within the session, score fixed effects,  
816 session fixed effects, and country fixed effects. Standard errors in the second row and they are corrected for clustering at the  
817 subject level. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01.

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819 **Table 3. Multiple Regression Analysis: The Effect of Negative Attributional Feedback**  
 820 **on Subsequent Willingness to Compete, Confidence, and Score for Subjects Who**  
 821 **Competed in R1**

	Compete in R2			Confidence in R2			Score in R2		
	(1) Luck	(2) Effort	(3) Ability	(4) Luck	(5) Effort	(6) Ability	(7) Luck	(8) Effort	(9) Ability
Luck Feedback	-0.066 (0.055)	-0.066 (0.055)	-0.066 (0.055)	-0.003 (0.017)	-0.003 (0.017)	-0.003 (0.017)	0.074 (0.412)	0.074 (0.412)	0.074 (0.412)
Effort Feedback	-0.055 (0.042)	-0.055 (0.042)	-0.055 (0.042)	-0.018 (0.016)	-0.018 (0.016)	-0.018 (0.016)	0.321 (0.468)	0.321 (0.468)	0.321 (0.468)
Ability Feedback	-0.029 (0.052)	-0.029 (0.052)	-0.029 (0.052)	-0.006 (0.020)	-0.006 (0.020)	-0.006 (0.020)	0.489 (0.336)	0.489 (0.336)	0.489 (0.336)
Lost in R1	-0.533*** (0.120)	-0.533*** (0.120)	-0.533*** (0.120)	-0.129*** (0.030)	-0.129*** (0.030)	-0.129*** (0.030)	0.000 (0.618)	0.000 (0.618)	0.000 (0.618)
Confidence in R1	0.366* (0.193)	0.366* (0.193)	0.366* (0.193)	0.646*** (0.060)	0.646*** (0.060)	0.646*** (0.060)	2.157*** (0.654)	2.157*** (0.654)	2.157*** (0.654)
Luck Feedback x Lost in R1	0.030 (0.139)			-0.028 (0.046)			0.011 (0.700)		
Effort Feedback x Lost in R1		-0.096 (0.132)			-0.040 (0.038)			-0.612 (0.740)	
Ability Feedback x Lost in R1			0.131 (0.195)			-0.075 (0.057)			-0.107 (0.675)
_cons	0.712*** (0.240)	0.712*** (0.240)	0.712*** (0.240)	0.355*** (0.100)	0.355*** (0.100)	0.355*** (0.100)	-1.037 (1.674)	-1.037 (1.674)	-1.037 (1.674)
Score FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Session FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	244	244	244	244	244	244	244	244	244

822 Note. This table presents the results from least squares regressions of willingness to compete in R2 (columns 1-3), confidence  
 823 in R2 (Column 4-6), score in R2 (7-9) on luck, effort, and ability attributional feedback treatment dummies, a dummy for  
 824 whether the individual lost in the previous round, confidence in R1, as well as interaction terms. All regression control for  
 825 gender, age, risk willingness, optimism, normalized rank within the session, score fixed effects, session fixed effects, and  
 826 country fixed effects. Results are presented for the subjects who competed in R1 and received the luck attributional feedback,  
 827 effort attributional feedback, and ability attributional feedback respectively. Standard errors in the second row and they are  
 828 corrected for clustering at the subject level. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01.

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831 **Table 4. Multiple Regression Analysis: The Gender Difference in the Effect of Negative**  
 832 **Performance Feedback on Subsequent Willingness to Compete, Confidence, and Score**

	Compete in R2			Confidence in R2			Score in R2		
	(1) All	(2) C R1	(3) PR R1	(4) All	(5) C R1	(6) PR R1	(7) All	(8) C R1	(9) PR R1
Luck Feedback	-0.006 (0.057)	-0.053 (0.058)	0.022 (0.085)	0.027* (0.014)	-0.002 (0.017)	0.049** (0.022)	0.434* (0.246)	0.104 (0.443)	0.751** (0.301)
Effort Feedback	0.030 (0.059)	-0.049 (0.041)	0.091 (0.082)	0.019 (0.012)	-0.017 (0.016)	0.041** (0.017)	0.173 (0.260)	0.335 (0.478)	0.032 (0.286)
Ability Feedback	0.011 (0.077)	-0.022 (0.052)	0.044 (0.111)	0.030* (0.016)	-0.006 (0.020)	0.060** (0.024)	0.154 (0.240)	0.505 (0.340)	-0.048 (0.308)
Lost in R1	-0.391*** (0.059)	-0.472*** (0.132)	-0.276*** (0.095)	-0.136*** (0.019)	-0.125*** (0.038)	-0.144*** (0.026)	0.294 (0.344)	0.141 (0.753)	0.304 (0.433)
Confidence in R1	0.335*** (0.071)	0.380* (0.194)	0.351*** (0.092)	0.644*** (0.034)	0.647*** (0.060)	0.645*** (0.049)	1.228*** (0.288)	2.189*** (0.638)	0.876** (0.354)
Female	0.033 (0.031)	0.012 (0.034)	0.079 (0.048)	-0.023* (0.013)	-0.014 (0.012)	-0.037* (0.018)	-0.043 (0.193)	0.009 (0.334)	-0.013 (0.254)
Lost in R1 x Female	-0.035 (0.049)	-0.136 (0.113)	-0.058 (0.057)	0.011 (0.020)	-0.008 (0.031)	0.032 (0.025)	0.188 (0.252)	-0.309 (0.565)	0.341 (0.336)
_cons	-0.077 (0.149)	0.648** (0.235)	-0.350* (0.182)	0.304*** (0.057)	0.352*** (0.102)	0.280*** (0.089)	-0.312 (0.869)	-1.184 (1.654)	0.410 (1.022)
Score FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Session FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	667	244	423	667	244	423	667	244	423

833 Note. This table presents the results from least squares regressions of willingness to compete in R2 (columns 1-3), confidence in  
 834 R2 (Column 4-6), score in R2 (7-9) on dummies for luck, effort, and ability attributional feedback treatment dummies, a dummy  
 835 for whether the individual lost in the previous round, a dummy for gender, confidence in R1, as well as interaction terms. Results  
 836 are presented for the whole sample, those who competed in R1, and those who chose piece-rate compensation in R1 respectively.  
 837 All regression control for age, risk willingness, optimism, normalized rank within the session, score fixed effects, session fixed  
 838 effects, and country fixed effects. Standard errors in the second row and they are corrected for clustering at the subject level. \*  
 839 p<0.10, \*\* p<0.05, \*\*\* p<0.01.

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841 **Table 5. Multiple Regression Analysis: The Gender Difference in the Effect of Negative**  
842 **Attributional Feedback on Subsequent Willingness to Compete, Confidence, and Score**  
843 **for Subjects Who Competed in R1**

	Compete in R2			Confidence in R2			Score in R2		
	(1) Luck	(2) Effort	(3) Ability	(4) Luck	(5) Effort	(6) Ability	(7) Luck	(8) Effort	(9) Ability
Luck Feedback	-0.048 (0.057)	-0.058 (0.060)	-0.048 (0.058)	0.008 (0.021)	-0.003 (0.017)	-0.002 (0.017)	-0.060 (0.579)	0.094 (0.437)	0.111 (0.446)
Effort Feedback	-0.048 (0.041)	-0.087 (0.061)	-0.047 (0.041)	-0.017 (0.016)	-0.028 (0.022)	-0.018 (0.015)	0.325 (0.485)	0.258 (0.540)	0.338 (0.480)
Ability Feedback	-0.022 (0.052)	-0.025 (0.053)	0.007 (0.031)	-0.005 (0.020)	-0.006 (0.020)	-0.009 (0.021)	0.485 (0.335)	0.500 (0.346)	0.551 (0.485)
Lost in R1	-0.442*** (0.128)	-0.460*** (0.146)	-0.528*** (0.139)	-0.125*** (0.038)	-0.115*** (0.041)	-0.138*** (0.038)	0.107 (0.792)	0.148 (0.743)	0.102 (0.783)
Confidence in R1	0.400** (0.193)	0.378* (0.194)	0.434** (0.177)	0.645*** (0.058)	0.645*** (0.059)	0.657*** (0.057)	2.192*** (0.615)	2.186*** (0.639)	2.231*** (0.639)
Female	0.015 (0.033)	-0.011 (0.042)	0.028 (0.044)	-0.006 (0.016)	-0.020 (0.016)	-0.015 (0.013)	-0.120 (0.404)	-0.037 (0.339)	0.033 (0.364)
Luck Feedback x Lost in R1	-0.112 (0.156)			-0.022 (0.047)			-0.014 (0.839)		
Luck Feedback x Lost in R1 x Female	0.405* (0.236)			-0.028 (0.087)			0.023 (0.891)		
Effort Feedback x Lost in R1		-0.123 (0.195)			-0.069 (0.044)			-0.619 (0.855)	
Effort Feedback x Lost in R1 x Female		0.063 (0.269)			0.065 (0.059)			0.016 (1.421)	
Ability Feedback x Lost in R1			0.409** (0.186)			-0.016 (0.058)			0.094 (0.955)
Ability Feedback x Lost in R1 x Female			-0.569*** (0.201)			-0.127* (0.064)			-0.387 (1.244)
_cons	0.639** (0.240)	0.657*** (0.226)	0.595** (0.232)	0.345*** (0.103)	0.352*** (0.098)	0.346*** (0.101)	-1.078 (1.669)	-1.161 (1.598)	-1.236 (1.665)
Score FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Session FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	244	244	244	244	244	244	244	244	244

844 Note. This table presents the results from least squares regressions of willingness to compete in R2 (columns 1-3), confidence in  
845 R2 (Column 4-6), score in R2 (7-9) on luck, effort, and ability attributional feedback treatment dummies, a dummy for whether  
846 the individual lost in the previous round, confidence in R1, a dummy for gender, as well as interaction terms. All regression  
847 control for age, risk willingness, optimism, normalized rank within the session, score fixed effects, session fixed effects, and  
848 country fixed effects. Results are presented for the subjects who competed in R1 and received the luck attributional feedback,  
849 effort attributional feedback, and ability attributional feedback respectively. Standard errors in the second row and they are  
850 corrected for clustering at the subject level. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01.  
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**Table 6. Multiple Regression Analysis: The Gender Difference in the Effect of Negative Attributional Feedback on Subsequent Willingness to Compete, Confidence, and Score for the Highly Confident Subjects Who Competed in R1**

	Compete in R2			Confidence in R2			Score in R2		
	(1) Luck	(2) Effort	(3) Ability	(4) Luck	(5) Effort	(6) Ability	(7) Luck	(8) Effort	(9) Ability
Luck Treatment	-0.053 (0.096)	-0.037 (0.070)	-0.038 (0.073)	0.044** (0.021)	0.037* (0.018)	0.037* (0.019)	-0.140 (0.675)	-0.065 (0.579)	-0.061 (0.581)
Effort Treatment	-0.084 (0.056)	-0.082 (0.060)	-0.087 (0.060)	0.009 (0.020)	0.006 (0.023)	0.007 (0.021)	-0.098 (0.449)	-0.176 (0.632)	-0.080 (0.447)
Ability Treatment	0.006 (0.050)	0.009 (0.052)	-0.002 (0.052)	0.044* (0.022)	0.043* (0.022)	0.049* (0.028)	0.515 (0.547)	0.542 (0.561)	0.557 (0.673)
Lost in R1	-0.255 (0.215)	-0.348 (0.218)	-0.411* (0.214)	-0.047 (0.050)	-0.036 (0.052)	-0.045 (0.053)	1.293 (0.887)	1.080 (0.900)	1.247 (0.887)
Confidence in R1	0.200 (0.655)	0.169 (0.629)	0.126 (0.781)	0.838*** (0.124)	0.791*** (0.121)	0.826*** (0.127)	3.661 (4.518)	4.251 (4.253)	3.598 (4.368)
Female	0.036 (0.033)	0.031 (0.040)	0.019 (0.038)	-0.001 (0.017)	-0.007 (0.012)	-0.002 (0.020)	-0.623 (0.605)	-0.721 (0.718)	-0.530 (0.657)
Luck Treatment x Lost in R1	-0.499* (0.248)			-0.109* (0.056)			-0.888 (1.050)		
Luck Feedback x Lost in R1 x Female	0.765** (0.281)			-0.026 (0.138)			0.720 (1.478)		
Effort Treatment x Lost in R1		-0.362 (0.303)			-0.111 (0.066)			-1.350 (1.380)	
Effort Feedback x Lost in R1 x Female		-0.285 (0.429)			0.105 (0.098)			-1.687 (2.375)	
Ability Treatment x Lost in R1			0.363 (0.216)			-0.095 (0.059)			-1.361 (1.106)
Ability Feedback x Lost in R1 x Female			-1.158*** (0.390)			-0.012 (0.085)			0.378 (2.312)
_cons	0.659 (0.701)	0.678 (0.629)	0.674 (0.799)	0.086 (0.167)	0.135 (0.153)	0.096 (0.172)	0.008 (5.167)	-0.478 (4.804)	0.014 (4.996)
Score FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Session FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	104	104	104	104	104	104	104	104	104

855 Note. This table presents the results from least squares regressions of willingness to compete in R2 (columns 1-3), confidence in  
856 R2 (Column 4-6), score in R2 (7-9) on luck, effort, and ability attributional feedback treatment dummies, a dummy for whether  
857 the individual lost in the previous round, confidence in R1, a dummy for gender, as well as interaction terms. All regression  
858 control for age, risk willingness, optimism, normalized rank within the session, score fixed effects, session fixed effects, and  
859 country fixed effects. Results are presented for the sub-sample of the highly confident subjects (top 25th percentile) who  
860 competed in R1 and received the luck attributional feedback, effort attributional feedback, and ability attributional feedback  
861 respectively. Standard errors in the second row and they are corrected for clustering at the subject level. \* p<0.10, \*\* p<0.05,  
862 \*\*\* p<0.01.

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**Table 7. Multiple Regression Analysis: The Gender Difference in the Effect of Negative Attributional Feedback on Subsequent Willingness to Compete, Confidence, and Score for the High-ability Subjects Who Competed in R1**

	Compete in R2			Confidence in R2			Score in R2		
	(1) Luck	(2) Effort	(3) Ability	(4) Luck	(5) Effort	(6) Ability	(7) Luck	(8) Effort	(9) Ability
Luck Treatment	-0.051 (0.045)	-0.086 (0.054)	-0.079 (0.057)	0.030* (0.015)	0.016 (0.010)	0.018* (0.010)	0.018 (0.547)	0.163 (0.458)	0.196 (0.470)
Effort Treatment	-0.076** (0.035)	-0.120* (0.065)	-0.078** (0.035)	-0.002 (0.026)	-0.008 (0.030)	-0.000 (0.025)	0.527 (0.465)	0.318 (0.545)	0.545 (0.461)
Ability Treatment	-0.033 (0.042)	-0.040 (0.045)	-0.014 (0.026)	0.001 (0.016)	0.000 (0.017)	0.006 (0.018)	0.343 (0.426)	0.348 (0.422)	0.408 (0.529)
Lost in R1	-0.097 (0.237)	-0.277 (0.312)	-0.353 (0.267)	-0.094* (0.050)	-0.055 (0.049)	-0.101** (0.047)	0.967 (0.816)	1.517*** (0.461)	1.155 (0.722)
Confidence in R1	0.255 (0.231)	0.265 (0.221)	0.279 (0.205)	0.651*** (0.096)	0.650*** (0.091)	0.652*** (0.089)	4.046*** (1.226)	4.009*** (1.253)	4.032*** (1.232)
Female	0.027 (0.033)	-0.018 (0.049)	0.014 (0.048)	0.009 (0.016)	-0.007 (0.014)	-0.000 (0.014)	0.050 (0.378)	0.054 (0.398)	0.217 (0.425)
Luck Treatment x Lost in R1	-0.754*** (0.261)			-0.002 (0.059)			-1.049 (1.250)		
Luck Feedback x Lost in R1 x Female	0.752** (0.364)			-0.004 (0.096)			-1.340 (1.428)		
Effort Treatment x Lost in R1		-0.393 (0.355)			-0.126** (0.053)			-1.696* (0.907)	
Effort Feedback x Lost in R1 x Female		-0.093 (0.491)			0.093 (0.091)			0.617 (1.613)	
Ability Treatment x Lost in R1			0.144 (0.337)			-0.017 (0.069)			-0.041 (0.710)
Ability Feedback x Lost in R1 x Female			-0.844** (0.331)			-0.129* (0.067)			-0.571 (1.547)
_cons	0.891*** (0.231)	0.864*** (0.222)	0.871*** (0.241)	0.319** (0.121)	0.329** (0.119)	0.336** (0.126)	-0.793 (2.140)	-0.808 (2.113)	-0.834 (2.230)
Score FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Session FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	144	144	144	144	144	144	144	144	144

868 Note. This table presents the results from least squares regressions of willingness to compete in R2 (columns 1-3), confidence in  
869 R2 (Column 4-6), score in R2 (7-9) on luck, effort, and ability attributional feedback treatment dummies, a dummy for whether  
870 the individual lost in the previous round, confidence in R1, a dummy for gender, as well as interaction terms. All regression  
871 control for age, risk willingness, optimism, normalized rank within the session, score fixed effects, session fixed effects, and  
872 country fixed effects. Results are presented for the sub-sample of the high-ability subject (above median) who competed in R1  
873 and received the luck attributional feedback, effort attributional feedback, and ability attributional feedback respectively.  
874 Standard errors in the second row and they are corrected for clustering at the subject level. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01.  
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876 **Appendix A. Descriptive Statistics by Gender and Treatment Group**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	All	Male	Female	p-value	Luck	Effort	Ability	Control	p-value
Female	0.564 (0.496)				0.517 (0.501)	0.579 (0.495)	0.586 (0.494)	0.578 (0.496)	0.536
Age	25.31 (5.825)	25.91 (5.742)	24.84 (5.853)	0.018	25.43 (5.674)	25.66 (6.555)	24.70 (4.700)	25.36 (6.083)	0.496
Science & technology	0.337 (0.473)	0.423 (0.495)	0.271 (0.445)	0.000	0.348 (0.478)	0.306 (0.462)	0.342 (0.476)	0.357 (0.481)	0.758
United Kingdom	0.456 (0.498)	0.454 (0.499)	0.457 (0.499)	0.922	0.433 (0.497)	0.448 (0.499)	0.487 (0.501)	0.461 (0.500)	0.793
Risk willingness	4.496 (2.695)	5.168 (2.662)	3.976 (2.607)	0.000	4.567 (2.708)	4.492 (2.820)	4.349 (2.509)	4.565 (2.725)	0.878
Optimism	5.868 (2.807)	5.966 (2.793)	5.793 (2.819)	0.430	6.073 (2.764)	6.060 (2.671)	5.480 (2.814)	5.786 (2.984)	0.184
Score in practice round	5.058 (2.260)	5.275 (2.441)	4.891 (2.098)	0.029	4.994 (2.231)	4.978 (2.201)	4.980 (2.257)	5.305 (2.369)	0.496
Total earnings	9.766 (3.543)	10.34 (4.178)	9.322 (2.889)	0.000	9.928 (3.431)	9.603 (3.618)	9.541 (3.349)	9.995 (3.773)	0.570
Competed in R1	0.366 (0.482)	0.509 (0.501)	0.255 (0.437)	0.000	0.365 (0.483)	0.377 (0.486)	0.316 (0.466)	0.403 (0.492)	0.452
Score in R1	6.517 (2.563)	6.928 (2.744)	6.199 (2.369)	0.000	6.404 (2.579)	6.601 (2.524)	6.250 (2.466)	6.812 (2.671)	0.238
Confidence in R1	0.607 (0.233)	0.674 (0.224)	0.555 (0.227)	0.000	0.623 (0.231)	0.613 (0.235)	0.568 (0.228)	0.621 (0.237)	0.129
Rank in R1	0.517 (0.286)	0.486 (0.291)	0.541 (0.280)	0.015	0.527 (0.293)	0.512 (0.276)	0.538 (0.298)	0.490 (0.279)	0.494
Lost in R1	0.477 (0.500)	0.460 (0.499)	0.489 (0.501)	0.460	0.534 (0.500)	0.443 (0.498)	0.493 (0.502)	0.435 (0.497)	0.221
Earnings in R1	3.774 (3.122)	4.258 (3.725)	3.399 (2.501)	0.000	3.792 (3.075)	3.626 (3.117)	3.539 (2.908)	4.159 (3.370)	0.306
Observations	667	291	376		178	183	152	154	

877 Note: This table presents the full sample means as well as the means of each gender and treatment group for gender, age, science  
878 and technology as a field of education, the United Kingdom as country of residence, risk willingness (1-10), optimism (1-10),  
879 score on the practice round, as well as the total earnings. The table also presents the full sample means as well as the means of  
880 each gender group and treatment group of the experimental choices and outcomes in round one including the subject's choice to  
881 compete, average score, confidence, normalized within-session rank, losing against the opponent, and earnings in R1. Risk  
882 willingness and Optimism are self-rated questionnaire measures. Earnings are in Euros/GBP. Standard deviations are in  
883 parentheses. Column (4) presents p-values from t-tests of the gender difference and column (9) presents p-values from ANOVA  
884 test of equality of all four treatment group means.  
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**Appendix B. Multiple Regression Analysis: The Gender Difference in the effect of Negative Performance Feedback on Subsequent Willingness to Compete, Confidence, and Score of the Highly Confident**

	Compete in R2			Confidence in R2			Score in R2		
	(1) All	(2) C R1	(3) PR R1	(4) All	(5) C R1	(6) PR R1	(7) All	(8) C R1	(9) PR R1
Luck Treatment	0.009 (0.087)	-0.037 (0.072)	0.070 (0.161)	0.018 (0.021)	0.037* (0.018)	-0.008 (0.040)	0.249 (0.420)	-0.061 (0.571)	0.557 (1.134)
Effort Treatment	-0.010 (0.097)	-0.077 (0.058)	0.045 (0.232)	0.004 (0.022)	0.008 (0.020)	-0.039 (0.032)	-0.078 (0.333)	-0.082 (0.440)	-0.055 (0.741)
Ability Treatment	0.095 (0.086)	0.007 (0.054)	0.064 (0.220)	0.019 (0.021)	0.043* (0.022)	0.013 (0.049)	0.398 (0.490)	0.520 (0.544)	-0.062 (1.174)
Lost in R1	-0.296* (0.146)	-0.325 (0.208)	-0.231 (0.289)	-0.078** (0.037)	-0.044 (0.050)	-0.140** (0.051)	0.924 (0.658)	1.221 (0.851)	0.514 (0.926)
Confidence in R1	0.694 (0.543)	0.064 (0.689)	2.486* (1.320)	0.915*** (0.171)	0.831*** (0.132)	0.979** (0.461)	1.734 (2.821)	3.651 (4.294)	4.368 (4.934)
Female	0.031 (0.075)	0.043 (0.033)	0.033 (0.177)	0.009 (0.016)	-0.006 (0.013)	-0.020 (0.037)	-0.152 (0.376)	-0.565 (0.529)	0.051 (0.681)
Lost in R1 x Female	0.032 (0.196)	0.178 (0.182)	-0.143 (0.284)	-0.022 (0.033)	-0.030 (0.052)	0.023 (0.060)	-0.306 (0.680)	-0.704 (0.900)	0.829 (0.774)
_cons	-0.262 (0.649)	0.770 (0.709)	-2.758* (1.495)	-0.006 (0.162)	0.096 (0.173)	-0.085 (0.401)	1.063 (3.199)	-0.020 (4.958)	-2.222 (3.453)
Score FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Session FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	167	104	63	167	104	63	167	104	63

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Note. This table presents the results from least squares regressions of willingness to compete in R2 (columns 1-3), confidence in R2 (Column 4-6), score in R2 (7-9) on dummies for luck, effort, and ability attributional feedback treatment dummies, a dummy for whether the individual lost in the previous round, a dummy for gender, confidence in R1, as well as interaction terms. Results are presented for the whole sub-sample of the highly confident subject (top 25th percentile), those who competed in R1, and those who chose piece-rate compensation in R1 respectively. All regression control for age, risk willingness, optimism, normalized rank within the session, score fixed effects, session fixed effects, and country fixed effects. Standard errors in the second row and they are corrected for clustering at the subject level. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01.

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**Appendix C. Multiple Regression Analysis: The Gender Difference in the effect of Negative Performance Feedback on Subsequent Willingness to Compete, Confidence, and Score of High-ability Subjects**

	Compete in R2			Confidence in R2			Score in R2		
	(1) All	(2) C R1	(3) PR R1	(4) All	(5) C R1	(6) PR R1	(7) All	(8) C R1	(9) PR R1
Luck Treatment	-0.039 (0.072)	-0.095 (0.060)	-0.011 (0.110)	0.021 (0.015)	0.019 (0.014)	0.018 (0.023)	-0.263 (0.417)	-0.686 (0.596)	0.296 (0.638)
Effort Treatment	-0.032 (0.073)	-0.125** (0.056)	0.066 (0.107)	0.011 (0.017)	-0.012 (0.022)	0.030 (0.021)	-0.228 (0.351)	0.085 (0.659)	-0.461 (0.537)
Ability Treatment	0.014 (0.082)	-0.015 (0.056)	0.032 (0.136)	0.018 (0.012)	-0.003 (0.017)	0.031* (0.017)	-0.130 (0.346)	0.070 (0.574)	-0.250 (0.560)
Lost in R1	-0.418*** (0.069)	-0.516*** (0.123)	-0.287** (0.109)	-0.146*** (0.022)	-0.145*** (0.030)	-0.140*** (0.032)	-1.320*** (0.435)	-1.396** (0.649)	-1.417*** (0.476)
Confidence in R1	0.723*** (0.159)	0.196 (0.246)	0.318 (0.225)	0.704*** (0.038)	0.653*** (0.093)	0.715*** (0.058)	4.257*** (0.659)	5.162*** (1.487)	2.990*** (0.918)
Female	-0.029 (0.042)	-0.012 (0.032)	0.089 (0.061)	-0.021* (0.012)	-0.012 (0.012)	-0.026 (0.022)	-0.244 (0.363)	-0.502 (0.579)	0.127 (0.433)
Lost in R1 x Female	-0.004 (0.096)	0.031 (0.194)	-0.138 (0.099)	-0.014 (0.031)	-0.009 (0.052)	-0.022 (0.035)	0.591 (0.585)	0.137 (0.733)	0.863 (0.712)
_cons	0.214 (0.153)	0.874*** (0.196)	0.194 (0.192)	0.270*** (0.033)	0.323*** (0.079)	0.255*** (0.046)	6.256*** (0.508)	5.873*** (1.387)	6.595*** (0.499)
Score FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Session FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	315	144	171	315	144	171	315	144	171

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Note. This table presents the results from least squares regressions of willingness to compete in R2 (columns 1-3), confidence in R2 (Column 4-6), score in R2 (7-9) on dummies for luck, effort, and ability attributional feedback treatment dummies, a dummy for whether the individual lost in the previous round, a dummy for gender, confidence in R1, as well as interaction terms. Results are presented for the whole sub-sample of the highly confident subject (top 25th percentile), those who competed in R1, and those who chose piece-rate compensation in R1 respectively. All regression control for age, risk willingness, optimism, normalized rank within the session, score fixed effects, session fixed effects, and country fixed effects. Standard errors in the second row and they are corrected for clustering at the subject level. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01.

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**Appendix D. Multiple Regression Analysis: The Gender Difference in the effect of Performance Feedback on Causal Attributions to Luck and Effort**

	Due to Luck			Due to Effort		
	(1) All	(2) C R1	(3) PR R1	(4) All	(5) C R1	(6) PR R1
Luck Treatment	-2.992 (4.698)	-5.132 (6.629)	-1.410 (5.494)	1.609 (3.687)	-2.721 (6.099)	4.297 (4.313)
Effort Treatment	1.603 (3.493)	-6.157 (6.034)	5.772 (4.063)	-4.397 (3.493)	-9.293 (6.077)	-1.181 (4.623)
Ability Treatment	-7.224 (4.368)	-9.848 (7.849)	-5.956 (4.731)	-5.017 (3.785)	-7.988 (6.191)	-2.701 (4.267)
Lost in R1	0.543 (5.909)	8.441 (11.766)	-8.543 (5.300)	-2.168 (5.703)	-0.102 (10.848)	-1.270 (7.303)
Confidence in R1	1.038 (6.410)	-4.975 (12.022)	4.557 (6.304)	-11.667*** (4.147)	-34.161*** (9.198)	-2.349 (5.556)
Female	6.533*** (2.106)	6.354 (4.098)	3.629 (2.589)	2.017 (2.056)	-1.441 (5.376)	3.746 (3.913)
Lost in R1 x Female	-4.417 (3.316)	-14.017** (5.303)	4.834 (3.983)	-2.915 (3.083)	-0.579 (6.338)	-4.241 (6.387)
_cons	31.952** (12.226)	57.912*** (20.811)	17.916 (13.940)	57.232*** (12.573)	84.656*** (20.332)	49.806** (23.557)
Score FE	Yes	Yes	Yes	Yes	Yes	Yes
Session FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	667	244	423	667	244	423

910 Note. This table presents the results from least squares regressions of Causal Attributions to Luck (columns  
911 1-3) and Causal Attributions to Effort (Column 4-6) as opposed to ability on dummies for luck, effort, and  
912 ability attributional feedback treatment dummies, a dummy for whether the individual lost in the previous  
913 round, a dummy for gender, confidence in R1, as well as interaction terms. Results are presented for the  
914 whole sub-sample of the highly confident subject (top 25th percentile), those who competed in R1, and those  
915 who chose piece-rate compensation in R1 respectively. All regression control for age, risk willingness,  
916 optimism, normalized rank within the session, score in R2, score in fixed effects, session fixed effects, and  
917 country fixed effects. Standard errors in the second row and they are corrected for clustering at the subject  
918 level. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01.