Linking Beliefs to Willingness to Compete
(Gender Difference in the Reference Group Neglect)

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Motivations

- Determinants of choice to enter a competition are still not fully understood.
- Men are known to have a higher taste for competition than women (Niederle and Vesterlund (2007), replicated many times).
- When having to decide whether to enter a competition, people often already have had feedback on past performances.
- The level of the group they evolve in is often determined by their past performances.
- Beliefs and the way they are updated are often suspected to play an important role.

Related literature

- Camerer and Lovallo (1999) find evidence suggesting people are subject to "reference group neglect".
- Feedback can remove the gender differences in tournament entry (Wozniak, 2011).
- A noisy feedback can lead to (Möbius et al. 2011):
  - Conservatism: subjects update less than Bayesian agents would in response to both negative and positive information and women are more conservative than men.
  - Asymmetry: subjects adjust more to positive than negative information. No gender difference.
- Information process is different when it concerns a non-performance task,a performance task or others' performance (Ertac 2011, Grossman and Owens 2011).

Research questions

- How do people adjust their competitive entry to their beliefs about their relative performance and to the level of the competition?
  - How do people update their beliefs following the reception of a relative performance feedback?
  - Are men and women, and low-performing and high-performing subjects different in these respects?
- Does additional information on relative performance lead to more optimal tournament entry decision?

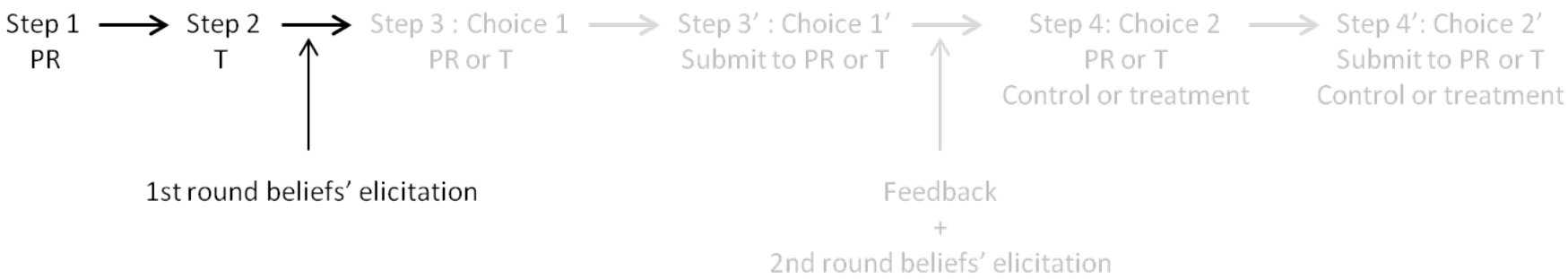
Research method

→ We build an experimental design where we elicit beliefs both before and after we provide subjects with a feedback on how they did relative to others, so that we are able to track how they update their beliefs.

→ We also manipulate the level of the competition participants evolve in.

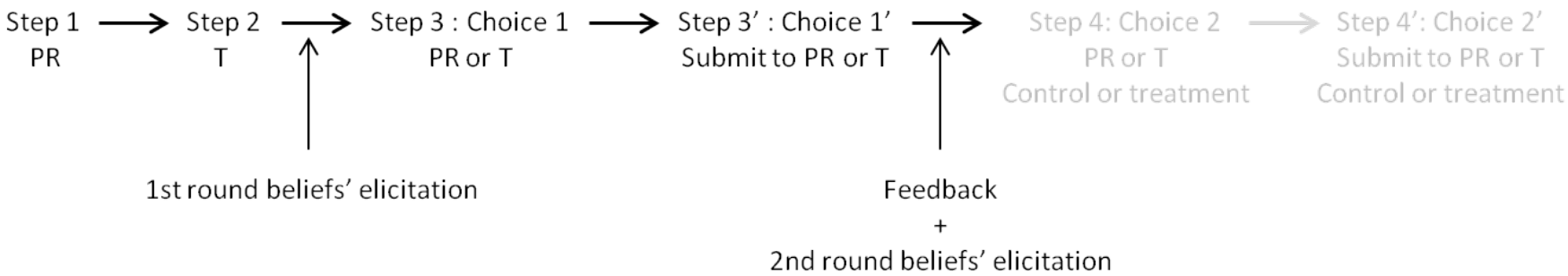
Experimental design

- Task= additions of five two-digits numbers (Niederle and Vesterlund, 2007).
- **Step 1** piece rate (PR) remuneration : 5 minutes to solve as many additions as one can (0.5€/correct addition).
- **Step 2** tournament (T): winner if performance is above the performance of a randomly chosen teammate (1€/correct addition).
- **Incentivized belief-assessment questions** (1): Elicit beliefs (in %) about belonging to each quartile. rule



Experimental Design (2)

- **Step 3**:
  - Choice between Piece Rate and Tournament (**Choice 1**).
  - If tournament is chosen: winner if performance is above the step 2 performance of a randomly chosen teammate.
- **Step 3prime**: Submit step 1 performance to Piece Rate or Tournament (**Choice 1prime**).
- **Feedback**: indicating to the subject if she is either below or above the median (based on step 2 performance).
- Incentivized **belief-assessment questions** (2): Elicit beliefs about belonging to each of the two possible quartiles.



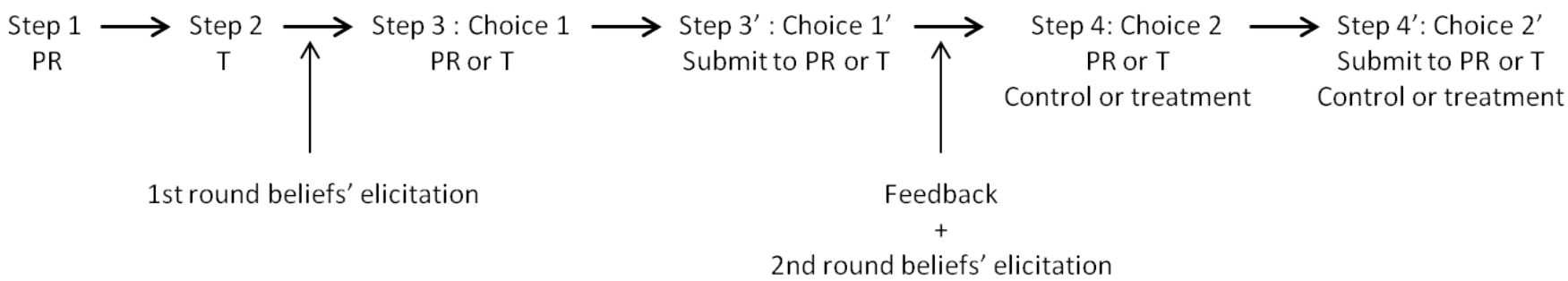
Experimental Design (3)

- **Step 4**: **Choice 2** (Control or Treatment)

Control	Treatment
Choice between PR and Tournament	Choice between PR and *ability grouping** Tournament.

- **Choice 4prime**: Submit step 1 performance to Piece Rate or Tournament (**Choice 2prime**).

$\Rightarrow$ **Ability grouping tournament*: A subject competes against someone having the same performance level (below or above the median).



General information about the experiment

- Run in Paris (LEEP).
- Same number of men and women in each session
- Control: 112 subjects (56 men, 56 women)
- Treatment: 116 subjects (58 women, 58 men)
- Remuneration: One step randomly chosen at the end of the experiment + belief-assessment questions + 7€ show-up fee.
- Average payoff: 15.3€.

Beliefs

- Before receiving the feedback: High performing men are more confident than HP women, but it is not observed for low performers.
- After the feedback: Among both the high and low performers, men are more confident than women.

Beliefs (2)

- Using the beliefs of belonging to the 4 quartiles assessed before receiving the feedback , we compute the "**bayesian beliefs**"= beliefs a bayesian agents would hold by updating his beliefs after he received the feedback telling him whether his performance is above or below the median.

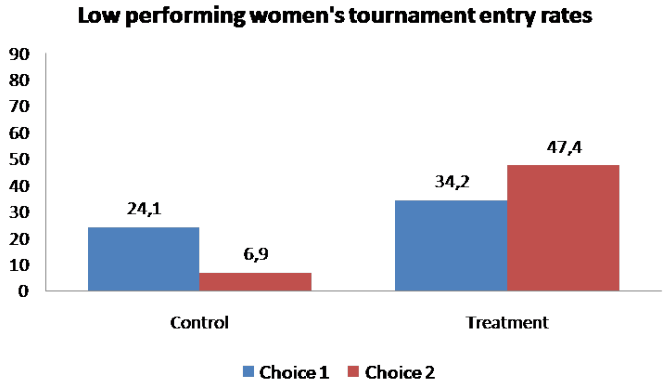
$$bayes_{low} = 100 * \frac{b1\_2}{b1\_2 + b1\_1}$$

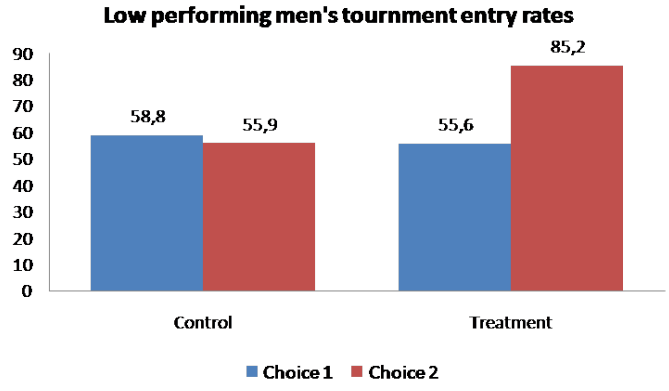
$$bayes_{high} = 100 * \frac{b1\_4}{b1\_4 + b1\_3}$$

- We then compare the actual second-round beliefs to the bayesian beliefs:
  - **Low-performing women and men update more pessimistically than a bayesian agent**.
    - Low-performing women update more pessimistically than their male counterparts *p=0.04*.
  - **High-performing men and women update more optimistically than a bayesian agent**.
    - High-performing women update significantly more optimistically than their male counterparts *p=0.04*.

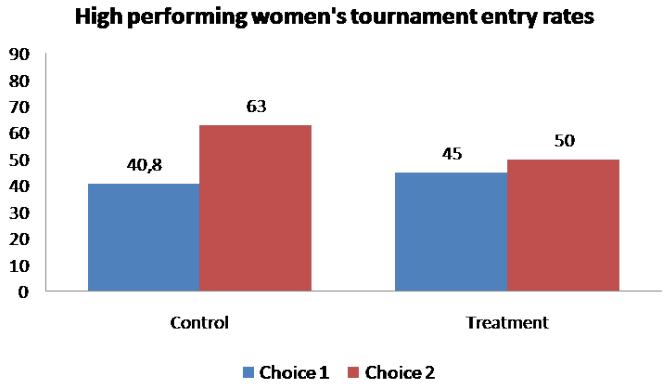
Diff-in-diff estimations

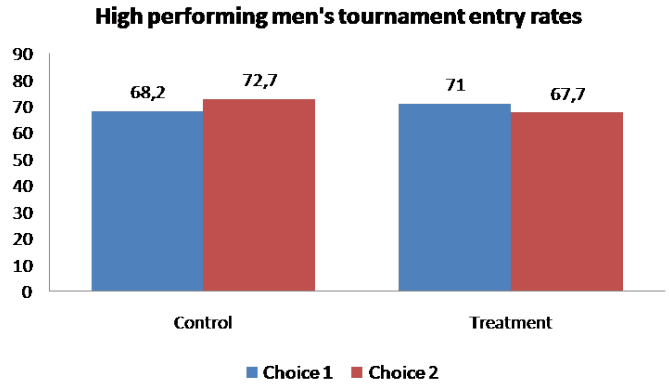
- For low performers: Significant treatment effect.





- For high performers : Non significant treatment effect.





The role of the beliefs in the decision to enter tournament

We create a variable **beliefwin** (bw) indicating the **beliefs of winning the tournament** (b_i_j: i^{th} round elicitation for the j^{th} quartile). BeliefWin

- By running an LPM on low-performing men and women, and high-performing men and women we find that:
  - "Surprise effect": After a negative (positive) feedback, the probability for women to enter tournament decreases (increases) if they were highly (very little) confident to start with.
  - When we add the beliefwin variable, the treatment effect for LP subjects disappears: the choice to enter competition for LP if mainly driven by the beliefs.

- Then we run an LPM on men and women in the control and treatment groups:
  - Women from the control group react strongly to the type of feedback they receive. However men do not change their competitive behavior in accordance to the nature of their feedback.
  - Men in the treatment group change their competitive behavior following the reception of the feedback, which is less the case for women.

$\rightarrow$ So, when looking closer to what is happening:

- $\triangleright$ Women are especially sensitive to the information on their own performance level (control).
- $\triangleright$ Men react more strongly to the level of their opponents (treatment).
- $\triangleright$ And beliefs might drive these behaviors.

Welfare analysis

- We compute the expected payoffs from entering the standard tournament (step 2).
- We then compare the participants who would have maximized their payoffs by entering the tournament and compare it to the participants who actually did.

Results:

- ▷ Low performing women are discouraged by the feedback and do not take into account the fact that their performance increases between the different steps.
- ▷ It is not the case for men who enter in more optimal way.
- ▷ It seems that the positive feedback does not enough encourage high performing women.

Concluding remarks

- Both men and women overreact (in comparison to bayesian updaters) to their feedback but women to a larger extent.
- Low-performing participants adjust to the level of the competition while high-performing participants do not.
- Beliefs play an important role in the decision to enter tournament.
- Men seem to enter tournament in the proportion that maximizes their expected payoffs, whereas women do not.
- In particular, women are more depressed than they should be by a negative feedback.
- Raises the question of how to provide feedback to women to help them make optimal choices.

Questions

- Any suggestions to improve our variable "beliefwin"? Problem that we might have with it: it assumes that everybody enter tournament.
- Is LPM the right model to use?
- References on how men and women incorporate information feedback? Internal vs. external?
- Extend to policy implications: education, workplace?

Thank you!

Incentivized belief-assessment questions (Möbius *et al.* 2011)

- Elicit beliefs about belonging to each quartile.
- What is your percentage chance of scoring in the top quartile?
  - Let's say your answer is x.
  - Then the computer randomly picks a number y between 0 and 100.
  - If $y \leq x$, you earn 1€ if *your step 2 score* belongs to the 4th quartile, otherwise you earn nothing.
  - If $y > x$, you earn 1€ with y% probability, with $100 - y$% probability, you earn nothing.

back

- For choice 1, this belief is equal to the beliefs of being above the median i.e. $bw = beliefsup = b1\_4 + b1\_3$.
- For choice 2, in the control:
  - For low performing subjects
    $bw = 0.375 * b2\_2 + 0.125 * b2\_1$.
  - For high performing subjects
    $bw = 0.875 * b2\_2 + 0.625 * b2\_1$
- For choice 2, in the treatment:
  - For both low and high performing subjects
    $bw = 0.75 * b2\_2 + 0.25 * b2\_1$.

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