

# **The effect of unlimited preparation on gender differences in willingness to compete**

## **Authors**

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## **Motivation**

Although women have surpassed men in education outcomes such as college attendance and graduation rates<sup>1</sup>, they are still underrepresented in top management positions in nearly all sectors<sup>2</sup> and a gender wage gap still persists<sup>3</sup>. Traditional economic variables account for some, but not all, of these disparities<sup>3</sup>. As such, additional explanations have been proposed, including gender differences in willingness to compete<sup>4,5</sup>. Previous research suggests that women are less willing to compete than men, even when they are equally, if not more, qualified<sup>6</sup>. A few factors, including women's relatively lower levels of confidence in their performance, were shown to partly explain this gender difference<sup>7</sup>. Since prior research has shown that confidence can improve with preparation and training<sup>8-10</sup>, providing potential competitors with opportunity to prepare before entering a competition may alleviate the gender gap in willingness to compete. The proposed study extends previous work where we replicated the gender difference in willingness to compete but did not find evidence that manipulating opportunities to prepare (i.e., with a restricted number of problems) affected the willingness to compete. In the current study, we plan to assess whether unlimited preparation reduces the gender difference in competitiveness. In prior work, we also found that while women were still less willing to compete they were more likely to prepare for the task compared to men. This finding also aligned with participants' perceptions of gender differences in preparation – that is, both men and women believed that women would prepare more for the task. Thus, we will assess whether the previously observed gender difference in preparation and lay beliefs about gender differences in preparation are replicable.

## **Overview**

In the current experiment, we will examine how unlimited preparation before a task affects men and women's willingness to compete. We plan to recruit 1,100 participants on Amazon Mechanical Turk to complete a study examining “decision-making and performance”, where they will be paid \$1.20. After providing their MTurk ID and consent, participants will learn about the general structure of the multiplication task, where they multiply two numbers (with digits ranging from 1-12) for 2 minutes.

Then, participants will be randomly assigned to one of two conditions: a control condition that does not include an opportunity to prepare and an unlimited preparation condition. Men and women will be evenly assigned to both conditions. Participants in the unlimited preparation condition will complete as many practice multiplication problems as they want, with the option to opt out of the practice at any time while participants in the control condition will complete a filler task (a Captcha-style counting task) for as long as they want.

Crucially, participants will be given the opportunity to practice/study *before* they make their decision to compete. Here, we define the decision to compete as the preference for a

tournament payment scheme over a piece-rate payment scheme. If they chose the piece-rate payment scheme, they will be paid \$.10 per problem solved correctly. If they choose the tournament payment scheme, they will be randomly matched with another participant that also chose this payment scheme and will receive \$.20 per problem if they solved more problems than the other participant. Otherwise, they will receive nothing. In the case of an uneven number of participants, we will randomly assign one participant to be matched against another participant that has already been selected for a pair. If there are any ties, one of the participants will be randomly selected to receive payment for their performance.

After deciding on a payment scheme, participants will complete the paid multiplication task and receive feedback about their absolute (but not relative) performance.

## **Variables**

### Manipulated variables

*Preparation condition:* Participants will be randomly assigned to either a preparation condition, where they will be able to prepare (i.e., practicing multiplication problems) before completing the task for as long as they want, or a control condition, where they will not have this opportunity to prepare, completing a filler task (i.e., a Captcha-style counting task where they are shown a matrix of zeros and ones and must count the number of zeros) instead. We are interested in how an unlimited opportunity to prepare for a task affects participants' choice of a payment scheme.

### Measured variables

*Gender:* Participants' gender will be coded as 1 if they indicate they are a woman, and 0 if they indicate they are a man. Gender will be collected with basic demographic information at the beginning of the survey, and if participants do not indicate man or woman as their gender, they will be screened out.

*Willingness to compete:* Participants' payment scheme choice will be coded as 0 if they choose the piece-rate payment scheme, and 1 if they choose the tournament payment scheme.

*Confidence:* After completing the tasks, participants will be incentivized to guess their relative performance compared to all other participants that completed the task by indicating the decile of their score relative to other participants. If they answer correctly and confidence is randomly selected as the incentivized post-competition measure for a bonus, they will be awarded \$.10.

*Risk tolerance (self-reported):* We will use the typical operationalization of risk aversion used in previous studies, where participants will respond to the question "How do you see yourself: Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks?" on a 0-10 scale<sup>11</sup>.

*Perceptions of gender differences:* After completing the task, participants will be asked questions about their expectations of gender differences in performance ("Do you think men or women in

this study correctly solved more multiplication problems on average?”), willingness to prepare (“Do you think men or women in this study spent more time practicing/studying before completing the multiplication task?”), and willingness to compete (“Do you think men or women in this study chose the tournament payment option more often?”). Also, if they answer correctly and one of their responses is randomly selected as the incentivized post-competition measure for a bonus, they will be awarded \$.10. An additional question about perceptions of general gender differences in willingness to prepare that will not be incentivized will be included after they respond to the first four questions: “For most tasks, do you think men or women generally prepare (i.e., practice and/or study) more?” This question will not be incentivized because we cannot attest to its overall accuracy.

*Manipulation check:* To assess whether the unlimited practice for the main task was perceived as beneficial for participants’ performance on the paid multiplication task relative to the control condition, we will show participants across both conditions a demonstration of both conditions and ask: “If you practiced with a series of multiplication or counting matrices problems shown here - which do you think would help with their performance on the paid multiplication task you just completed more?” If they answer correctly (that is, we find evidence of a significant difference in performance on the paid multiplication task across conditions) and the manipulation check is randomly selected as the incentivized post-competition measure for a bonus, they will be awarded \$.10.

*Number of comprehension check questions incorrect:* Participants will be asked a series of comprehension check questions to assess their understanding of the payment schemes, which must be answered correctly for them to be able to participate. We will count the number of comprehension check questions that they answer incorrectly until they proceed.

*Performance on the task:* Participants’ performance on the task will be based on the number of problems they answer correctly during the 2 minutes they are allotted.

*Number of practice problems attempted:* For the participants assigned to the unlimited preparation condition, we will record the total number of practice multiplication problems they completed.

### **Study Timeline:**

1. Participants complete a series of screening questions. Screening and exclusion criteria designated below.
2. After providing their MTurk ID and consent, participants will learn about the general structure of the multiplication task, where they multiply two numbers (with digits ranging from 1-12) for 2 minutes. Then, they will complete a series of comprehension check questions about the multiplication task. They must answer all comprehension questions correctly to proceed; otherwise, they will repeat them until they answer them correctly.

3. Participants are randomly assigned to either the control condition or the unlimited preparation condition.
4. Participants in the preparation condition will complete as many practice multiplication problems as they want, with the option to opt out of the practice at any time while participants in the control condition will complete a filler task (a Captcha-style counting task) for as long as they want.
5. Participants receive a 30-second break before proceeding onto the multiplication task
6. All participants proceed to learn more information about the two payment schemes and complete comprehension check questions to ensure they understand them, which they must pass to proceed onto the next section
7. Participants choose a payment scheme, where the order of the presentation of the tournament and piece-rate payment options will be randomized.
8. Participants will complete the paid multiplication task and receive feedback about their absolute (but not relative) performance
9. Participants will answer the questions about risk tolerance, confidence, and perceptions of gender differences.
10. Payment: Participants will receive their guaranteed payment (\$1.20) immediately after completing the study and their bonus payment will be calculated based on their performance and choice of a payment scheme, which will be sent to them within 3-5 business days. Participants will be randomly assigned to a participant within the same condition, since preparation may affect performance. If they chose the piece-rate payment scheme, they will be paid \$.10 per problem solved correctly. If they chose the tournament payment scheme, they will be randomly matched with another participant that also chose this payment scheme and if they solved more problems than the other participant, will receive \$.20 per problem. Otherwise, they will receive nothing. In the case of an uneven number of participants, we will randomly assign one participant to be matched against another participant that has already been selected for a pair. If there are ties, one of the participants will be randomly selected to receive payment for their performance. Additionally, for each participant, we will randomly select one of their five guesses about their own performance, gender differences, and the manipulation check. If they guess correctly for their designated question, they will be paid an additional \$.10.

### **Screening and data exclusion**

The workers who opt into the study will have to pass several screening questions to be included as participants in the paid portion of the study. Specifically, participants included in the study have to (i) be using a computer (rather than a phone or tablet), (ii) identify their nationality as American and live in the United States (to control for gender differences in competitiveness across cultures), and (iii) indicate that they are a woman or man (instead of selecting any of the other options provided when asked about their gender). Also, we will use Qualtrics' fraud detection software to filter out responses that are suspicious either because they are likely 1) bots and/or 2) duplicate responses. Namely, for all analyses, we will test whether the results found using the full dataset hold excluding participants who have 1)

Q\_RecaptchaScore less than .5 (indicating the respondent is likely a bot) 2) Q\_RelevantIDDuplicate equal to 1 (indicating the response is likely a duplicate) 3) Q\_RelevantIDDuplicateScore greater than or equal to 75 (indicating the response is likely a duplicate) or 4) Q\_RelevantIDFraudScore is greater than or equal to 30 (indicating the response is likely fraudulent and a bot).

## **Hypotheses and analyses**

### **Hypothesis I**

Women in the unlimited preparation condition will be significantly more likely to compete compared to women in the control condition

Analysis: Two-proportions z-test

Predictor(s): Condition

Outcome: Willingness to compete

### **Hypothesis II**

Women will attempt more practice problems than men. To fully explore this relationship we will run a series of regressions to examine the role of other variables.

Analysis: Poisson regression

Predictor(s):

- Regression 1 (Gender)
- Regression 2 (Gender, performance)
- Regression 3 (Gender, performance, risk tolerance, confidence)

Outcome: number of practice problems attempted

### **Hypothesis III**

The gender difference in competition choice will be smaller in the treatment condition than the control condition. To fully explore this relationship we will run a series of regressions, first with our main predictors of interest, then with control variables included.

Analysis: Logistic regression

Predictor(s):

- Regression 1 (Gender, condition, gender\*condition)
- Regression 2 (Gender, condition, gender\*condition, performance)
- Regression 3 (Gender, condition, gender\*condition, performance, risk tolerance, confidence).

Outcome: Willingness to compete

## **References**

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