Gender differences in competition and task choice

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Stanford University and NBER

Gender differences in economic success

• Glass ceiling effect
• Women have a higher attrition rate in e.g. academia.
• Gender wage gap...

Theories so far:
• Discrimination
• Difference in preferences (over outcomes), abilities

Women and men may differ in their propensity to compete, select into competitions, hard tasks.

When ability is not the most important determinant in the decision to select into different environments, can environments be changed to increase diversity?

What are the costs of changes in institutions to enhance diversity?

Questions

Are there gender differences on a level playing field (experiments)?

May competitive attitudes cause a gender difference?
  – Boys spend much of their time at competitive games
  – Girls select activities with no winner and no clear end-point
  – Difference increases through puberty
  – More men than women describe themselves as competitive

Are differences in willingness to compete robust to performance controls and monetary compensation?

Are women more prone to select a non-competitive piece rate over a competitive tournament compensation? What may explain such a difference?


Laboratory experiments
To study questions of gender differences in performance and preference for performing in tournament: use Experiments:

• Control self selection issues
• Measure performance.
• No issue of discrimination, or believed discrimination
• No issue of “career concerns” or “time commitment”.

Experiments: Leveled playing fields: do we still find gender differences?

Performance in competitive environments: Gender differences
with Uri Gneezy and Aldo Rustichini, QJE 2003

Do women and men differ in their propensity to perform in competitive environments?

Do women and men that perform similarly in non-competitive environments differ as soon as the environment is competitive?

Experiment
Participants:
• Technion undergraduate students. (Degree in Engineering)
• Each session: 3 women and 3 men.
• Each treatment: 10 groups of 6 participants each. Hence in each treatment 30 women and 30 men.
• 384 participants in 64 experimental sessions.
• Always different participants in different treatment: (Between subject design.)
• Payment: Participants receive 20 NIS show up fee. (4NIS=1$).

The Task:
• Solving Mazes. (http://games.yahoo.com/games/maze.html)

After all participants solved one maze of level 2, the final part of the instructions were distributed.
Mazes on the internet

Piece rate scheme:
Noncompetitive

3 women and 3 men (from the Technion) solve mazes for 15 minutes receive 2 shekels for each solved maze. Participants do not know how much the others earned. A total of 30 men and 30 women participate.

Competitive Pay / Tournament

- 3 Women and 3 Men solve mazes for 15 min.
- The person that solves the most mazes receives 12 shekels for each maze solved. Others receive nothing.
- Winner remains anonymous

Results:
- **Significant Increase in Performance**
  - Tournament average: 12.95
  - Piece Rate average: 10.48
- p-values of WMW-test: 0.007 significant differences.

Non competitive: Piece Rate

Average Male: 11.23  Female: 9.73. (p= 0.2023)
**Are all men / women equally affected?**

- How do these average experiences translate to behavior within each group?
- Consider for each treatment performance quintiles: Rank participants according to their performance (without forgetting their gender).
  - First quintile: 20 percent participants that solved the most mazes.
  - Second quintile: the next 20 percent best participants. ...
  - For each treatment consider for each quintile the proportion of women in this quintile.

No gender difference in non-competitive incentive scheme, but large gender difference in competitive environments.

Gender gap in mean performance in mixed tournaments of 4.2 is significantly larger than the gender gap of 1.5 in the piece rate performance.
Consider cumulative graph: For each decile: Consider the proportion of women among the participants whose performance ranks them higher than this decile.

Proportion of Women above each Percentile

Results so far
Tournaments result in a significant increase in the gender gap in mean performance as compared to the piece rate.

Reasons for this gender gap: Tournament incentives
- do not increase mean performance of women.
- significantly increase mean performance of men.

WHY?

Why do women not compete?
Why do women not compete?
- Women can't perform higher
- Women do not like to compete at all
- Women do not like to compete against men
- Women do not like to perform when payment is uncertain
Difference between tournament and piece rate:
• Payment depends on the performance of the other participants.
• Payment is uncertain.

Is the gender gap in mean performance in tournaments driven by the uncertainty only, through gender differences in risk-aversion?

Big Debate: Possible Gender differences on Risk-Aversion.
• Byrnes, Miller and Schafer (1999), Eckel and Grossman (2008): If anything, women are more risk-averse.

To discern effect of risk aversion, need to consider incentives where the payment is uncertain, though independent of the performance of others.

**Treatment 3: Random Pay**
Group: 3 Men and 3 Women: Solve mazes for 15 minutes. At the end: One person is chosen randomly and receives 12 shekels for each maze she or he has solved. Other participants receive no payment additional to show-up fee.

Performance in the random pay treatment

Mean for males: 11.83, for females: 10.33. WMW p: 0.165. Difference is not significant.

**Random Pay versus Piece Rate:** Differences not significant for men (0.65) and women (0.61).

**Random Pay versus Tournaments:** Difference is significant for men (0.01) but not for women (0.63).

**Women do not like to compete**

**Single sex tournaments**
6 Women, or 6 men solve mazes for 15 min. The person that solves the most mazes receives 12 shekels for each maze solved. Others receive nothing.

Women compete and perform highly, they are not different from men who compete in single sex tournaments.
Men in single-sex tournaments look like men in mixed tournaments: Men are not strongly affected by the fact that they do not compete against women.


Are Women Competitive?

Women in Single-sex Tournaments Versus women in non competitive environments

- Single-sex tournaments: 12.6
- Random pay: 10.33 (p-value two-sided: 0.0469)
- Piece Rate: 9.73: (p-value two-sided: 0.0148)

Women react strongly to tournament incentives in single-sex groups.

Women in mixed and single sex tournaments

Women versus Men in single-sex tournaments

Gender gap in mean performance:

- Mixed Tournament: 4.2
- Single sex tournament: 1.7
- Piece Rate: 1.5
- Random pay: 1.5

Moving from mixed to single sex tournaments significantly reduces the gender gap in mean performance:

Repeat our bootstrap procedure, and find p-value of 0.082, hence the reduction in the gender gap is significant.

However no significant difference in the gender difference in performance when moving from single-sex tournaments to piece rate (0.459) and random pay (0.535).
Are all men / women equally affected?

- Consider for each quintile the proportion of men and women.
- For the single-sex tournaments, we pool the observations of men and women and take quintiles of the overall distribution.

Proportion of Women in each quintile

<table>
<thead>
<tr>
<th>Quintile (1: Best, ..., 5: Worst)</th>
<th>Proportion of Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
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<tr>
<td>2</td>
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<tr>
<td>10</td>
<td>0.9</td>
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<tr>
<td>11</td>
<td>1</td>
</tr>
</tbody>
</table>

Proportion of Women above each Percentile

<table>
<thead>
<tr>
<th>Percentile</th>
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<tbody>
<tr>
<td>10</td>
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<tr>
<td>20</td>
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<td>40</td>
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<td>70</td>
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<td>80</td>
<td>0.8</td>
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<tr>
<td>90</td>
<td>0.9</td>
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<tr>
<td>100</td>
<td>1</td>
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</tbody>
</table>

Performance averages: Women and Men

- Women do not compete against men.
- Women competing against women respond to competition as much as men do.

At some tasks: Women who perform as well as men, do not perform as well in mixed competitive environments.

In single sex environments: Women perform as well as men.

Some women perform well even when competing against men.

How does performance in competitions translate to a preference to perform in competitions?
“Do women shy away from competition?”
Want to observe selection into competitive environments.
• Performance differences
• Taste for Competition
  – Psychic costs or benefits
  – Nurture and/or Nature (gains and losses from competing)
• Beliefs about relative performance
  – Overconfidence of men.
• Risk attitudes.
  – women may be more risk averse than men
• Feedback aversion
  – Men respond more to positive feedback compared to negative feedback
  – Mobius, Niederle, Niehaus and Rosenblat (in progress)

Experimental Design
80 students from U. of Pittsburgh and CMU
• Groups of 2 women and 2 men perform a real task multiple times under different compensations (given as experiment progresses)
• Performance of others not known until end of experiment
• No mention of gender
Want to observe selection into competitive environments.
To observe selection into tournaments: Need task with little gender difference in performance.
Add up 5 two-digit numbers floor 5 mn: Performance is the number of correct answers.

Benchmark Performances

Task 1- Piece Rate:
50 cents per correctly solved problem.
Participants receive no feedback.

Task 2 – Tournament:
Groups of 2 men and 2 women (gender not mentioned)
The participant who solves the most (correct) problems in the group receives $2 per correct problem.
Other participants receive no payment.
Participants receive no feedback.

Piece Rate and Tournament Performance

Averages:  PR: W: 10.15   M: 10.68 Not sign
           T:    W: 11.8     M: 12.1   Not sign
Probability to win the tournament

20 groups (tournaments):
   11 won by women, 9 by men.
Unconditional probability of winning:
   W: 24%.  M: 26%
Conditional on performance, p.o.w. is:

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<thead>
<tr>
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<th>8</th>
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<th>10</th>
<th>11</th>
<th>12</th>
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<tr>
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Choice between tournament and piece rate

Goal:
(i) Choice:
   • depends on beliefs over the other players’ performance
   • Does not depend on other players' choices.
(ii) If choose tournament: compete against players who are in a tournament
(iii) Be able to predict money maximizing choices.

Choice of a participant cannot impose externalities on any other participant.

Task 3 Choice

Choose compensation scheme for the next 5-minute addition task:
• Piece Rate: 50 cents for each correctly solved problem
• Tournament: Performance is compared to task-2 tournament performance of the other participants.
If the participant has the highest performance she or he receives $2 for each correct answer, otherwise no payment.

Predicted Choices

In Task 3: participants decide whether to perform under a piece rate or under a tournament.

Given task 2 tournament performance:
• 30% of women and 30% of men could gain from entering the tournament.
• With indifference: 40% of women and 45% of men

Who enters?

35% of Women and 73% of Men
Does performance predict entry?

Proportion of participants that enter the tournament for each performance quartile

Performance does not predict entry for Women, weakly for Men
Significant gender difference in entry

Role of Beliefs

Tournament decision is driven by relative performance, participants only know absolute performance.

Is the decision driven by participants’ beliefs about their relative performance?

Belief Elicitation

After all decisions are made, but before participants receive any feedback
We ask participants to guess their rank for Task 1 Piece Rate
Task 2 tournament
Receive $1 if guess is correct.

Two issues
- Are there gender differences in elicited beliefs?
- Can such differences explain the tournament-entry gap?

Beliefs on Tournament Performance

<table>
<thead>
<tr>
<th>Rank</th>
<th>Men: guess</th>
<th>Men: wrong</th>
<th>Women: guess</th>
<th>Women: wrong</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<td>2</td>
<td>5</td>
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<tr>
<td>4</td>
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<td></td>
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<tr>
<td>Total</td>
<td>40</td>
<td></td>
<td>40</td>
<td></td>
</tr>
</tbody>
</table>

Men’s guess: different from optimal and actual
Women’s guess: different from actual and (weakly) optimal (p=0.1).
Men are different from women in their belief formation.
Beliefs on Tournament Performance

<table>
<thead>
<tr>
<th>Rank</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>guess</td>
<td>wrong</td>
</tr>
<tr>
<td>1</td>
<td>30</td>
<td>22</td>
</tr>
<tr>
<td>2</td>
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<tr>
<td>3</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>28</td>
</tr>
</tbody>
</table>

Men’s guess: different from optimal and actual
Women’s guess: different from actual and (weakly) optimal (p=0.1).
Men are different from women in their belief formation.

Why do women shy away from competition?

Can the overconfidence of men (compared to women) account for the gender difference in tournament entry?

Beliefs and tournament entry

For both, women and men, better beliefs predict more entry into the tournament

Conditional on beliefs, women enter the tournament significantly less than men.

Why do Women Shy away from Competitions?

Additional treatments show that gender differences cannot be fully accounted for by gender differences in risk attitudes, aversion to general feedback.

Women decide not to enter tournaments because of

– Lack of confidence in one’s ability
– Psychic costs of performing once more or in tournaments
– Only somewhat: Aversion to feedback about tournament performance and Risk aversion.
Task 4: Submitting Piece-Rate Performance

Choose payment for task-1 piece-rate performance

- **Piece Rate:**
  - 50 cents for each correctly solved problem

- **Tournament:**
  - Compare performance to piece-rate performance of other group members
  - Receives $2 per correct answer if participant has the highest piece-rate performance, otherwise no payment

Probit of Tournament-Entry Decision (Task 3)

<table>
<thead>
<tr>
<th></th>
<th>Coefficient</th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>(A)</td>
<td>(B)</td>
<td>(C)</td>
</tr>
<tr>
<td>Female</td>
<td>-0.379</td>
<td>-0.278</td>
<td>-0.162</td>
</tr>
<tr>
<td></td>
<td>(0.01)</td>
<td>(0.01)</td>
<td>(0.05)</td>
</tr>
<tr>
<td>Tournament</td>
<td>0.015</td>
<td>-0.002</td>
<td>-0.009</td>
</tr>
<tr>
<td></td>
<td>(0.39)</td>
<td>(0.90)</td>
<td>(0.42)</td>
</tr>
<tr>
<td>Tournament – Piece Rate</td>
<td>0.008</td>
<td>-0.001</td>
<td>0.011</td>
</tr>
<tr>
<td></td>
<td>(0.72)</td>
<td>(0.94)</td>
<td>(0.44)</td>
</tr>
<tr>
<td>Guessed Tournament Rank</td>
<td>-0.181</td>
<td>-0.120</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.01)</td>
<td>(0.01)</td>
<td></td>
</tr>
<tr>
<td>Submitting the Piece Rate</td>
<td></td>
<td>0.258</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.012)</td>
<td></td>
</tr>
</tbody>
</table>

Marginal effects evaluated at a man with T=13, PR=12, G_TR=1, submits to tournament:
- Beliefs, risk and feedback aversion account for 57% of original gender gap
- Women remain 16 percentage points less likely to compete
- Women appear to shy away from competition

Gender and Competition

Women may perform less well in mixed competitive environments.

Even for tasks where women perform as well as men in mixed competitive environments, women, when given a choice, do not select into these environments.

Men and women appear to have different attitudes towards competition

High performing women enter the tournament too little. Few women enter the competition and few women win the competition

Why concerned about suboptimal entry?

- **Firm**
  - Performance
  - Diversity

- **US corporations are increasingly developing programs to retain more of their female workers**
  - Ernest and Young
  - IBM
  - Goldman Sachs

- Which institutions help attract more women workers?
May affirmative action improve outcomes?

- How do changes in incentives affect workers?
  - Will women compete more and men compete less when we distort the incentives in favor of women?
  - Effect on applicant pool
- What are the effects on firms?
  - Effects on winners of the competition: Diversity? Performance? Inequity?
- What are the costs of diversity?

Michigan Civil Rights Initiative

- Primary concern in evaluating the initiative was the implications for fairness in terms of admission or hiring decisions (e.g., A Decision-Making Guide to the MCRI, by Page and Suhay)
- We hope to also examine the effects on the applicant pool

How may AA-quota alter tournament entry?

- Change the probability of winning
- Gender specific competition
  - A woman wins if she is *either* among the best women or among the top performers
  - A man wins if he is *both* among the best men and among the top performers
  - Tournament entry may be affected if gender specific competition alters the pleasure or fear of competition, or if beliefs within gender differ from those across gender
- Mention of AA

How Costly is Diversity? Affirmative Action in Light of Gender Differences in Competitiveness

Niederle, Segal and Vesterlund

Build on Niederle and Vesterlund: same task
3 women and 3 men per group from universities in Boston
- Gender mentioned during sign up
- In the tournaments 2 winners out of 6
- 42 men and 42 women
- 6 tasks, no feedback, 1 task randomly chosen for payment
Benchmark Performances

Task 1: Piece Rate
- 5 minutes to add up sets of 5 two-digit numbers
- Receive $0.5 per correct problem

Task 2: Tournament
- Groups of 3 women and 3 men
- 5 minutes to add up sets of 5 two-digit numbers
- Win if among the two best performing individuals
- Winners receive $1.5 per correct problem

Task 3: Selecting Piece Rate or Tournament
- 5 minutes to repeatedly add up sets of 5 two-digit numbers
- Tournament: Receive $1.5 per problem if the individual’s Task-3 performance exceed the Task-2 performance of at least four other group members
- Piece Rate: Receive $0.5 per problem

Piece Rate and Tournament Performance

- Piece Rate Averages: Women: 10.3; Men: 12.9
- Tournament Averages: Women: 12.3; Men: 14.8

Predicted Tournament Entry

Probability to win the tournament for each performance

<table>
<thead>
<tr>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>17</th>
<th>18</th>
<th>19</th>
<th>22</th>
<th>35</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women</td>
<td>2.5</td>
<td>8.6</td>
<td>21.8</td>
<td>40.7</td>
<td>58.1</td>
<td>71.4</td>
<td>80.2</td>
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<td>85.6</td>
<td>91.1</td>
<td>--</td>
<td>98.1</td>
</tr>
</tbody>
</table>

Given Task-2 tournament performance:
28.6% of women and 50% of men should enter, p=0.07

Who enters?
31% of women and 73.8% of men, p < 0.001
Gender gap greater than expected (p = 0.04)

Gender Gap in Tournament Entry

Are entry decisions correlated with performance?

<table>
<thead>
<tr>
<th>Given Task-2 Performance</th>
<th>Given Task-3 Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative Earnings</td>
<td>Positive Earnings</td>
</tr>
<tr>
<td>% Women Entering</td>
<td>30</td>
</tr>
<tr>
<td>% Men Entering</td>
<td>47.6</td>
</tr>
<tr>
<td>Fisher’s Exact Test</td>
<td>0.25</td>
</tr>
</tbody>
</table>

High performing women do not enter enough
No gender difference among low performing participants
Belief Elicitation

After all decisions are made, but before participants receive any feedback, we ask participants to guess their rank for Task 1 Piece Rate and Task 2 tournament. Receive $1 if guess is correct.

Two issues
– Are there gender differences in elicited beliefs?
– Can such differences explain the tournament-entry gap?

Beliefs and Tournament Entry

- Men are more overconfident than women.
- Beliefs predict entry.
- Gender difference in entry conditional on guessed beliefs.

Replicate Pittsburgh Study

- Findings
  – Men are more likely to enter tournament
  – High performing women do not enter enough
- Gender gap in tournament entry
  – Conditional on performance men are 36 percentage points more likely to enter the tournament.
  – Control for beliefs the gender gap reduced by 30%.
  – Control for beliefs and submit to Piece Rate gap reduced by 53%.
- A gender gap of 17 percentage points remains.
Room for Affirmative Action

In an environment without any discrimination we find:
Women shy away from Competition.
Can we affect the choices of women, and if so, at what cost?

Effect of AA on prob. of winning

<table>
<thead>
<tr>
<th>Probability of winning Tournament</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
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<td>85.6</td>
<td>91.1</td>
<td>-- 98.1</td>
<td>100</td>
<td></td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Probability of winning AA Tournament</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
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<th>16</th>
<th>17</th>
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<td>50.6</td>
<td>58.6</td>
<td>66.8</td>
<td>-- 79.6</td>
<td>84</td>
<td></td>
</tr>
</tbody>
</table>

Experimental design: Affirmative Action

Task 4: Select Piece Rate or Affirmative-Action Tournament
- 5 minutes to add up sets of 5 two-digit numbers
- Task 4 performance compared to Task 2 performance of other group members
- The best performing woman is one of the two winners
- The second tournament winner is the best performing individual among the remaining 5 group members

Women: Win if (i) best within gender or (ii) among top 2 performers
Men: Win if (i) best within gender and (ii) among top 2 performers

Affirmative Action Tournament Entry
- Based on Task-2 tournament performance:
  - Should enter 40.5% of women and 38.1% of men (p = 1.0)

Who enters?
- 83.3% of women and 45.2% of men (p = 0.001)
  - Fraction of Women greater than predicted (p<0.01)
  - Fraction of Men as predicted (p=0.66)
Does the prob. of winning explain effect of AA?

- Affirmative Action decreases tournament entry for men and increases it for women
- Conditional on probability of winning women enter more than men

What explains the effect of AA?

- Changes in probability of winning does not account for change
- The response to AA is explained by:
  - Mention of AA
  - More gender specific competition
    - Within gender beliefs
    - Willingness to compete in mixed vs. single gender groups

Beliefs within Gender and Overall

- Changes in probability of winning does not account for change
- The response to AA is explained by:
  - Mention of AA
  - More gender specific competition
    - Within gender beliefs
    - Willingness to compete in mixed vs. single gender groups
Beliefs within Gender and Overall

Within Gender: Women are as confident as men
Significantly greater gender gap across gender than within gender beliefs.

Do beliefs explain effect of AA?

- Beliefs predict entry
- Conditional of beliefs there is still a gender difference

AA Effect on Firms: Applicants

Composition of applicant pool:
- Before AA: Women 13, Men 31
- With AA: Women 35, Men 20

Mean performance
- Task-2 performance:
  Before AA 15.5, with AA 14.4 ($p = 0.33$)
- Task-3 & 4 performances:
  Before AA 15.9, with AA 15.3 ($p = 0.66$)

Effects of AA on participant pool

Composition of Entrants:
- Choice: Women 13, Men 31
- AA Choice: Women 35, Men 19

We will compare
- Performance of Entrants
- Expected costs of affirmative action (hiring at least one woman for every man)
- Actual costs of affirmative action as the participant pool changes through self-selection.
Performance of entrants

For each performance group proportion of participants that enter the tournament

For each performance the level the number of entrants with at least that performance

No large overall differences in number of entrants that should have entered the original tournament

Gender composition of the pool

Proportion of Women above each performance

Much larger proportion of women among high performing entrants in the AA tournament. Already hints that affirmative action may not be that costly.

Introducing Affirmative Action
Introducing Affirmative Action

For every man, we have to hire at least one woman, and the importance for hiring is the minimum performance.

Inequity

Number of men with superior performance who do not qualify under AA
**AA Conclusion**

Decision to compete responds to economic incentives: Women compete more and men compete less

Some win (high performing women and low performing men) others lose (High performing men and low performing women)

Effect on firms
- AA changes the gender composition of applicants and competitors
- Able to hire a diverse applicant pool with higher minimum ability
- In the presence of suboptimal entry diversity may not be too costly
- Caution should be used when using ex post applicant pool to assess the effect of institutional changes such as affirmative action

**Conclusion**

Affirmative Action can have positive effects on the decision of women to enter competitive environments.

Positive effects of Affirmative Action in an environment in which there is no discrimination.

New view of Affirmative Action due to new insights into preferences on competitive preferences of women and men.

**Broader Implications**

- Alternative institutions
  - Affirmative action
  - Single gender
  - Group competition

- Implications for academia
  - Competitive vs. noncompetitive
  - Selection
  - Institutions?

**Parallels between GNR 2003 and NV ‘07, NSV ‘07**

<table>
<thead>
<tr>
<th>Decision: provide sustained effort, perform highly in tournaments</th>
<th>Decision: Enter competitions compared to a piece rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women do not perform well in tournaments against men</td>
<td>Women do not enter tournaments against men</td>
</tr>
<tr>
<td>Women do perform well against other women</td>
<td>Affirmative action (quota) can entice women to enter tournaments</td>
</tr>
</tbody>
</table>
Related work on Competitiveness

Gender difference in Competition, task choice...:
- Gneezy, Niederle and Rustichini 2003
- Niederle and Vesterlund, 2007
- Niederle, Segal, and Vesterlund, 2007
- Gneezy and Rustichini, 2004
- Gupta, Poulsen and Villeval, 2005
- Gneezy, Leonhard and List, 2006
- Gneezy and Rustichini 2005
- Cason, Masters and Sheremeta (2008),
- Price (2008),
- Ernesto Reuben et al (2009),
- Marie-Pierre Dargnies (2009),
- Bartling, Fehr, Maréchal and Schunk (2009),
- Dohmen and Falk (2009),
- Gneezy, Leonard, and List (2008),
- Dreber, von Essen, and Ranehill (2008),
- Freeman and Gelber(2008)
- Dargnies (2008)

Empirical Work
- Paserman 2008,

Research Questions

1. Do Women perform less well in competition and does the gender of the competitor matter? YES
2. Do abilities translate to choices over competitive and non-competitive payment schemes? NO
3. What factors drive gender differences in choices, beyond differences in abilities? BELIEFS, GENDER DIFF. in COMPETITIVE ATTITUDES
4. Can we change the institution to decrease gender differences in choices? What can be done to increase diversity, and how costly will that be? SINGLE SEX TOURNAMENTS, QUOTA
5. Do general gender differences emerge that have effects in other dimensions?

Gender Differences in Seeking Challenges: The Role of Institutions

with Alex Yestrumskas, WP 2008

How do women and men decide which task to choose?
Do we find gender differences similar to those in tournaments?
Which institutional changes affect choices?
Choosing Challenging Tasks

Need: Easy and Hard Task
Want this to be common knowledge
For each participant: We need to be able to measure whether they are high or low performing?

**High performing**
on average higher earnings from hard task

**Low performing**
on average higher earnings from easy task

Challenge:
1. Create such an environment
2. Measure performance level of participants without participants learning their performance level.

The Easy and Hard task

**Easy:** $0.5 per maze

**Hard:** per maze
1-4: $0.25; 5+: $3.50

Benchmark (Calibration) Treatment

Task 1: 10 min. easy mazes a $0.25 each
Task 2: 10 min. easy mazes a $0.5 each
Task 3: 10 min. hard mazes a: 1-4: $0.25 each, 5th+: $3.50 each.

Earnings: Task 1;
Task 2 or Task 3;
Beliefs.
31 women and 30 men.

Performance in Benchmark

For 60/61 participants:
**11 + mazes in Task 1:** More money from Task 3:
Hard mazes

**10 – mazes in Task 1:** More money from Task 2:
Easy mazes
True, for both women and men.

**High performance level:** solve 11+ in easy task 1 (roughly top 40% of participants).

**Low performance level:** solve 10- in easy task 1
Choosing the hard task

Participants first perform in the easy task, so we know their performance level.

They are informed of the calibration:
• the top 40% performers on average have higher earnings from hard task,
• other from the easy task.

They choose difficulty level for next 2 tasks, one of which is paid.

Proportion of “Hard” Choices

Gender Differences in Seeking Challenges

1. High performing women do not choose the challenging task and loose earnings
2. Low performing men choose the challenging task, and lose earnings.
3. No Gender differences in Beliefs about broad relative performance classes.

What are the reasons, can we “fix” it?
Should we be concerned in the 1st place?

Gender Differences in Preference for Challenging task per se?

Give participants perfect feedback: before they make their 2 choices:
• Learn about calibration (top 40% on average higher earnings from the hard task)
• In addition: Learn what performance is a top 40% performance.

Choices of women: Same as choices of men:
Low performers mostly choose easy task,
High performers largely choose hard task.
Changing Institutions

To have high performing women choose challenging task, and low performing men choose easy tasks:
Provide **Perfect Feedback**

Practical problems:
- Hard to do in practice
- In the long run a secret “perfect” test may not be feasible:
  - If participants know they’re performing in a test that may affect their performance:

Practically, may need less strong institutional change that can affect the choices of women and men.

Hypotheses for gender differences in seeking challenges

H1: Women have lower point estimates about their relative performance than men: **NO**
H2: Men prefer the hard task more than women. **NO**
H3: Women are more averse to receiving feedback/information about their relative performance.
H4: Women are less certain about their ability to perform in the hard task, or derive a larger disutility from this uncertainty than men.

Reduced Commitment Choice

Compared to Choice Treatment:
Women and men do not decide once and for all Rather decide for each task one at a time.
Participants can experience their choice, before choosing the task difficulty for the last (third) task

This change *does not* affect choices driven by preferences for receiving feedback about performance in the hard task

This change *does* affect choices driven by uncertainty about the ability to perform well in challenging tasks.

Choosing the hard task with reduced commitment

High performing women choose Hard task. Low performing men also choose Hard task.
Gender Differences in Competition and Task Choice

Gender differences in preferences for Competition and challenges

Affirmative Action can have positive effects on the decision of women to enter competitive environments, making AA less costly.

Positive effects of Affirmative Action in an environment in which there is no discrimination.

Studying and understanding gender differences can lead to institutional design changes that can reduce those differences.

Gender Differences in Beliefs

• Beliefs on relative performance: Important for decisions on compensation scheme and task choice.
• Often (though not always): gender differences in beliefs on relative performance (also large psych literature)

Gender differences in beliefs:
• Women & men react similarly to information, but are fed different signals (stereotypes…)
  – Started with very different priors
• Women & men receive the same information but process it differently.

Gender Differences in Incorporating Performance Feedback

w. Markus Mobius, Paul Niehaus, Tanya Rosenblat

• How do subjects process information?
• Does information processing differ across gender?

1. Choose a task that subjects care about - IQ test.
2. Track a subject’s belief of being in top half of performers.
   – Prior beliefs can be captured by a single number.
3. Repeatedly provide noisy feedback as a simple binary signal whether subject's performance is among the top 50 percent (correct with 75% chance)
   – We can calculate a clean Bayesian benchmark.
   – We can compare how different subjects with the same prior react to the same sequence of signals.

The task

After a 3 min IQ test, we ask:
Chance that your performance is in the top 50%?

Solicit belief between 0 and 100, incentives are given through a BDM-like procedure:
  – Win prize if your or a random draw performance is actually in the top 50%: How high does the chance of “winning” of the random draw have to be, so you prefer to take the draw over your performance?
    • Random draw x has an x % chance to be in the top 50%.
Feedback
After eliciting beliefs to be in top 50%
Feedback: Yes, No: correct with 75% chance
  – 50% True feedback
  – 50% random feedback
Re-eliciting beliefs
Feedback 2: Re-eliciting beliefs
Feedback 3: Re-eliciting beliefs
Feedback 4: Re-eliciting beliefs
We can compare updating to Bayesian benchmark, due to the binary state: Top 50% or not.

Updating of Beliefs

Conservatism
• Subjects update less than Bayesians in response to both negative and positive information.

Asymmetry
• Subjects adjust more to positive than negative information.

Gender Differences
• Men are less conservative than women.
• No significant difference in asymmetry.

Which participants enter tournaments?
A subsample: participated in a decision to enter a tournament or a piece rate
Main result:
• Confident participants enter more
• Conservative enter less (unless they are very confident)
• More asymmetric participants
  – (react to positive info much more than negative)
  enter tournament at a higher rate
  – controlling for beliefs about relative performance, and performance.

Findings on Beliefs
• Under Bayesian updating informative feedback will induce convergence of beliefs of subjects of similar ability.
• In our experiment, subjects’ updating rule are highly heterogeneous and non-Bayesian.
  – Heterogeneity can give rise to divergence of beliefs.
  – Noisy feedback will make the most able men more confident compared to the most able women since men are less conservative than women on average.
• Providing many weak signals may have undesirable consequences by making more conservative and less asymmetric updaters relatively underconfident which in return might make them less willing to compete.
Conclusion

Gender differences in
• Attitudes towards competition,
• Beliefs on relative performance,
• Beliefs on ability to perform in new tasks,
• Updating of beliefs.

Need to understand gender differences well enough to design institutional changes to help overcome differences.