Influence of Gender, Past, and Future on Cooperation in Non-Cooperative Games

A Vignette Study

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Is there any potential for cooperation in non-cooperative situations?

Do

- repeated interaction (iteration of a game) and
- gender of the participants (players)

influence decision making (the players’ choices)?
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Game Theory and Repeated Games

- Basis: strategic (one-shot) games
- Reality offers the possibility of
  - Having met each other (played together) in the past
  - Interacting (playing) again in the future
- Additional examination of common past and future required
- Repetition of a game provides for
  - New strategies
  - Reward and punishment
  - Cooperation
Hypotheses (1)

- Games without past and future
  - One-shot games
  - Cooperation \textit{not} expected

- Games with future
  - Finite play: Backward Induction
  - Cooperation \textit{not} expected
  - Infinite play: Folk-Theorem
  - Cooperation expected

- Games with past
  - Information about other’s strategies
  - Shared future crucial
  - Cooperation expected
Hypotheses (2)

- Games with past *and* future
  - Cooperation expected
- Intensity of repetition
  - Possibility of cooperation increases with increasing probability of repetition
- Importance of past vs. future
  - Influence of future is more fundamental
Influence of Gender

- Gender important in two ways
  - Respondent’s sex (psychological aspect)
  - Opponent’s sex (frame aspect)
- Previous experiments show no consistent findings
- Some experiments don’t consider all players’ sex
Socialisation Theory (Gilligan)

- **Two morals:**
  - Men follow justice orientation
  - Women follow care orientation

- **Justice**
  - Solutions found by deducing abstract rules
  - Self-centered way of considering problems

- **Care**
  - Individual solutions for individual problems
  - Think of others well-being
Social Role Theory (Eagly)

- Women and men hold different sex roles
  - Women are communal
  - Men are agentic

- Communal
  - Concern common welfare
  - Self-abandonment

- Agentic
  - Self-assertion
  - Controlling tendency

- Gender roles work in 2 ways
  - Knowledge of sex roles enforce stereotypical behavior
  - Sex roles allow prediction of other’s behavior
Gender

Hypotheses

- **Prisoners’ Dilemma**
  - Women cooperate more often than men
  - Rate of mutual cooperation is higher in mere female games than in mere male games

- **Trust Game**
  - Female trustors cooperate more often than male trustors
  - Female trustors are more trusted than male trustors

- **Ultimatum Game**
  - Women more often make a fair offer (50%) than men
  - Offers made by women are more often rejected than equal offers made by men
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Prisoners’ Dilemma

<table>
<thead>
<tr>
<th></th>
<th>Cooperate</th>
<th>Defect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooperate</td>
<td>-1, -1</td>
<td>-5, 0</td>
</tr>
<tr>
<td>Defect</td>
<td>-4, -4</td>
<td>-4, -4</td>
</tr>
</tbody>
</table>
Trust Game

Trustor

Trustee

C

D

(1,1) (-1,3) (0,0)
Ultimatum Game

Proposer

Responder

C

D

p - x

(x, p - x)
(0,0)
Vignette Analysis

- Vignette describes hypothetical situation
- Combined appearance of values is independent from empirical occurrence
- Influence of variables can be treated separately
- Quasi-experimental design
  - Randomizing vignette dimension improves internal validity
  - Using real situation improves external validity
- Subject selects one of a set of given actions (e.g., cooperation or defection)
- Dispute: measuring actions or norms?
Implementation

- **Online survey**
  - Facilitates randomization of vignette dimensions (independent variables)
  - Easy to reach a lot of people per email

- **Vignette allocation**
  - 7 to 15 Vignettes per person (free choice)
  - Random order
  - 1xPD, 2xTG, and 4xUG within the first seven vignettes

- **Sampling modalities**
  - Students
  - University of Cologne
  - January 7th to February 14th 2006

- **Sampling problems**
  - Self selection
  - No trusted information about respondents
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Descriptives

Response

- 555 respondents (about 500 after two weeks)
- 5162 vignettes (modus: 8 vignettes per person)
- Hardly any dropouts

Respondents’ demography

- Age: mean 24 years (94% younger than 30 years)
- Nearly all subjects (20% languages)
- State: 92% Nordrhein-Westfalen
- Gender: 33% men, 67% women
Prisoners’ Dilemma

- 93% cooperation
- No significant influence of past, future and gender
- Significant influence of loss and gain ($p=0.006$)
- Possible explanation:
  - Student role dominates sex roles
  - Student standard (code of honor)
  - One-shot games and finite play not conceivable for the player
**Trustor**

- 79% cooperation
- Medial and intensive past significant ($p=0.001$)
- Intensive future significant ($p=0.03$)
- Opponent’s sex almost significant ($p=0.08$)
- Significant influence of loss and gain ($p=0.000$)

**Interpretation:**
- Indicates strategic behavior
- Acquaintances more trusted than strangers, independent of further repetition
- Shared past more important than shared future
- Women more trusted than men
Trustee

- 97% cooperation
- No significant influence of past, future and gender
- Explanation:
  - Social desirability
  - Self selection
Proposer

- Median offer 50%
- No significant influence of past and future
- No difference in mean offer of women and men, but women offer more often more than 50% than men
- Interpretation:
  - All effects are dominated by a fairness norm
  - Fairness compulsive for both sexes, but women are slightly more altruistic
## Responder (1)

<table>
<thead>
<tr>
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<th>40% offer</th>
<th>25% offer</th>
<th>10% offer</th>
</tr>
</thead>
<tbody>
<tr>
<td>acceptance</td>
<td>73.1%</td>
<td>39.7%</td>
<td>30.4%</td>
</tr>
<tr>
<td>no past</td>
<td>72.2%</td>
<td>32.7%</td>
<td>32.3%</td>
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<tr>
<td>median past</td>
<td>71.3%</td>
<td>40.0%</td>
<td>28.9%</td>
</tr>
<tr>
<td>intensive past</td>
<td>77.0%</td>
<td>48.7%</td>
<td>31.4%</td>
</tr>
<tr>
<td>no future</td>
<td>69.5%</td>
<td>40.2%</td>
<td>29.9%</td>
</tr>
<tr>
<td>median future</td>
<td>69.1%</td>
<td>39.5%</td>
<td>31.6%</td>
</tr>
<tr>
<td>intensive future</td>
<td>79.2%</td>
<td>39.6%</td>
<td>29.5%</td>
</tr>
<tr>
<td>men</td>
<td>72.3%</td>
<td>36.8%</td>
<td>30.1%</td>
</tr>
<tr>
<td>women</td>
<td>73.4%</td>
<td>41.2%</td>
<td>30.5%</td>
</tr>
</tbody>
</table>
Responder (2)

- Acceptance rate increases with level of proposal
- Intensive past almost significant ($p=0.08$)
- No significant influence of future
- Interaction effect between actor’s sex and opponent’s sex ($p=0.05$)
- Significant influence of loss and gain ($p=0.001$)

Interpretation:
- Women’s offers more likely to be accepted by men
- Men’s offers more likely to be accepted by women
- “Unfair” offers made by acquaintances more likely to be accepted
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Conclusion

- Empirical results do not match theoretical prediction
- Common past is more important than common future
- Opponent’s sex is more important than respondent’s sex
- Differences between the sexes smaller than expected (by theory and by players)
- Vignette Analysis inadequate design?
Thank you for your attention!