What do Bargainers' Preferences Look Like?

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1 Introduction

Today's Paper: James Andreoni, Marco Castillo, and Ragan Petrie. "What do Bargainers' Preferences Look Like? Exploring a Convex Ultimatum Game." *American Economic Review*, 93(3), June 2003, 672-685.

What do Preferences for Fairness Look Like?

$$\begin{aligned} \pi_s &= \text{Payoff to Self} \\ \pi_o &= \text{Payoff to Other} \\ U_s &= U_s(\pi_s, \pi_o) \end{aligned}$$

Things to Consider:

- Pure allocations.
  - Are preferences consistent?
  - Are preferences monotonic?
- Opportunities to be fair.
- Intentions/Responsibility.

- “Entitlement”

Let $\gamma =$ environmental variables, e.g. the means to the allocation

$$U_s = U_s(\pi_s, \pi_o; \gamma)$$

For a given γ choices should adhere to an economic model of choice. As γ changes, choices should change systematically.

2 Understanding the Ultimatum Game

Standard UG:

$$\pi_p = (1 - a) \times m$$
$$\pi_r = a \times m$$

Proposer Chooses: $a \in [0, 1]$
Responder Chooses: $m \in \{0, M\}$
so $m = M$ is "Accept"
and $m = 0$ is "Reject"

Subgame Perfect Prediction: $\alpha = \epsilon$ and $m = M$

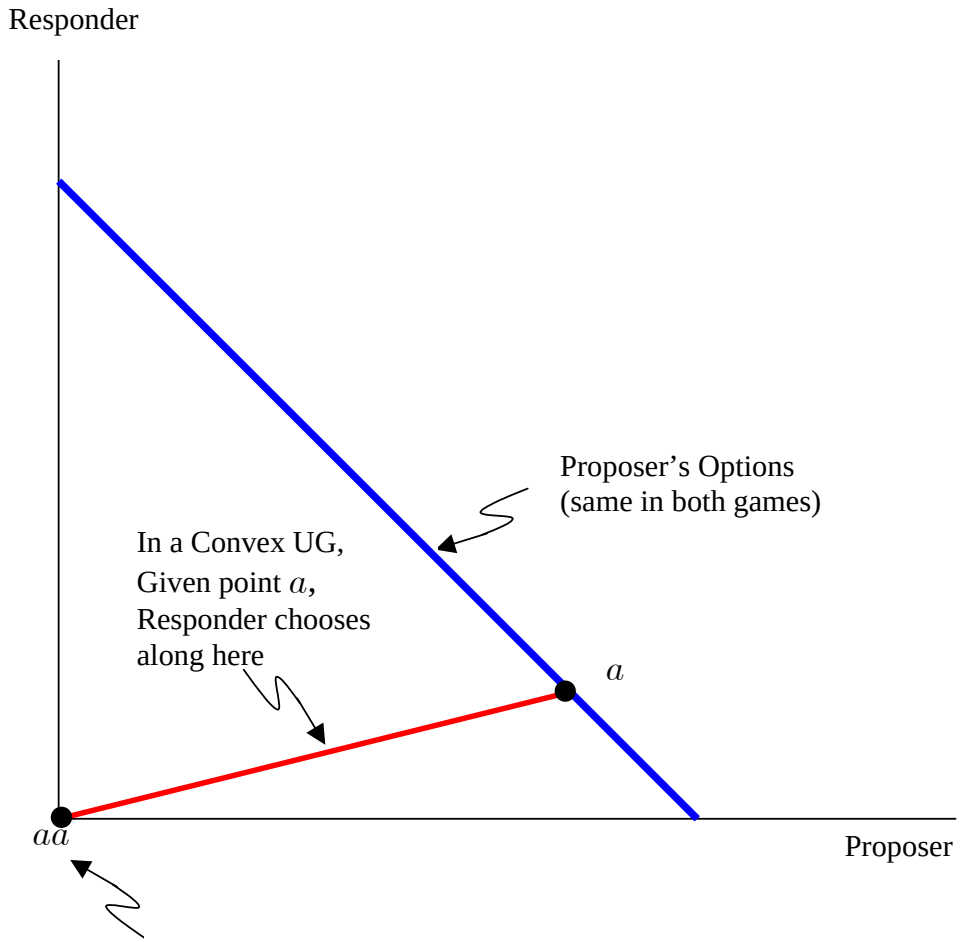
- Lots of "fair" offers and rejections of "unfair offers."
- Most puzzling behavior is rejections.
- This game "wastes" information about responders with non-convex choice set.

Convex UG:

$$\pi_p = (1 - a) \times m$$
$$\pi_r = a \times m$$

Proposer Chooses: $a \in [0, 1]$
Responder Chooses: $m \in [0, M]$
now $0 < m < M$ is also possible

Subgame Perfect Prediction: $\alpha = \epsilon$ and $m = M$


Responder
Proposer's Options
(same in both games)
In a Convex UG,
Given point a,
Responder chooses
along here
a
aa
Proposer
But in a Standard UG, the Responder can only
choose a or aa, and nothing in between.

Note:

- The Convex UG will help us learn more about Responders
- May better inform these attempts to model fairness
- Convex game more “realistic”
  - Most bargaining is not “all or nothing”
  - Workers can slow down
  - Bargainers can reply slowly
  - They can agree to sections of the contract
- Also called “squishy game.” Rabin (1997).

3 The Experiment

- Recruit 58 Subjects.
- Divide into two rooms:
  - 28 Standard UG + 1 monitor
  - 28 Convex UG + 1 monitor
- Subjects make decisions for both roles.
- $M = \$12.$
- Decision forms are collected, shuffled, split.
  - Half are Proposers, half Responders.
- Complete post-questionnaire.
- Paid with private “earnings envelopes.”
- Repeat, total subjects: 112.

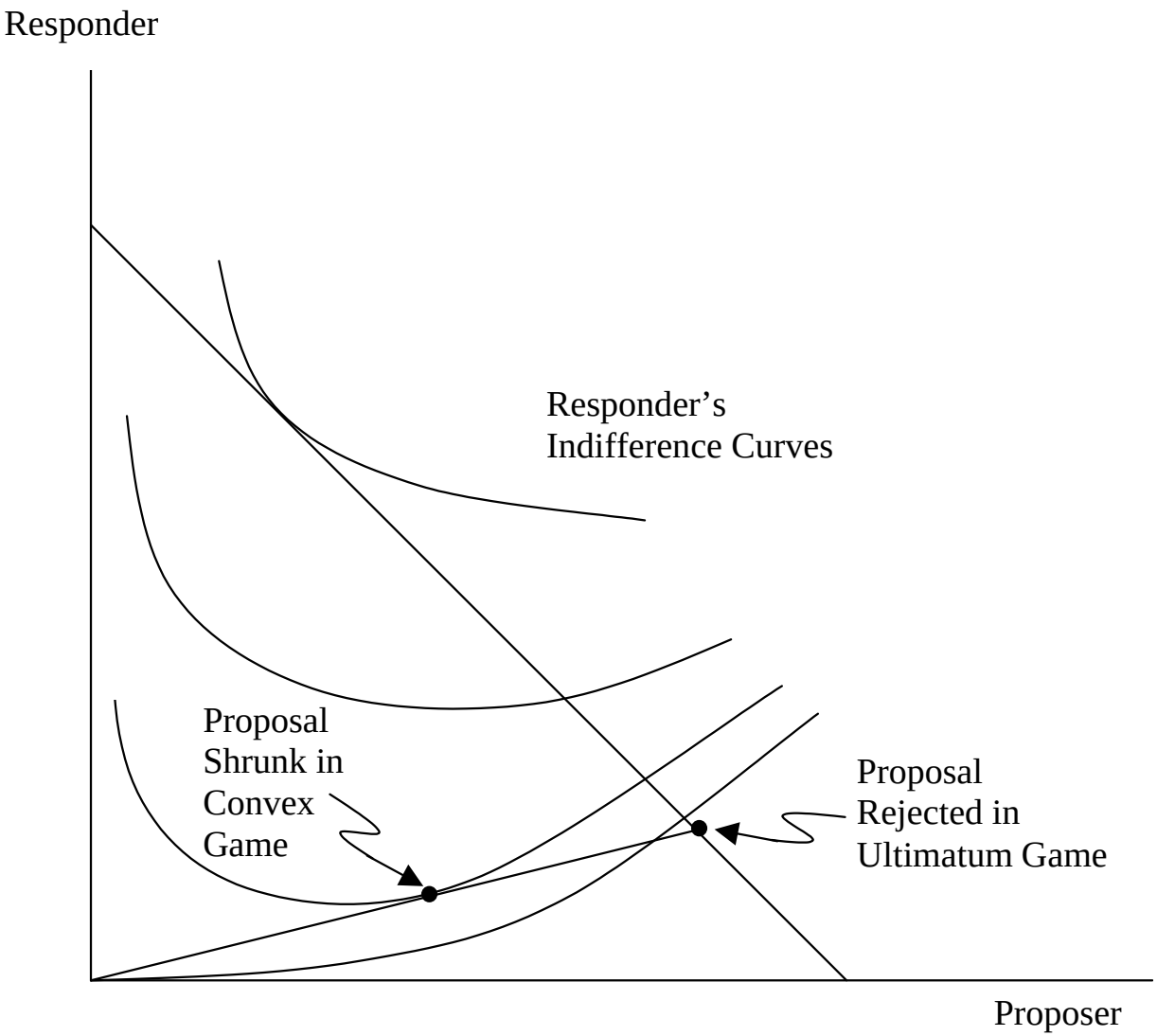
A. Divider chooses a rule by circling one letter in this column	**B. Possible Dividing Rules** *Of each Dollar to divide, the rule is:*
a	Divider gets 99¢ and Designator gets 1¢
b	Divider gets 90¢ and Designator gets 10¢
c	Divider gets 80¢ and Designator gets 20¢
d	Divider gets 70¢ and Designator gets 30¢
e	Divider gets 60¢ and Designator gets 40¢
f	Divider gets 50¢ and Designator gets 50¢
g	Divider gets 40¢ and Designator gets 60¢
h	Divider gets 30¢ and Designator gets 70¢
i	Divider gets 20¢ and Designator gets 80¢
j	Divider gets 10¢ and Designator gets 90¢
k	Divider gets 1¢ and Designator gets 99¢

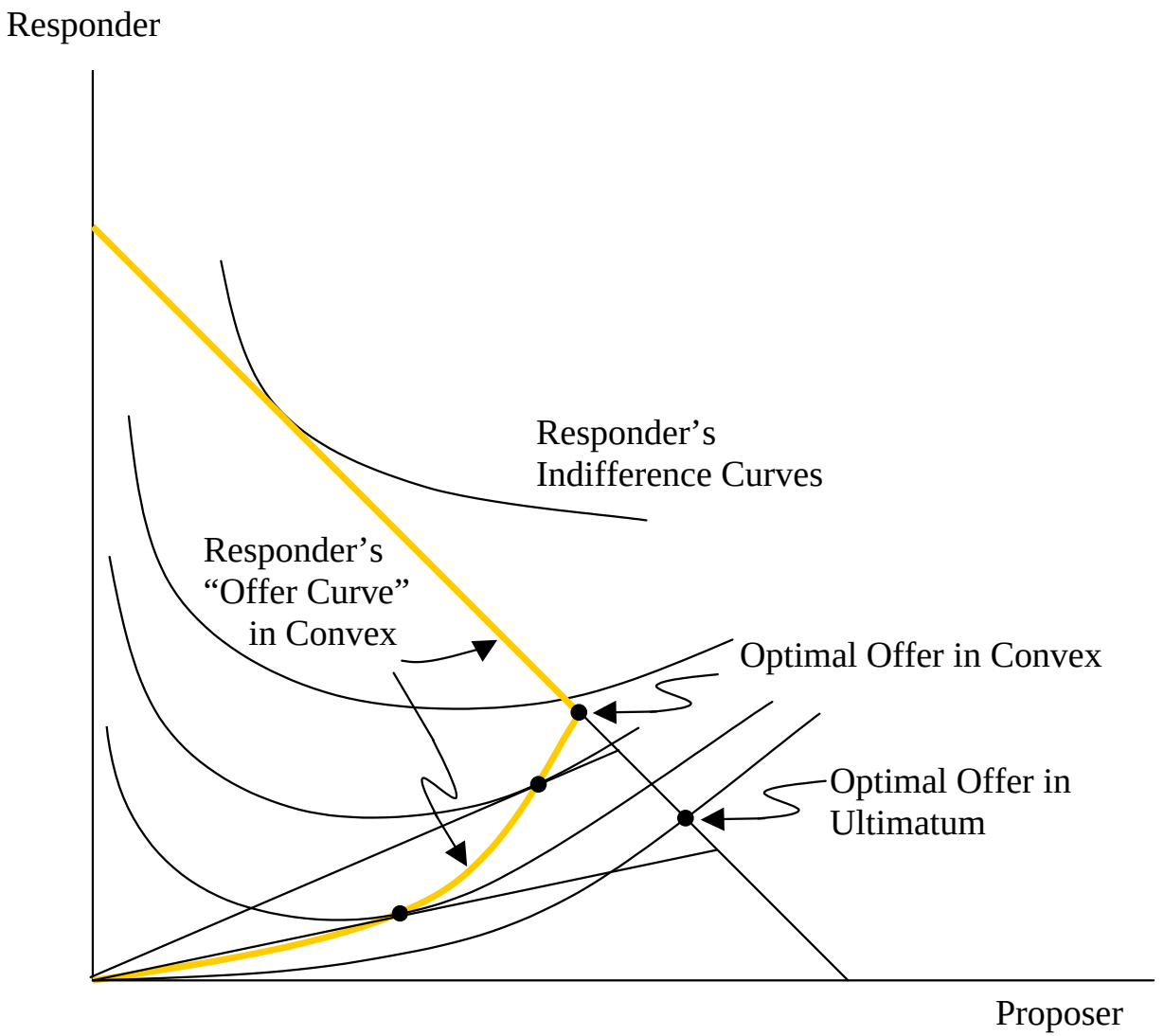
	A. If the Divider chooses this Dividing Rule….	**B.** …then I choose to divide this many dollars (circle one for each Dividing Rule):
a	Divider gets 99¢ and Designator gets 1¢	0 1 2 3 4 5 6 7 8 9 10 11 12
b	Divider gets 90¢ and Designator gets 10¢	0 1 2 3 4 5 6 7 8 9 10 11 12
c	Divider gets 80¢ and Designator gets 20¢	0 1 2 3 4 5 6 7 8 9 10 11 12
d	Divider gets 70¢ and Designator gets 30¢	0 1 2 3 4 5 6 7 8 9 10 11 12
e	Divider gets 60¢ and Designator gets 40¢	0 1 2 3 4 5 6 7 8 9 10 11 12
f	Divider gets 50¢ and Designator gets 50¢	0 1 2 3 4 5 6 7 8 9 10 11 12
g	Divider gets 40¢ and Designator gets 60¢	0 1 2 3 4 5 6 7 8 9 10 11 12
h	Divider gets 30¢ and Designator gets 70¢	0 1 2 3 4 5 6 7 8 9 10 11 12
i	Divider gets 20¢ and Designator gets 80¢	0 1 2 3 4 5 6 7 8 9 10 11 12
j	Divider gets 10¢ and Designator gets 90¢	0 1 2 3 4 5 6 7 8 9 10 11 12
k	Divider gets 1¢ and Designator gets 99¢	0 1 2 3 4 5 6 7 8 9 10 11 12

4 Predictions:

1. Money Maximizers:
   - Accept all offers
   - Offer 1¢, $b = M$ in both games.
2. Convex but Monotonic Altruism
   - Accept all offers
   - $b = M$ in both Games
3. Inequality Aversion Models
   - Linear but non-Monotonic (Fehr-Schmidt Preferences)
   - – Reject offers below a^*
     – Accept offers above a^*
   - Bolton-Ockenfels: $U(\pi_s, \pi_s/(\pi_s + \pi_o))$
     – Never Shrink

4. Convex but not Monotonic:
   - Responders may shrink the pie
   - Gives repsonders more bargaining power
   - May get more fair offers


Responder
Responder's
Indifference Curves
Proposal
Shrunk in
Convex
Game
Proposal
Rejected in
Ultimatum Game
Proposer


Responder
Responder's
Indifference Curves
Responder's
"Offer Curve"
in Convex
Optimal Offer in Convex
Optimal Offer in
Ultimatum
Proposer

5 Results

QUESTION 0: Were our results similar to others?
ANSWER 0: Yes.

QUESTION 1: Are all offers Accepted?
ANSWER 1: No.

Table 2A

	Choose		
	12	0	Shrink
Standard UG:	89%	11%	
Convex UG:	68%	6%	26%
For Selfish Offers			
Standard UG:	82%	18%	
Convex UG:	61%	9%	30%

QUESTION 2: Are Preferences Convex and non-Monotonic?
ANSWER 2: People are Different

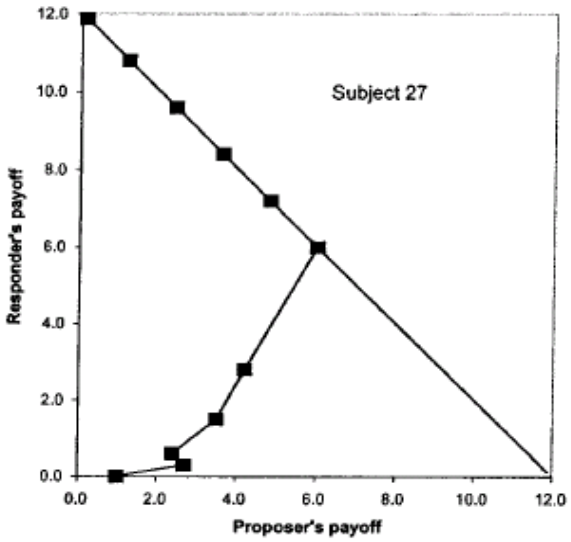
Table 2

Classification of Responder Behavior

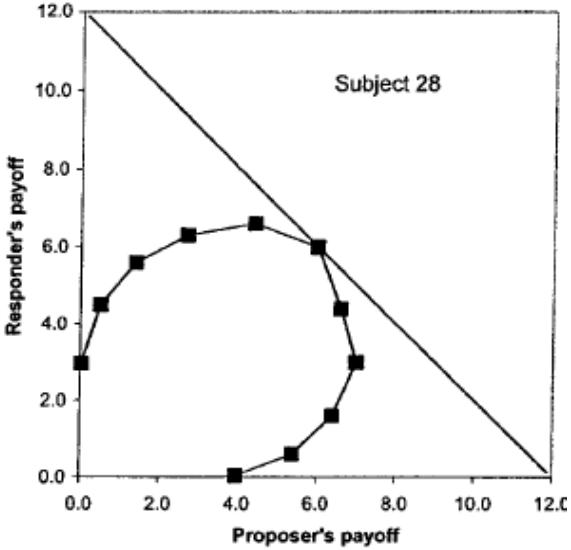
Category	Convex UG	Standard UG
Monotonic	26 (46%)	31 (55%)
Linear	7 (13%)	22 (39%)
Strictly Convex	23 (41%)	3 (5%)
Total	56	56

QUESTION 3: What do these Strictly Convex People look like? Errors or order?
ANSWER 3:
Definition: *Regular Preferences:* As Offers get closer to the responder's most preferred offer, the dollars allocated do not decrease. In other words, responders' choices are "single-peaked."

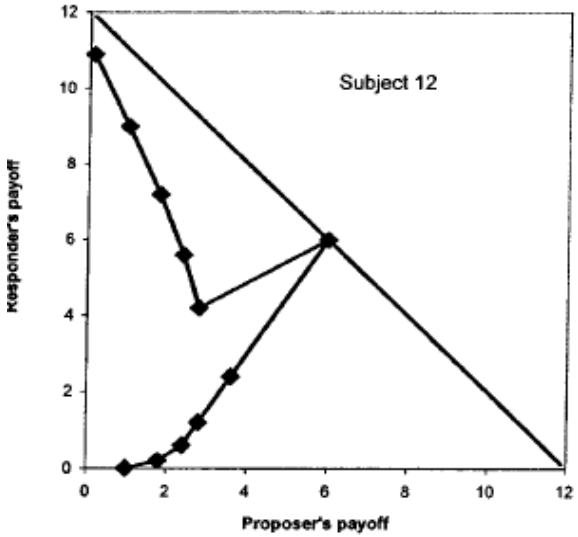
- Similar notion to normal goods
- Condition is imposed by Rabin's model of fairness.



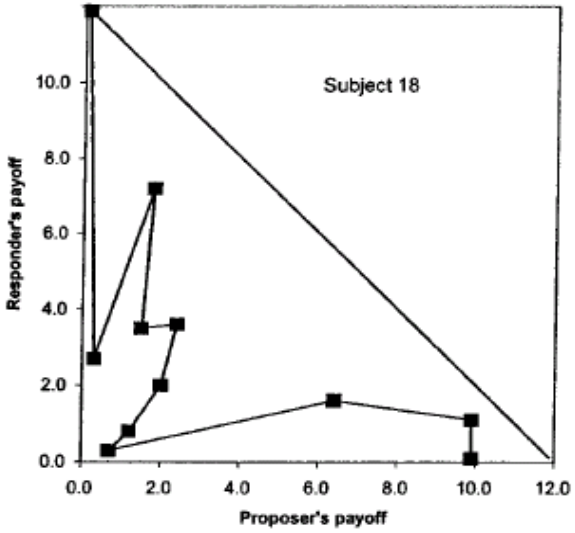
a. One-Sided Inequality Averse



b. Two-Sided Inequality Averse



c. Weakly Regular Two-Sided



d. Not Regular Preferences

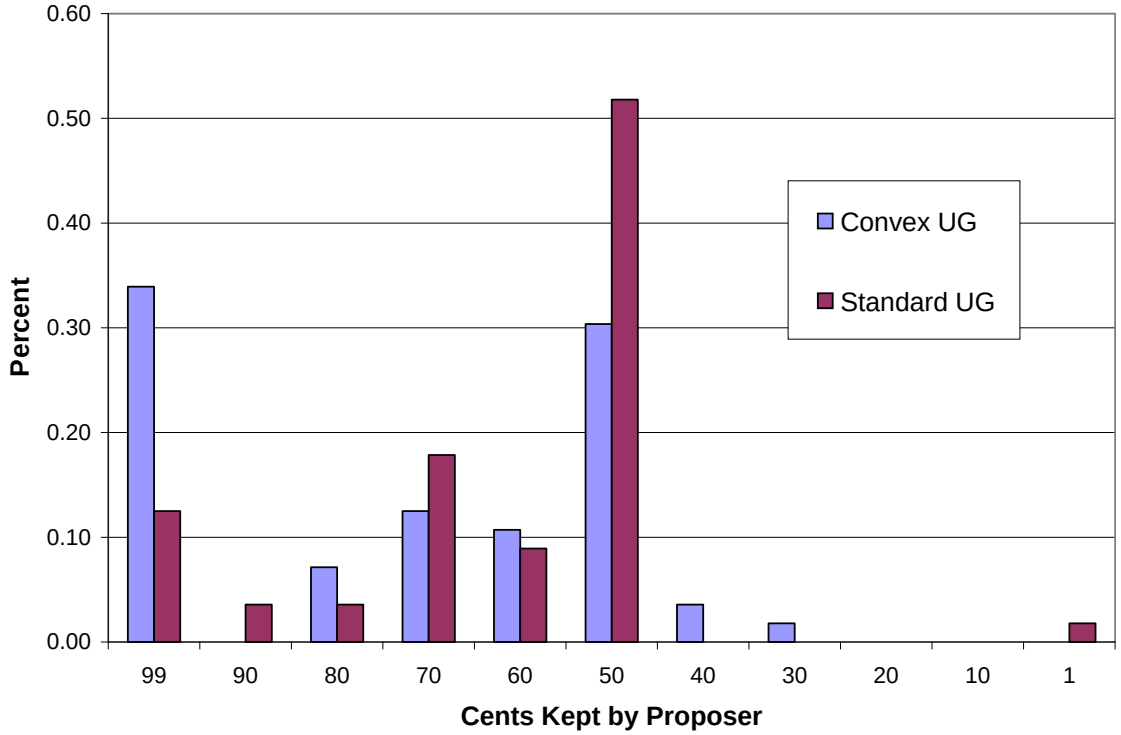
FIGURE 4. EXAMPLES OF SUBJECT'S CHOICES

Table 3

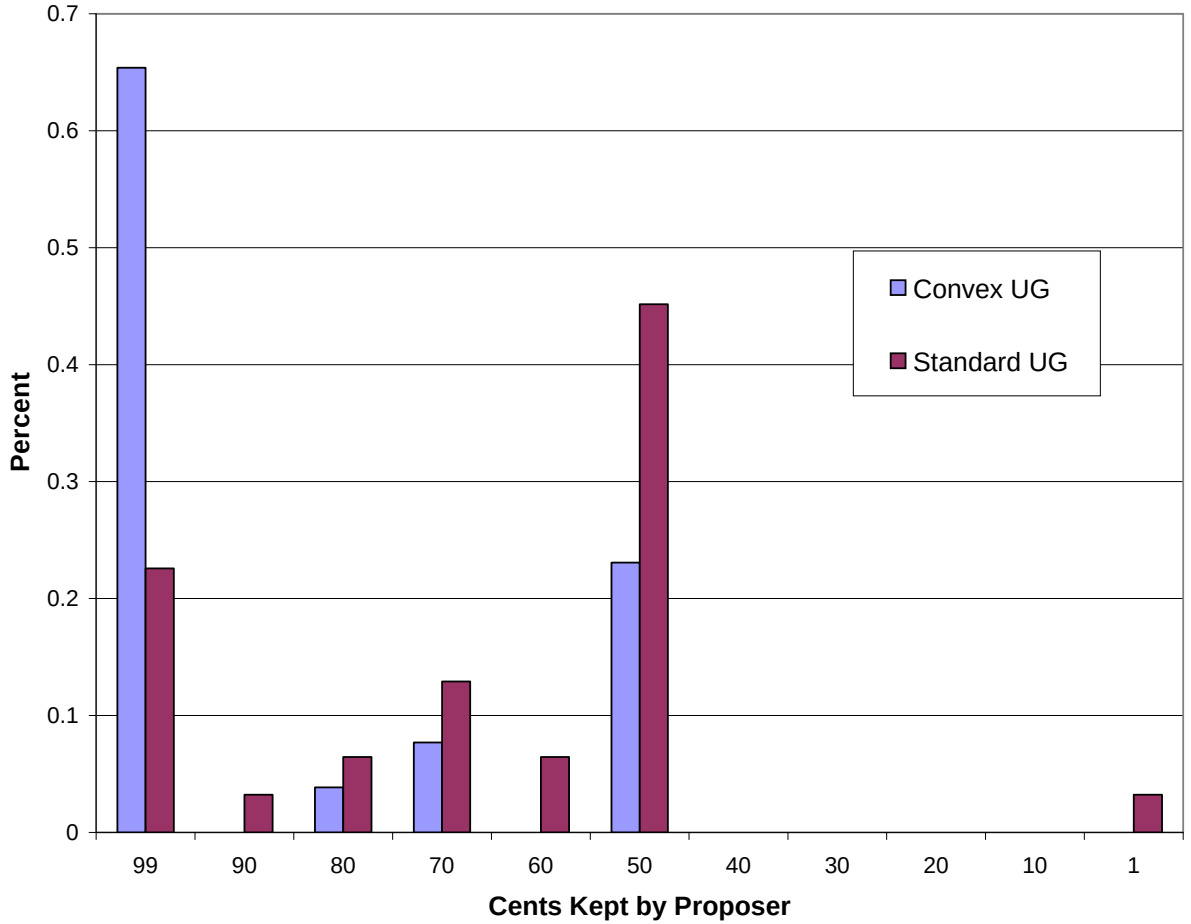
Classification of Nonmonotonic and Convex Responders by Minimum Distance of Choice to Linear and Regular Preferences, Averaged Per Choice.

	Convex Ultimatum Game 23 Subjects (41% of total)				Ultimatum 3 Subjects (5% of total)	
	Regular One-Sided	Regular Two-Sided	Weakly Two-Sided	Not Regular Pref.'s	Regular Two-Sided	Not Regular Pref.'s
Number of Subjects	9	4	7	3	1	2
Percent of Total	16%	7%	13%	5%	2%	3%
Min. Distance to Linear:						
Straight Average	$1.34	$2.36	$2.94	$2.73	$2.18	$3.82
Choice-Weigted Average	$1.72	$2.32	$1.89	$3.20	$0.00	$4.07
Min. Distance to Regular:						
Straight Average	0	0	$0.34	$1.39	0	$2.73
Choice-Weigted Average	0	0	$0.15	$1.49	0	$4.07

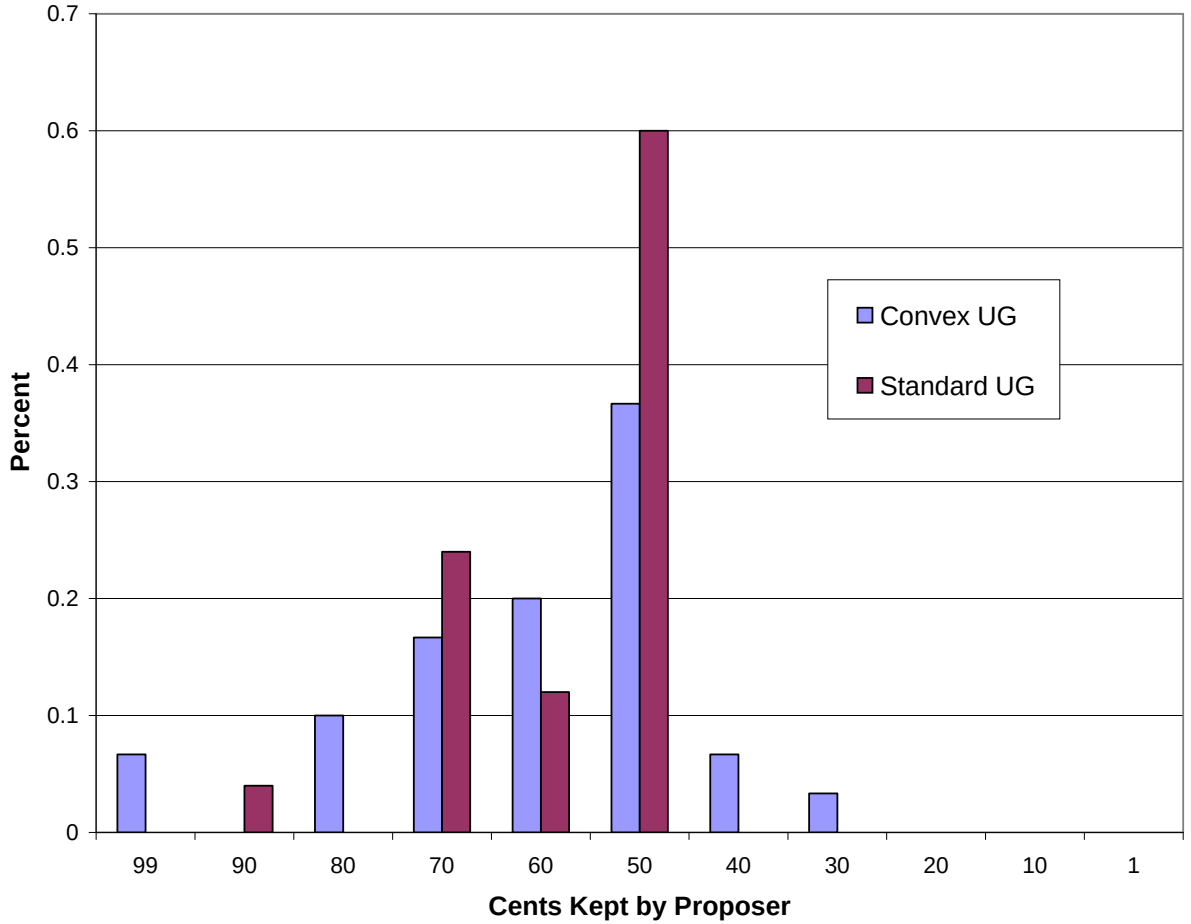
QUESTION 4:
How does this affect Proposals?
ANSWER 4:



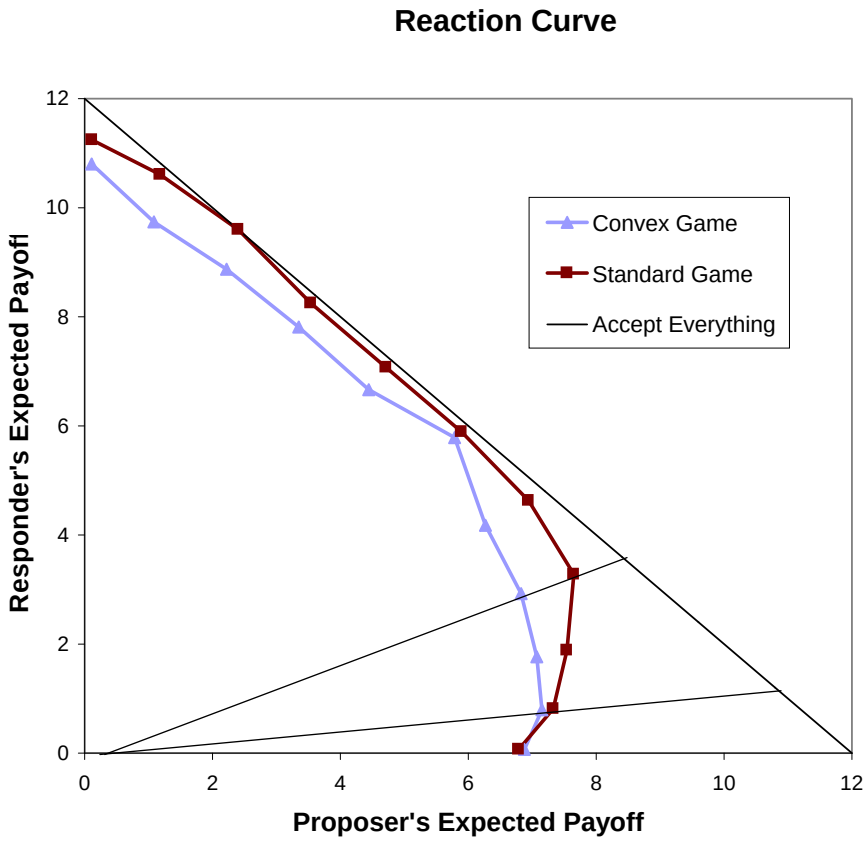
Proposals by People who, as Responders, Accept Everything



Proposals by People who, as Responders, Do Not Accept Everything



QUESTION 5: Why Didn't the Convex Game Result in Fairer Offers?
ANSWER 5: Risk Aversion?



Convex UG acts as a mean-preserving spread on expected offer, hence is more risky for proposers.

6 Conclusions

- The Convex UG gives us richer information on rejections and the preferences of Responders.
- Aggregate data, even on the Convex UG, hides a great deal of information.
- Half of responders care for something other than money maximization.
  - Similar to many other findings
- Responders can best be characterized as having strictly convex, but not monotonic preferences, most of which satisfy a regularity condition that is similar to a normal goods assumption.
- Proposers in the Convex game are far more aggressive than in UG.
  - This is opposite of what theory predicted.
  - This was not due to all subjects acting differently
    - Subjects who care about fairness as responders also make fair offers as proposers and are not affected by treatments.
    - Those who reveal only a concern for money-maximization are responsible for the adjustment.
  - What explains why they respond this way. Possibly risk aversion: The convex game has similar expected return but much less risk.

- Big finish: When conditioning on this game, it is possible to use a consistent and well-behaved preference ordering to describe behavior.
  - Letting subjects reveal preferences shows a great deal of heterogeneity and this heterogeneity is essential to understanding behavior in these games.