Would You Mind if I Get More?
An Experimental Study of the Envy Game

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"*Money, it's a crime.
Share it fairly but don't take a slice of my pie.*"

Money (The Dark Side of the Moon) - Pink Floyd

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Money, it's a crime.

Share it fairly...

So far, the Social Preferences literature has focused mainly on "nice" features of human beings

- Altruism (Becker, 1974; Andreoni and Miller, 2002)
- Equity (Fehr and Schmidt, 1999; Bolton and Ockenfels, 2000)
- Positive reciprocity (Rabin, 1993; Fehr and Gächter, 1998)
- Guilt (Charness and Dufwenberg, 2006)

Money, it's a crime.

...but don't take a slice of my pie!!!

Recently, attention has shifted to "detrimental" features

- Deception (Fischbacher and Heusi, 2008; Houser et al., 2010)
- Aggressiveness (Herrmann et al., 2008)
- Nastiness (Zizzo and Oswald, 2001; Abbink and Sadrieh, 2009)

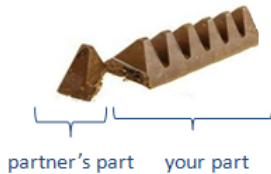## Sharing Chocolate Bars

Sharing Chocolate Bars

partner's part   your part

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The Envy Game

Two-player game

- A party chooses how much both parties can earn together
- The other party receives a fixed part

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Envy → inequ(al)ity helps one party but harms another

Do we observe envy in such a setting?

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Introduction	Method	Results	Conclusions	References
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Interaction Structure

The Proposer: Player X

Player X:

- chooses the pie size $\Pi \in \{\Pi \in \mathbb{N} : \underline{\Pi} \leq \Pi \leq \overline{\Pi}\}$
- knows that her partner (Player Y) is given a fixed share of the pie equal to κ
- is the residual claimant and receives the rest of the pie $(\Pi - \kappa)$

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Introduction	Method	Results	Conclusions	References
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Introduction
00000

Method
0●000000

Results
000000

Conclusions
0

References

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Introduction
00000

Method
0●000000

Results
000000

Conclusions
○

References

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Introduction
00000

Method
00000000

Results
000000

Conclusions
0

References

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Introduction	Method	Results	Conclusions	References
00000	0●000000	000000	O	

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Introduction	Method	Results	Conclusions	References
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Introduction
00000

Method
0●000000

Results
000000

Conclusions
0

References

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Introduction
ooooo

Method
oo●ooooo

Results
oooooo

Conclusions
o

References

Interaction Structure

Game Types

		Self-damaging	
		NO	YES
Other-damaging	NO	$(V)oice\ only$ $\pi_x = \Pi - \kappa$ $\pi_y = \kappa$	$(I)mpunity$ $\pi_x = \Pi - \kappa$ $\pi_y = 0$
	YES	$(P)unity$ $\pi_x = 0$ $\pi_y = \kappa$	$(U)ltimatum$ $\pi_x = 0$ $\pi_y = 0$

Behavioural Predictions

Prototypical Types of Social Preferences

Intuition about behavior $\rightarrow$ Charness and Rabin (2002)'s model of distributional preferences

$$U_Y(\pi_x, \pi_y) = \begin{cases} (1-\rho)\pi_y + \rho\pi_x & if \ \pi_y \geq \pi_x \\ (1-\sigma)\pi_y + \sigma\pi_x & if \ \pi_y < \pi_x \end{cases}$$

and four alternative social preference types:

1. **Selfish** ($\sigma = \rho = 0$)
2. **Difference-averse** ($\sigma < 0 < \rho < 1$)
3. **Welfare-enhancing** ($1 \geq \rho \geq \sigma > 0$)
4. **Competitive** ($\sigma \leq \rho \leq 0$)

Introduction	Method	Results	Conclusions	References
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Introduction	Method	Results	Conclusions	References
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Introduction
00000

Method
0000●0000

Results
000000

Conclusions
0

References

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Table: Behavioral Predictions for Player Y (Summary)

Treatment	Prediction	Π Interval
	Selfish	
I	$\delta(\Pi) = 1$	Π
P	$\delta(\Pi) = \{0, 1\}$	Π
U	$\delta(\Pi) = 1$	Π

	Difference-averse	
I	$\delta(\Pi) = 1$	Π
P	$\delta(\Pi) = 1$	$\Pi \leq 2\kappa$
	$\delta(\Pi) = F\left(\Pi < 2\pi_y + \pi_y\left(\frac{\rho}{-\sigma}\right)\right)$	$\Pi > 2\kappa$
U	$\delta(\Pi) = 1$	$\Pi \leq 2\kappa$
	$\delta(\Pi) = F\left(\Pi < 2\pi_y + \pi_y\left(\frac{1}{-\sigma}\right)\right)$	$\Pi > 2\kappa$

Note: $F(\cdot) = 1$ if the condition $(\cdot)$ is fulfilled, otherwise $F(\cdot) = 0$.

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	Competitive	
I	$\delta(\Pi) = 1$	Π
P	$\delta(\Pi) = 0$	Π
U	$\delta(\Pi) = 1$	$\Pi \leq 2\kappa$
	$\delta(\Pi) = F\left(\Pi < 2\pi_y + \pi_y\left(\frac{1}{-\sigma}\right)\right)$	$\Pi > 2\kappa$

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Participants and Procedures

- The experiment was conducted using the z-Tree software (Fischbacher, 2007)

- 128 participants: half of them randomly assigned to role X and the other half to role Y

- Players X could choose a pie size Π in the range from €8 to €24

- The fixed share κ of Player Y was set equal to €6

- Participants received a show-up fee of €2.50

Introduction
00000

Method
000000●0

Results
000000

Conclusions
0

References

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Introduction
00000

Method
0000000●0

Results
000000

Conclusions
○

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Participants and Procedures

- Participants were exposed to two distinct treatments, in particular:

  ◇ 32 participants were assigned to the sequence $V \rightarrow I$
  ◇ 32 participants to the sequence $I \rightarrow V$
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Thus, each treatment (V, I, P, and U) was played first in one session.

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Introduction
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Method
○○○○○○○●

Results
○○○○○○

Conclusions
○

References

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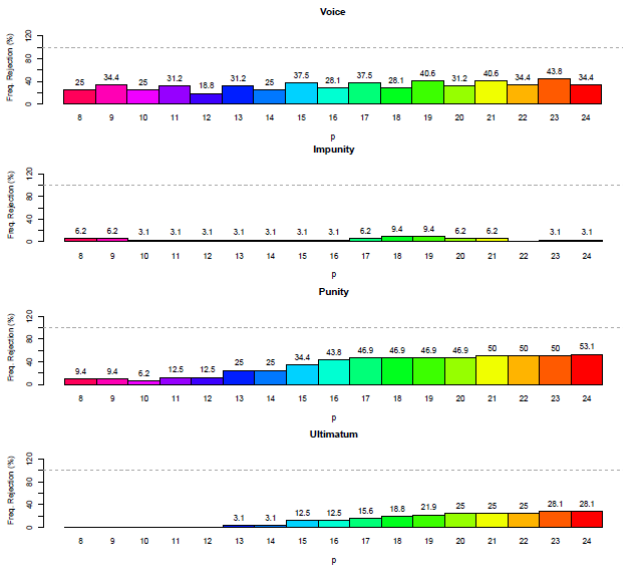 - ◇ 32 participants to the sequence $U \rightarrow P$

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Introduction
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Method
○○○○○○○○

Results
●○○○○○

Conclusions
○

References

Player Y

Voice

Impunity

Punity

Ultimatum

Result 1

Result 1

For higher claims of Player X, rejections are frequently
observed when they are other-damaging.
Rejections are either more erratic or almost absent when
rejection is symbolic or self-damaging.

Introduction	Method	Results	Conclusions	References
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Player Y

Table: Choices of Player Y (Generalized linear mixed model)

	Coeff (Std. Err.)		
Rejection~	$\Pi \in \{8, \dots 12\}$	$\Pi \in \{13, \dots 18\}$	$\Pi \in \{19, \dots 24\}$
(Intercept)	0.531 (8.398)	-0.634 (6.489)	1.325 (9.450)
Self harming	-3.883 (1.278)**	-6.093 (2.150)**	-1.306 (3.426)
Other harming	-4.250 (2.269)°	-6.037 (2.246)**	-4.208 (3.994)
Pie size	-0.217 (0.222)	0.088 (0.141)	-0.051 (0.155)
Self harming× Pie size	-0.142 (0.399)	0.194 (0.232)	-0.267 (0.242)
Other harming× Pie size	0.441 (0.351)	0.668 (0.199)***	0.509 (0.240)*
Age	-0.124 (0.328)	-0.092 (0.248)	-0.186 (3.527)
Econ	-1.762 (2.955)	-4.963 (3.885)	-1.881 (3.527)
Female	-1.459 (1.821)	-0.140 (1.358)	0.258 (1.852)
Obs (Subj)	640 (64)	768 (64)	768 (64)
Prob > chi2	< 0.001	< 0.001	< 0.001

∗∗∗(0.1%);∗∗ (1%); ∗(5%); °(10%) significance level

Introduction
00000

Method
00000000

Results
000●00

Conclusions
0

References

Player Y

Result 2

Result 2

For fair and unfair choices of Player X, rejection is chosen more parsimoniously when it bears payoff consequences. As soon as the unfairness of the allocation increases with Π size, more rejections are observed when the negative consequences of rejection are borne by Player X.

Table: Agreements

| | Treatment | | | |
	V	*I*	*P*	*U*
Actually accepted Π (%)	68.7	96.9	56.2	71.9
Y's average earnings	6.000	5.812	6.000	4.312
X's average earnings	17.719	17.375	7.188	10.969
Loss of social welfare (%)	1.2	3.4	45.1	36.3

Result 3

Result 3

When rejection is other-damaging, Players Y tend to punish greedy choices of Players X. This generates significant losses in terms of social welfare. Interestingly, social welfare losses are higher when they are entirely borne by Player X than when they are shared by both players.

Conclusions

Envy has important detrimental consequences in terms of individual and social welfare.

Envy is affected by the process leading to the disadvantageous allocation:

- when the disadvantageous situation is created by the suffering decision maker herself, like in Güth et al. (2012), envy seems to be dominated by efficiency concerns.

- when the disadvantageous situation is imposed by another party, envy seems to beat efficiency seeking.

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References I

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Abbink, K. and Sadrieh, A. (2009). The pleasure of being nasty. *Economics Letters*, 105(3):306–308.

Andreoni, J. and Miller, J. (2002). Giving according to garp: An experimental test of the consistency of preferences for altruism. *Econometrica*, 70(2):737–753.

Becker, G. S. (1974). A theory of social interactions. *Journal of Political Economy*, 82(6):1063–93.

Bolton, G. E. and Ockenfels, A. (2000). Erc: A theory of equity, reciprocity, and competition. *The American Economic Review*, 90(1):pp. 166–193.

Charness, G. and Dufwenberg, M. (2006). Promises and partnership. *Econometrica*, 74(6):1579–1601.

Charness, G. and Rabin, M. (2002). Understanding social preferences with simple tests. *The Quarterly Journal of Economics*, 117(3):817–869.

Fehr, E. and Gächter, S. (1998). Reciprocity and economics: The economic implications of homo reciprocans. *European Economic Review*, 42(3-5):845–859.

Fehr, E. and Schmidt, K. M. (1999). A theory of fairness, competition, and cooperation. *Quarterly Journal of Economics*, 114(3):817–868.

Fischbacher, U. (2007). z-tree: Zurich toolbox for ready-made economic experiments. *Experimental Economics*, 10(2):171–178.

Fischbacher, U. and Heusi, F. (2008). Lies in disguise. an experimental study on cheating. TWI Research Paper Series 40, Thurgauer Wirtschaftsinstitut, Universität Konstanz.

Güth, W., Levati, M., and Ploner, M. (2012). An experimental study of the generosity game. *Theory and Decision*, 72:51–63.

Herrmann, B., Thöni, C., and Gächter, S. (2008). Antisocial punishment across societies. *Science*, 319(5868):1362–1367.

Introduction
00000

Method
00000000

Results
000000

Conclusions
0

References

References II

Houser, D., Vetter, S., and Winter, J. (2010). Fairness and cheating. Discussion Papers 335, SFB/TR 15 Governance and the Efficiency of Economic Systems, Free University of Berlin, Humboldt University of Berlin, University of Bonn, University of Mannheim, University of Munich.

Rabin, M. (1993). Incorporating fairness into game theory and economics. *American Economic Review*, 83(5):1281–1302.

Zizzo, D. J. and Oswald, A. J. (2001). Are people willing to pay to reduce others' incomes? *Annals of Economics and Statistics*, 63-64:39–65.