Trust

November 2, 2019

Trust game

- Proposer and responder each given $10
- Proposer decides how much of $10 to pass to the responder
- The amount passed gets tripled and added to the responder's account
- The responder decides how much to pass back to the proposer
- **What is the subgame-perfect Nash equilibrium?**

Berg, et al (1995)

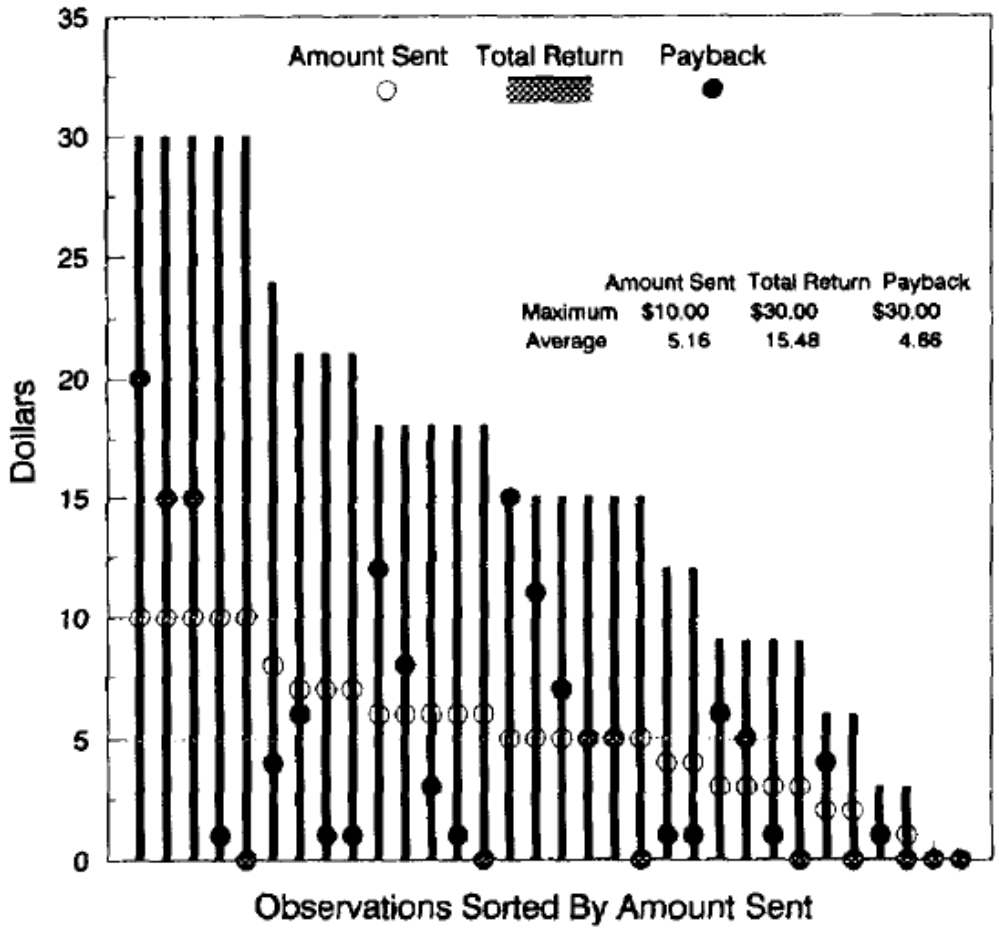


FIG. 2. Trust experiment results showing amount sent (○), total return (■), and payback (●). No history was provided to the subjects.

On average, \$5.16 is sent by proposers and \$4.66 is returned by responders

McCabe, et al (2003)

McCabe, et al (2003) use two treatments to understand behavior in the trust game:

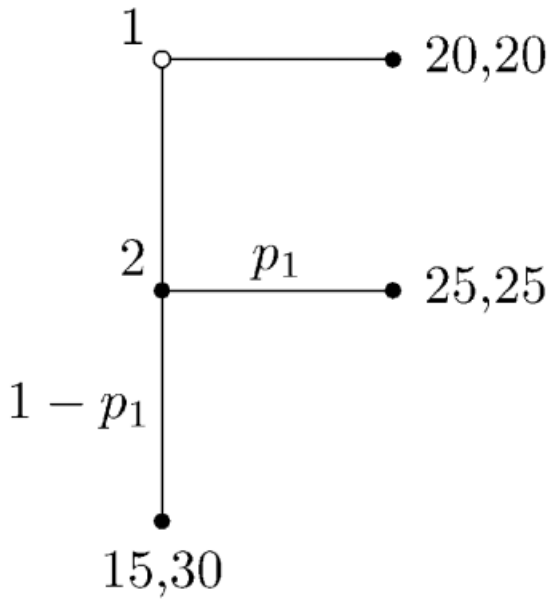


Fig. 1. Voluntary trust game (VTG).

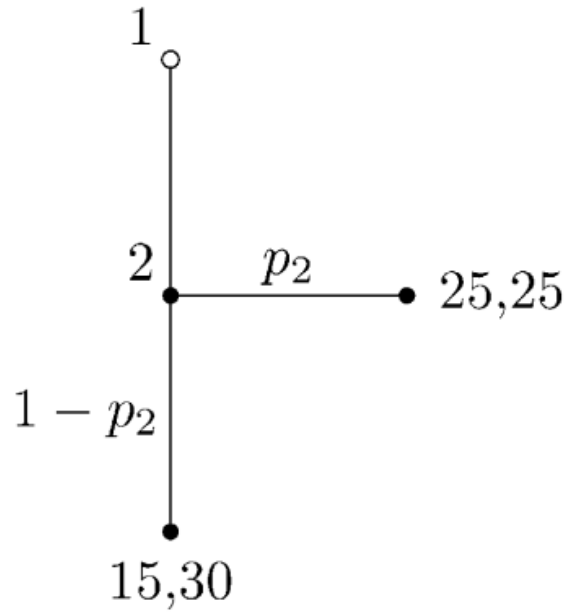


Fig. 2. Involuntary trust game (ITG).

Outcome-based models (i.e., inequity aversion) predict the same behavior for Player 2. **What do you think happens?**

McCabe, et al (2003)

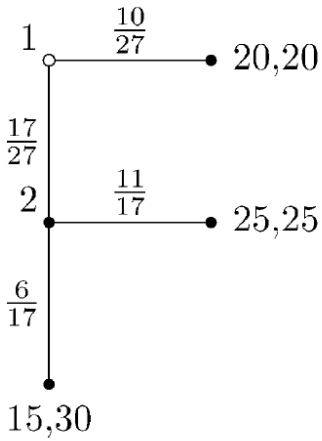


Fig. 3. Frequency of moves in the voluntary trust game.

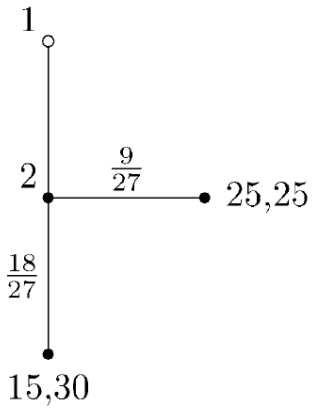
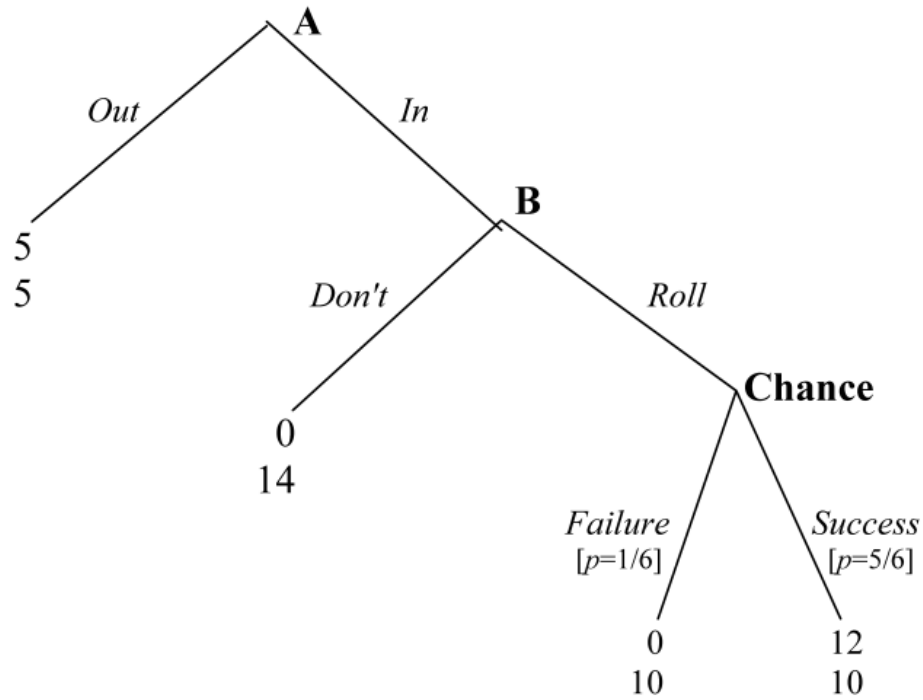


Fig. 4. Frequency of moves in the involuntary trust game.

Results show that intentions matter!

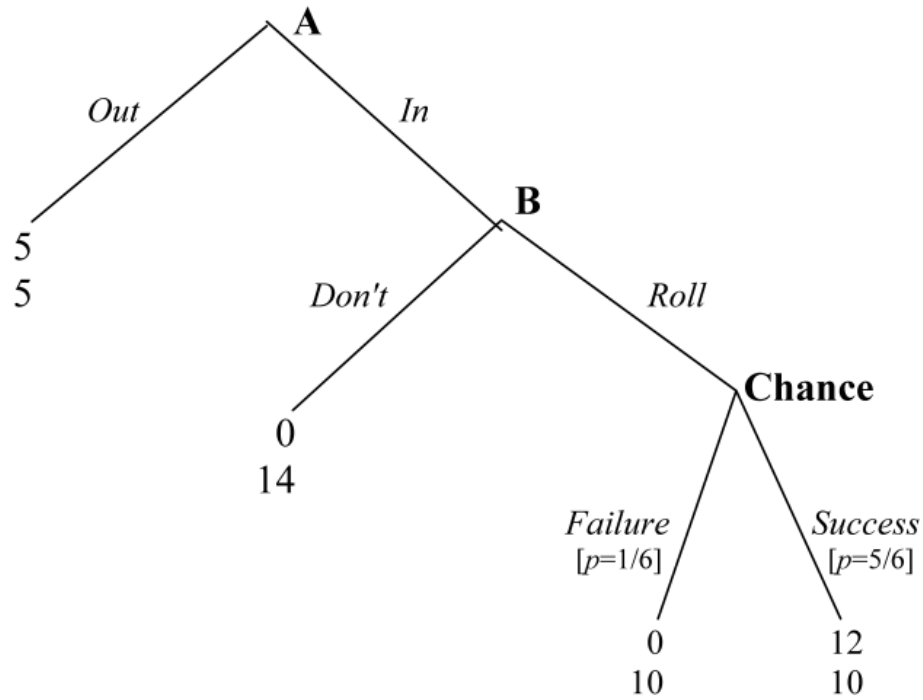
Charness and Dufwenberg (2006)

Subjects play this game with and without communication:



Charness and Dufwenberg (2006)

The idea is to study how communication affects reciprocity and trust



A simple model of guilt aversion

- Player 2 believes that Player 1 believes that Player 2 will roll with probability τ_B

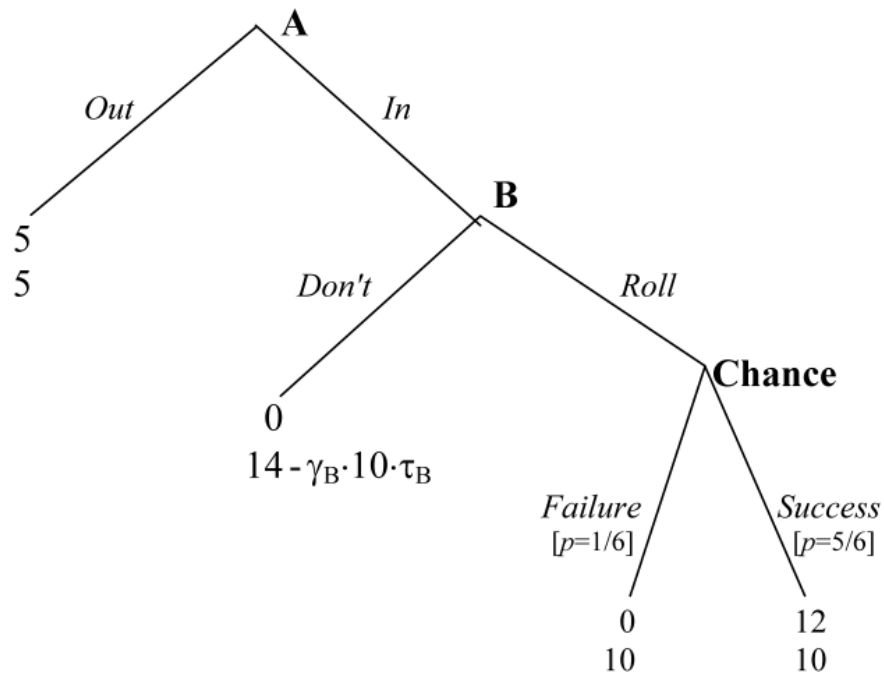
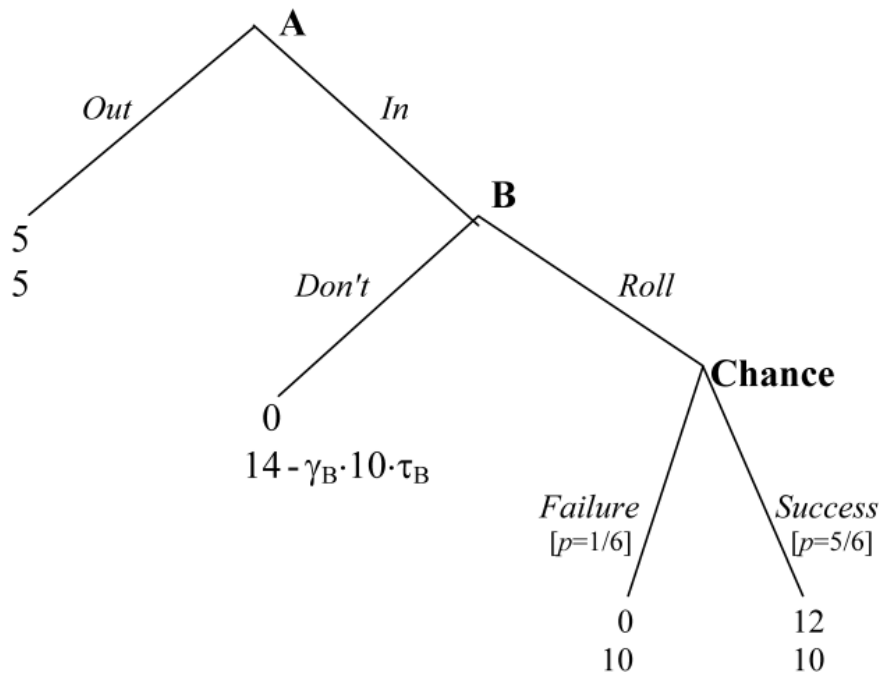


FIGURE 2.—Psychological game Γ_2.

A simple model of guilt aversion

- Player 2 believes that Player 1 believes that Player 2 will roll with probability τ_B
- If Player 1 goes in, he therefore expects a payoff $\tau_B((1/6)*0+(5/6)*12) = 10\tau_B$



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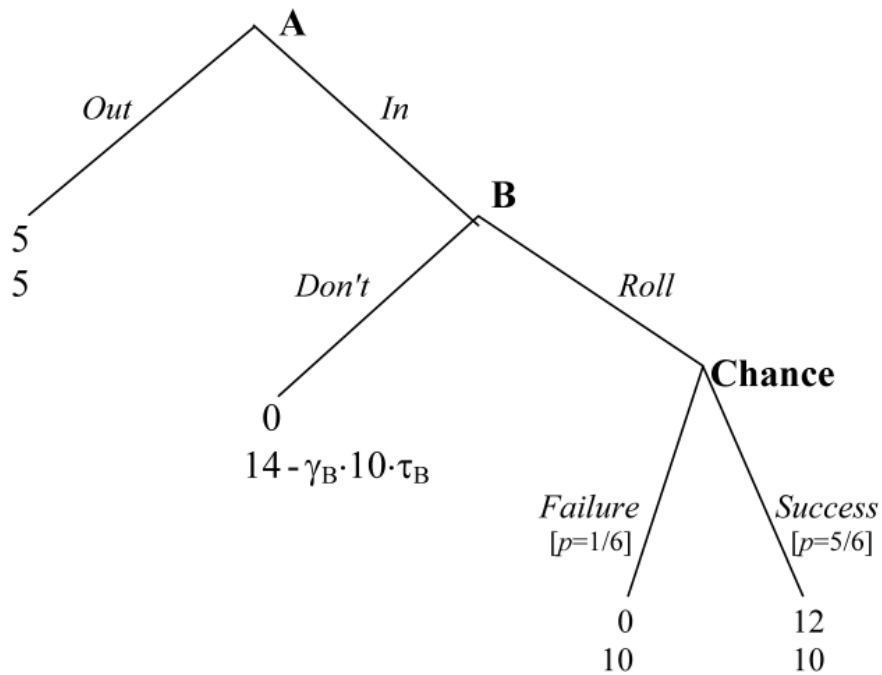

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- $\gamma_B 10\tau_B$ is subtracted from Player 2's payoff if he doesn't roll, where γ_B is a guilt-aversion parameter

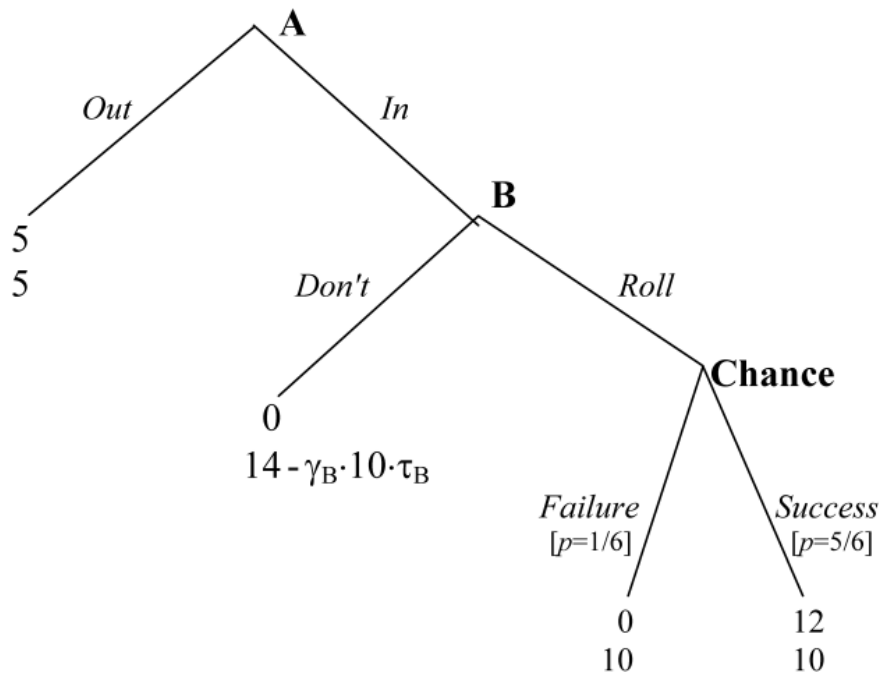


FIGURE 2.—Psychological game Γ_2.

Experimental design

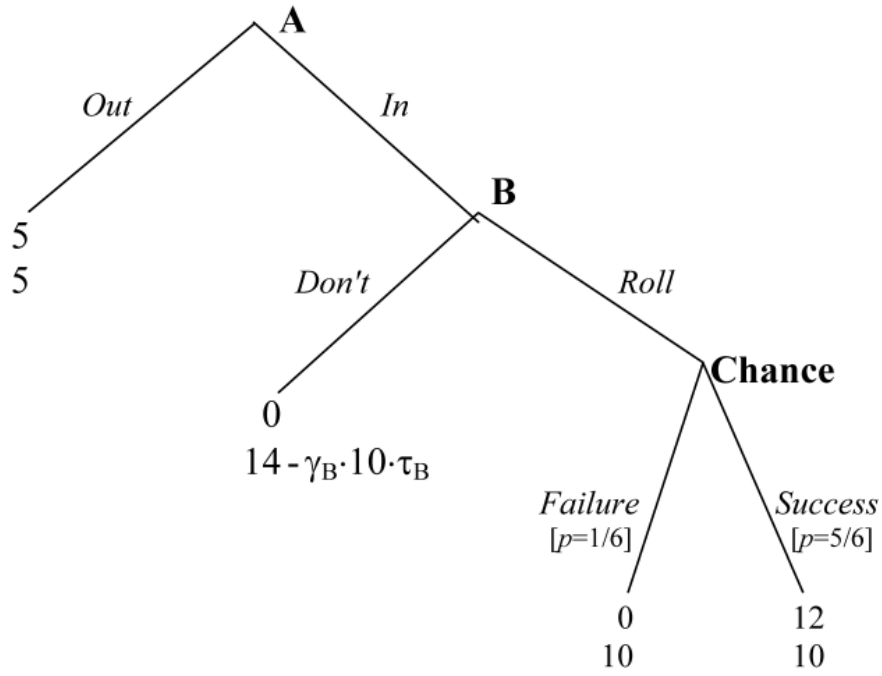
- Room split into two sides (A and B)
- **Treatment 1:** Participants play the game described above
  - A makes a choice first
  - B makes a choice without observing A's choice (counts only if A chooses in)
  - A six-sided die is rolled regardless of B's choice
- **Treatment 2:** B has the option to send A a message prior to A's choice
- **Treatments 3 and 4:** Same as 1 and 2, but with (7, 7) as the outside option
- **Treatment 5:** Same as 1 except A sends a message to B

Belief elicitation

- τ_A: A's asked to guess the percentage of B's who choose roll
- τ_B: B's asked to guess the guesses of A's who chose in
- Each guess rewarded with \$5 if within 5 percentage points

Research questions

1. What is the effect of communication?
2. Do subjects with higher τ_B roll more?
3. Do promises increase τ_B and τ_A?
4. Does this affect behavior in the predicted direction?



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Messages

Sess.	ID	Message	Class	A	B
1	4	I have to do laundry tonight and I really don't want to do it! But I don't have any clean underwear left and I don't want to go commando tommorrow. We'll see what I decide tonight. This man acts funny doesn't he? But he seems cool, he's quite a character. All this mystery is kinda cool.	E	Out	R
1	5	If you will choose "In", I will choose to roll. This way, we both have an opportunity to make more than $5! ☺	P	In	R
1	6		N	Out	R
1	7	If I roll a 2–6 (you'll know when you receive the $, you will give $5.00 to a stranger. [[[then there is a line, under which is written "Sign here if you are so kind]]] Thanks. You'll still be gaining more than if I had chosen Don't roll.	P	In	R
1	8	The fairest thing to do is if you opt "IN". Then I will proceed to choose "roll." That way you and I have 5/6 chances to make money for the both of us. That's much better than just making $5 each. Increases both our chances. Thanks.	P	In	R
1	9	Choose In and I will Roll You have my word	P	In	DR

Effect of communication

TABLE I

TESTS FOR THE EFFECT OF COMMUNICATION[a]

	A's *In* Rate			B's *Roll* Rate			(*In*, *Roll*)		
Treatment	M	NM	Z Stat	M	NM	Z Stat	M	NM	Z Stat
(5, 5)	31/42	25/45	1.78**	28/42	20/45	2.08**	21/42	9/45	2.94***
B Messages	(74%)	(56%)		(67%)	(44%)		(50%)	(20%)	
(7, 7)	23/49	11/48	2.48***	24/49	12/48	2.44***	15/49	4/48	2.76***
B Messages	(47%)	(23%)		(49%)	(25%)		(31%)	(8%)	
(5, 5)	31/46	25/45	1.16	18/46	20/45	−0.51	12/46	9/45	0.69
A Messages	(67%)	(56%)		(39%)	(44%)		(26%)	(20%)	

[a]M/NM means that messages/no messages were feasible. The Z stat reflects the test of proportions for the two populations (see Glasnapp and Poggio (1985)). ** and *** indicate $p < 0.05$ and 0.01, respectively, one-tailed tests. Note that the NM data from the (5, 5) case are used as the control in both the first and third rows.

Beliefs and behavior

TABLE II

BELIEFS AND BEHAVIOR[a]

	A's Average Guess			B's Average Guess		
Treatment	*In*	*Out*	Z Statistic	*Roll*	*Don't*	Z Statistic
(5, 5) no messages	51.3	28.2	2.55***	54.2	39.6	1.99**
(5, 5) B messages	65.4	42.5	2.02**	73.2	45.1	3.20***
(5, 5) A messages	56.7	35.4	2.65***	69.6	50.0	2.80***
(7, 7) no messages	35.7	31.8	1.06	69.4	41.7	3.08***
(7, 7) B messages	70.0	45.3	3.00***	66.9	36.9	3.52***

[a]The Z statistic reflects the Wilcoxon–Mann–Whitney rank sum test for the two populations compared (see Siegel and Castellan (1988)). *, **, and *** indicate $p < 0.10, 0.05$, and 0.01, respectively, one-tailed tests.

A's guesses as function of A behavior

B's guesses of A's guesses as function of B behavior

For B's, results in line with guilt aversion

Promises and behavior

TABLE III

PROMISES AND BEHAVIOR[a]

	A's *In* Rate			B's *Roll* Rate			(*In*, *Roll*)		
Treatment	P	NP	Z Stat	P	NP	Z Stat	P	NP	Z Stat
(5, 5)	22/24	9/18	3.04***	18/24	10/18	1.32*	16/24	5/18	2.49***
B messages	(92%)	(50%)		(75%)	(56%)		(67%)	(27%)	
(7, 7)	16/24	7/25	2.71***	20/24	4/25	4.71***	14/24	1/25	4.13***
B messages	(67%)	(28%)		(83%)	(16%)		(58%)	(4%)	
Pooled	38/48	16/43	4.07***	38/48	14/43	4.49***	30/48	6/43	4.73***
	(79%)	(37%)		(79%)	(33%)		(62%)	(14%)	

[a]P/NP means that a promise/no promise was sent or received. The Z stat reflects the test of proportions for the two populations compared. *, **, and *** indicate $p < 0.10, 0.05$, and 0.01, respectively, one-tailed tests.

Promises and beliefs

TABLE IV

PROMISES AND BELIEFS[a]

	Average A Guess			Average B Guess		
Treatment	P	NP	Z Stat	P	NP	Z Stat
(5, 5)	65.8	50.0	1.63*	66.2	59.9	1.10
B messages	(24)	(18)		(24)	(18)	
(7, 7)	63.1	50.9	1.44*	59.6	51.0	1.17
B messages	(24)	(25)		(24)	(25)	
Pooled	64.4	50.5	2.24**	63.1	54.7	1.74**
	(48)	(43)		(48)	(43)	

[a] P/NP means that a promise/no promise was sent or received. The number of observations is in parentheses. The Z stat reflects the Wilcoxon rank sum test for the two populations. * and ** indicate $p < 0.10$ and 0.05, respectively, one-tailed tests.

Charness and Dufwenberg (2006)

- Reciprocity? Some models cannot explain the effect of communication
  - If B promises to roll and A believes him, in is less kind compared to the situation where A doesn't know
  - So A should go in less if motivated by kindness alone

- Still, B's behavior is consistent with reciprocity (McCabe, et al (2003))

- Fixed cost of lying???

$$\begin{aligned} Roll = & -1.924 + 0.027 * \text{Guess} + 0.054 * \text{A\_message} \\ & \quad (0.645) \quad (0.010) \qquad\quad (0.991) \\ & - 0.010 * \text{A\_message} * \text{Guess}. \\ & \quad (0.015) \end{aligned}$$

Trust games

- Subjects don't act like money-maximizers in trust games (Berg, et al (1995))
- Not driven by pure altruism (McCabe, et al (2003))
- One way to encourage prosocial behavior is through communication (Charness and Dufwenberg (2006)):
  - Communication builds trust
  - Trust leads to prosocial behavior (perhaps because of guilt aversion)