Reciprocity

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Outline

- ▶ Reciprocal altruism: an evolutionary theory of cooperation
- ▶ Requirements
- ▶ Tit for tat
- ▶ Predictions
- ▶ Problem

Reciprocity means trading favors

Both parties win if benefit to recipient exceeds cost to donor.

Why reciprocate? Why not cheat?

- ▶ That would end the relationship.
- ▶ You would lose future benefits.
- ▶ If the relationship is valuable, it can pay to reciprocate.

When is the relationship valuable?

- ▶ When it is hard to find a new partner.
- ▶ When the relationship is likely to continue, but its duration is uncertain.

Why must the length of the relationship be uncertain?

If its length were known,
- ▶ both partners should defect on the last day,
- ▶ so there is no incentive to cooperate on the day before,
- ▶ or on the day before that. . .
- ▶ or ever.

Tit for Tat

a strategy in repeated prisoner's dilemma game.
- cooperate on first round
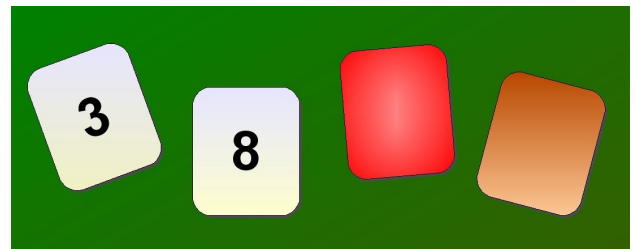- thereafter, copy your partner's last move

Mimics reciprocity.

Tit for Tat fares well in simulations of evolution

- Beats most other strategies.
- Suggests that reciprocal altruism can be favored by selection.

Predictions

- More reciprocity in small populations. (Hard to find new partner.)
- Psychological traits including
  - trustworthiness
  - guilt
  - resentment toward cheaters
  - skill at detecting cheaters

Wason Selection Task

Which cards must be turned over to determine whether all cards with even number on one side have primary color on other?

Answer: 8 and brown only

Wason Selection Task: alternate wording

Rule: If you are drinking alcohol then you must be over 18. Which of these must we examine to look for violations?

1. The beverage being consumed by a 17-yr-old
2. The beverage being consumed by a 22-yr-old
3. The age of a person drinking coke
4. The age of a person drinking beer

Answer: 1 and 4 only
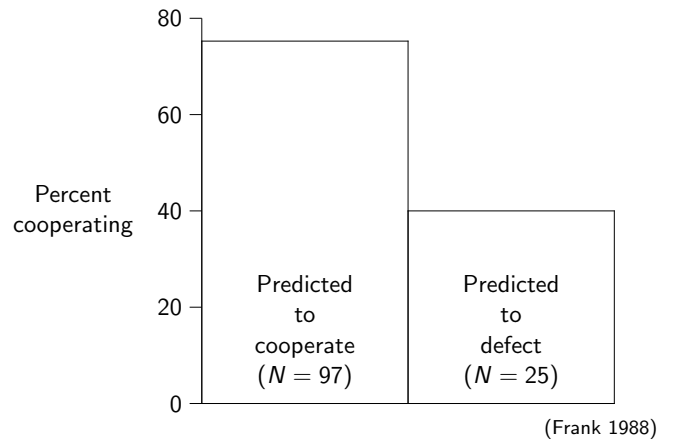
Wason Selection Task

- Described in Ridley's *Origins of Virtue*
- Two equivalent forms of same problem.
- The problem is easier if explained in terms of social obligations.

Implication: humans are good at detecting cheaters.

Robert Frank's Prisoner's Dilemma Experiment

- Give subjects 30 minutes to get acquainted.
- Tell them about Prisoner's Dilemma game.
- In private, ask each to predict who will cooperate and who defect.
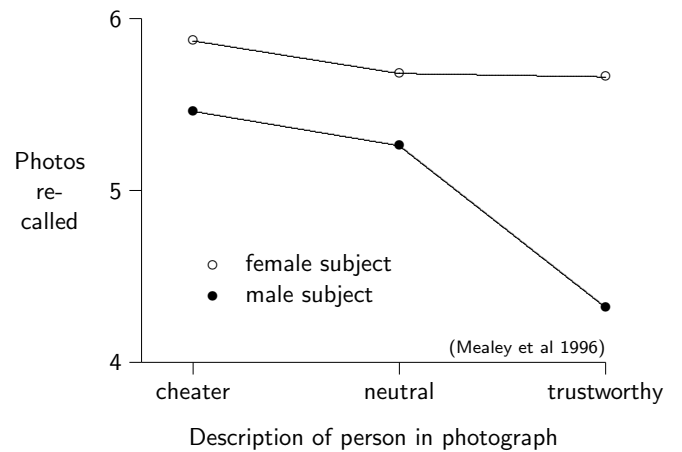- One round of Prisoner's Dilemma.

We can detect cheaters

Percent cooperating

Predicted to cooperate ($N = 97$)

Predicted to defect ($N = 25$)

(Frank 1988)

Who do we remember?

- Experiment with college students.
- Each subject shown photos faces along with fictional descriptions.
- Trustworthy: e.g. found wallet and returned it
- Cheater: e.g. caught embezzling
- Which faces do they remember 1 week later?

Mealey et al (1996)

We remember cheaters' faces

Photos re-called

- ○ female subject
- ● male subject

(Mealey et al 1996)

cheater   neutral   trustworthy

Description of person in photograph

Where does this leave us?

- Humans engage in reciprocity.
- They have appropriate psychological adaptations.
- Is it a satisfactory explanation of human cooperation?

Not quite

- Models show that reciprocal altruism works for pairs of individuals,
- but breaks down in larger groups.
- Yet humans cooperate in large groups.

Reputation and Gossip

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- ▶ Perhaps people cooperate to maintain their reputations.
- ▶ If so, they should cooperate less when no one is watching.
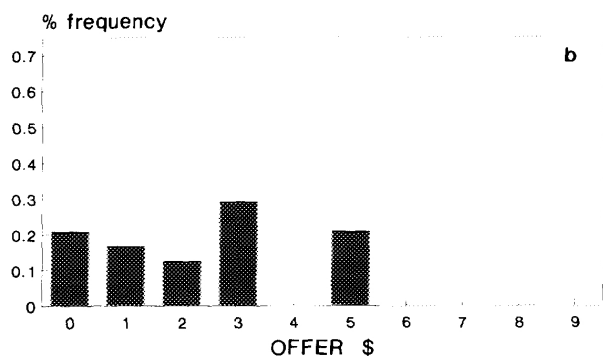

Double-blind dictator game

- ▶ No one—not even experimenter—knows what any subject did.
- ▶ If generosity is about reputation, then these subjects should be less generous.
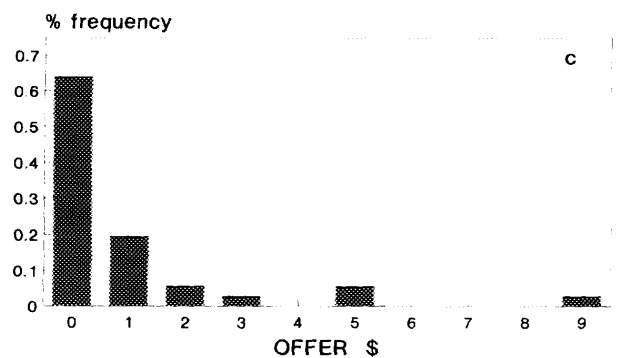
(Hoffman et al 1994)

Double-Blind Protocol

- ▶ In private, subject receives envelope containing 10 $1 bills.
- ▶ Keeps some $1 bills; puts rest in the envelope.
- ▶ Drops envelope in a box on the way out the door.
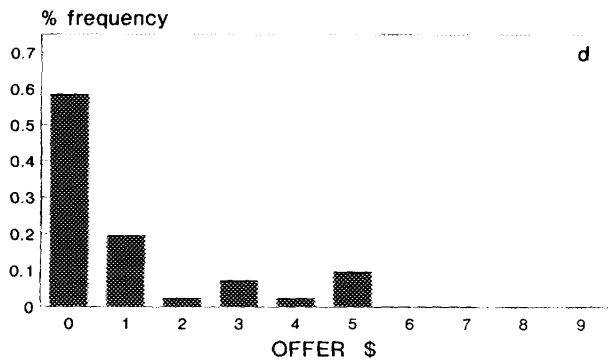- ▶ Envelopes are shuffled and then delivered to recipients.

Dictator Game: Not Blind

Dictator Game: Double Blind 1

Dictator Game: Double Blind 2

Results

- Anonymous subjects are less generous.
- Supports reputation hypothesis.

The large-group problem

- Reciprocal altruism breaks down in large groups.
- In small groups, the cheater eventually runs out of victims, so cheating doesn't pay.
- Reputation makes cooperation feasible in large groups

How gossip and reputation solve the large-group problem

- Because of language and gossip, an individual's reputation is widely known.
- Cheaters soon run out of victims even in large groups.
- Explains one unusual feature (cooperation) in terms of another (language).

Why punish? What about the 2nd-order collective action problem?

- Individuals punish cheaters by refusing to interact with them.
- The punisher receives a direct benefit—he avoids being cheated.
- There is no 2nd-order collective action problem to worry about.

Indirect reciprocity

- People help others with good reputations.
- Punish others with bad reputations.
- No tendency to help the individual who helped you.
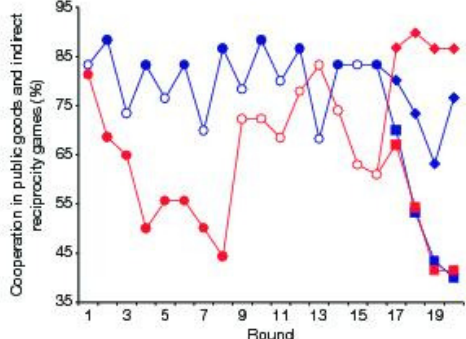- Used to be a controversial idea.

Recent work on reputation and indirect reciprocity

► Nowak and Sigmund (1998): they can evolve by natural selection.
► Milinski et al (2002): they maintain cooperation in experimental games
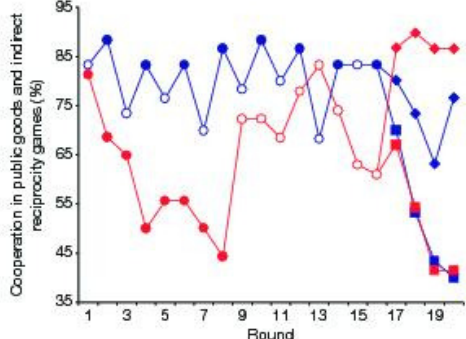
Indirect Reciprocity Game

► 6 anonymous players interact via computers.
► Experimenter asks "Telesto" whether s/he will give to "Galateo". If so, Telesto loses DM 2.50 and Galateo gains DM 4. Telesto's decision displayed on all screens.
► Next, experimenter asks Galateo whether he will give to Jivare.
► No direct reciprocity: if A is potential donor to B, then B is never potential donor to A.
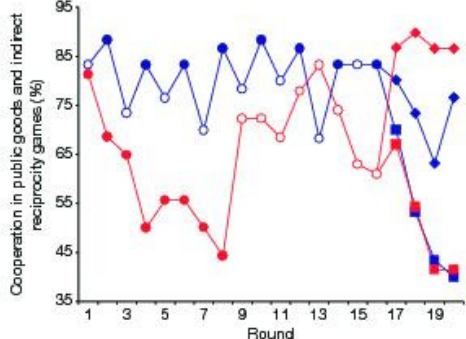
Milinski et al (2002) experiment

► Filled circles: public goods (PG)
► Open circles: indirect reciprocity (IR)
► After round 16, only public goods.
► Some groups, but not others, were told this on round 16.

Milinski et al (2002) experiment

► Result: IR stabilizes cooperation in PG games.
► Cooperation decays if IR stops.

Milinski et al (2002) experiment

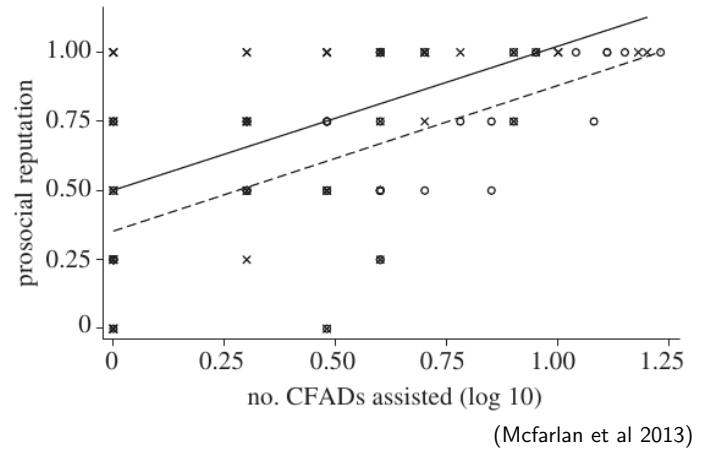► Result: IR stabilizes cooperation in PG games.
► Cooperation decays if IR stops.

How are reputations formed and maintained?

► Count number of helpful acts?
► Count number of people helped?
► What if we fail to help those with bad reps?
► Do you have to keep helping?

Bay oil production on Dominica (Caribbean)

- ▶ Bay oil made by boiling leaves of Caribbean Bay tree and distilling the steam.
- ▶ Labor intensive: people help each other.
- ▶ Owner of plot gets oil; reciprocates labor.

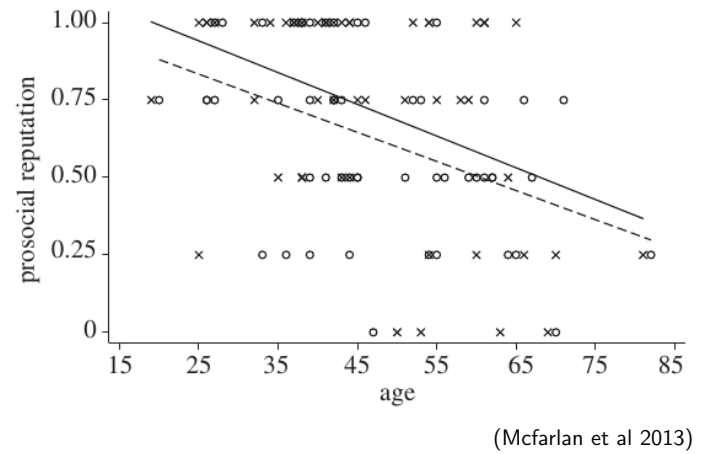## Reputation increases with the number helped

(Mcfarlan et al 2013)

This shouldn't work

- ▶ It ought to matter how *much* you help, not just how many people you help.
- ▶ It shouldn't help to help those with bad reps.

But on Dominica, it seems to. We don't understand this.

Reputation decreases with age

(Mcfarlan et al 2013)

Summary

1. Evidence shows that we are concerned about repution—our own and that of others
2. Reputation makes it easier for reciprocal altruism to evolve.
3. It allows indirect reciprocity to evolve by natural selection.
4. Why do we think gossip is a bad thing?