

'Give and you shall receive.'

—Luke.6 Verse 38, Bible

Reputation and Cooperation

PSYC370: The Psychology of Cooperation

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Week 19

Outline

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- The 'tragedy of the commons'
- Indirect reciprocity: 'Give and you shall receive'
- Reputation helps solve the 'tragedy of the commons'
- Strategic investment in reputation
- Gossip helps indirect reciprocity and increases contributions to the public good
- Reputation effects outside the laboratory

The ‘Tragedy of The Commons’

The 'Tragedy of The Commons' (Hardin, 1968, 1998)

- The product of Darwinian evolution is individuals that **maximally exploit resources under competition**
- Ruthless exploiters with access to technology will **overexploit** resources
- Apocalyptic vision of the future
- Whenever people have free access to a public resource, the resource will be overused and will collapse

The Tragedy of The Commons

*Competition for access to **limited resources** leads to a conflict between **self-interest** and the **common good**; the rational consequences of which create a **lose-lose** situation*

Garrett Hardin

The 'Tragedy of The Commons' (Hardin, 1968, 1998)



The 'Tragedy of The Commons' (Hardin, 1968, 1998)



Cooperation in the Laboratory: Public Goods Game

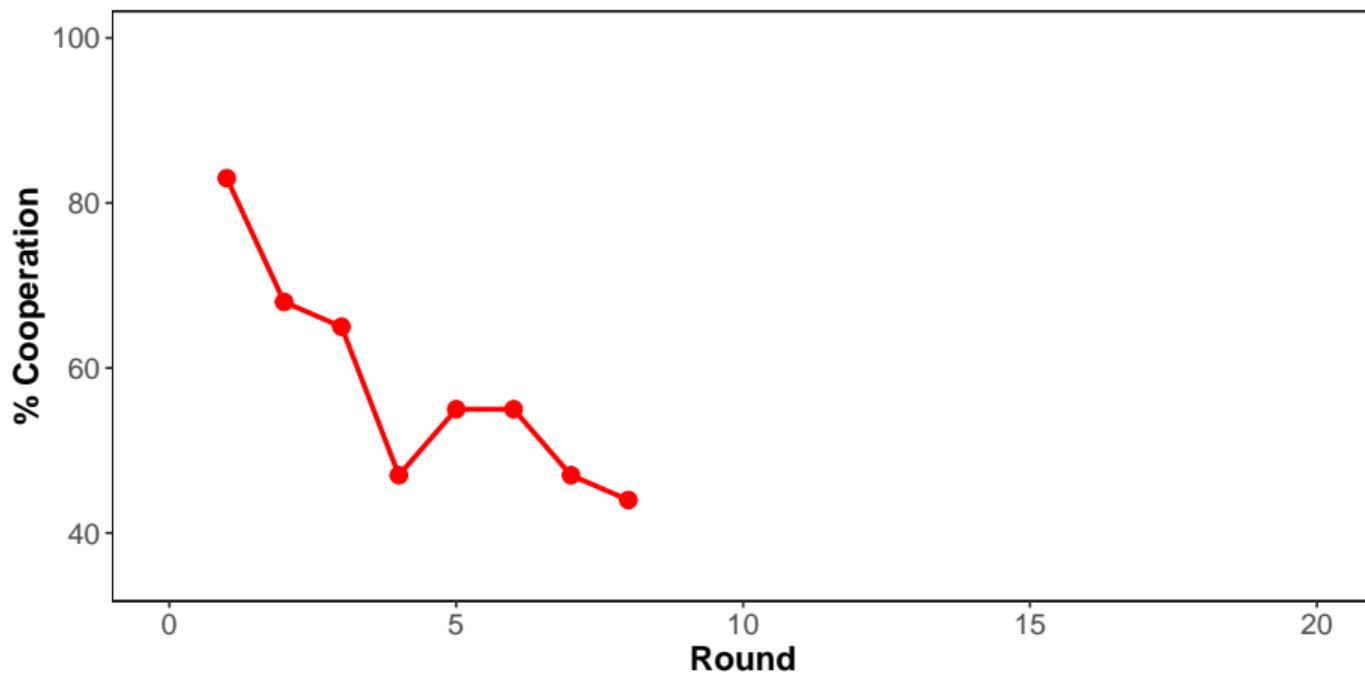
	Player 1	Player 2	Player 3	Player 4
Contribution	\$1	\$1	\$0	\$1
Payoff	\$1.50	\$1.50	\$1.50	\$1.50
Net Profit	\$0.50	\$0.50	\$1.50	\$0.50

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- The **collective-best outcome** arises when **all players contribute** to the public good but **defection is individually profitable**

Cooperation in the Laboratory: Public Goods Game



Milinski et al. (2002)

The 'Tragedy of The Commons' (Hardin, 1968, 1998)

- Several potential solutions to the social dilemma:
 1. Punishment of uncooperative group members
 2. Allowing conditional cooperators to preferentially associate with one another

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Today:

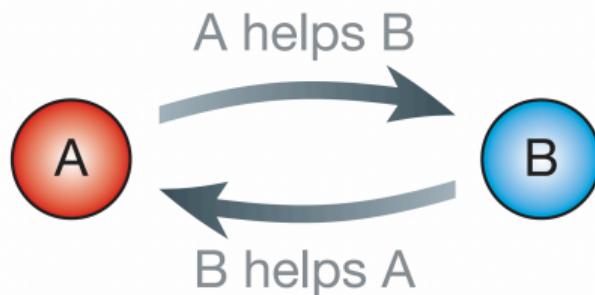
- Can reputation facilitate a cooperative solution to the problem?

Indirect Reciprocity: ‘Give and You Shall Receive’

Two Rules for Cooperation: Direct and Indirect Reciprocity

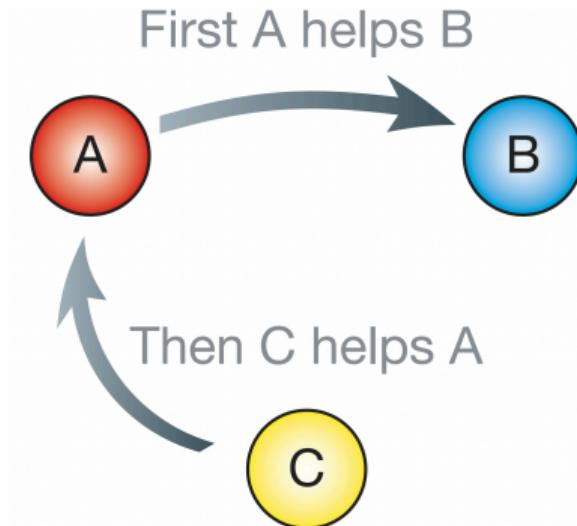
Direct Reciprocity

*"You scratch my back,
and I'll scratch yours"*



Indirect Reciprocity

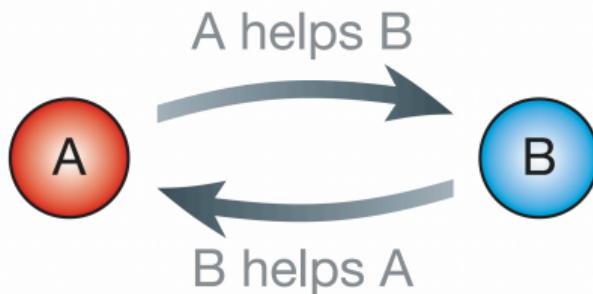
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Two Rules for Cooperation: Direct and Indirect Reciprocity

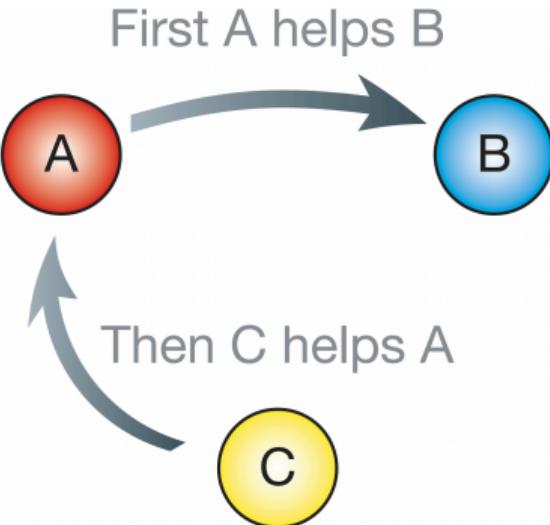
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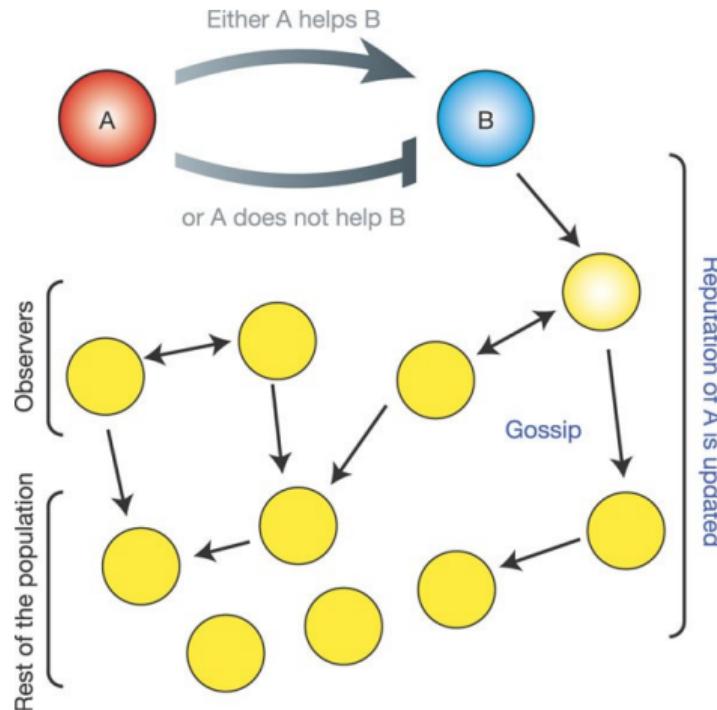
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Indirect reciprocity is based on
reputation

Indirect Reciprocity: Building A Reputation



Indirect Reciprocity: 'Give and You Shall Receive'

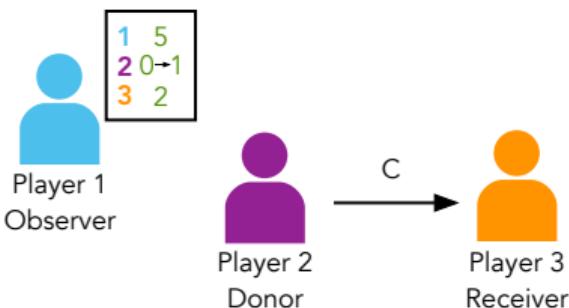
- To study indirect reciprocity, researchers use the **indirect reciprocity game**
- A **donor** chooses whether or not to pay a small cost to confer a benefit to a **receiver** (i.e., whether to cooperate or defect)
- Other group members observe the donor's action and update the donor's reputation
- Updating occurs based on some form of **social norm**, comprising two components:
 1. **Assesment rule:** prescribes how to update reputations based on observations
 2. **Action rule:** tell the donor whether or not to cooperate with a given recipient

Social Norms: ‘Image Scoring’ (Nowak & Sigmund, 1997)

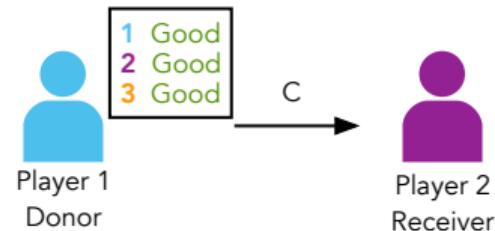
- Each player has an **image score**—which starts at 0—that reflects their reputation and is bounded between -5 and +6
- Assessment rule:
 - Each act of helping another *increases* a donor’s image score by +1
 - Each act of withholding help *decreases* a donor’s image score by -1
- Action rule:
 - -5 strategy: help everyone who has an image score greater than or equal to -5 (unconditional helping)
 - +6 strategy: help everyone who has an image score equal to +6 (unconditional defecting)
 - zero-strategy: help everyone who has a zero or positive image score (maximally discriminating)

Image Scoring: Example

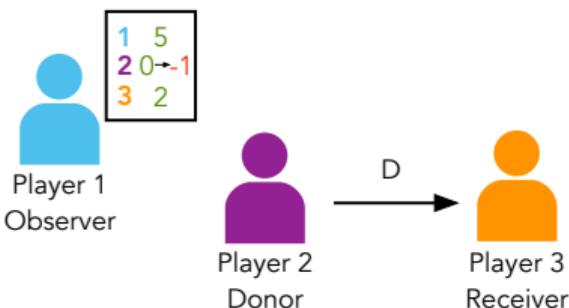
A Assessment stage: Updating reputation scores



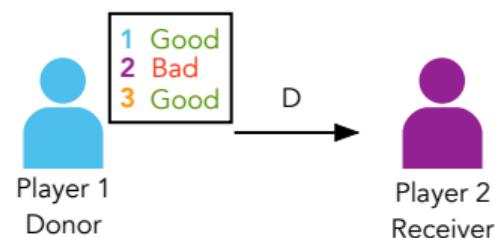
B Action stage: Decision based on overall judgement



C Assessment stage: Updating reputation scores



D Action stage: Decision based on overall judgement



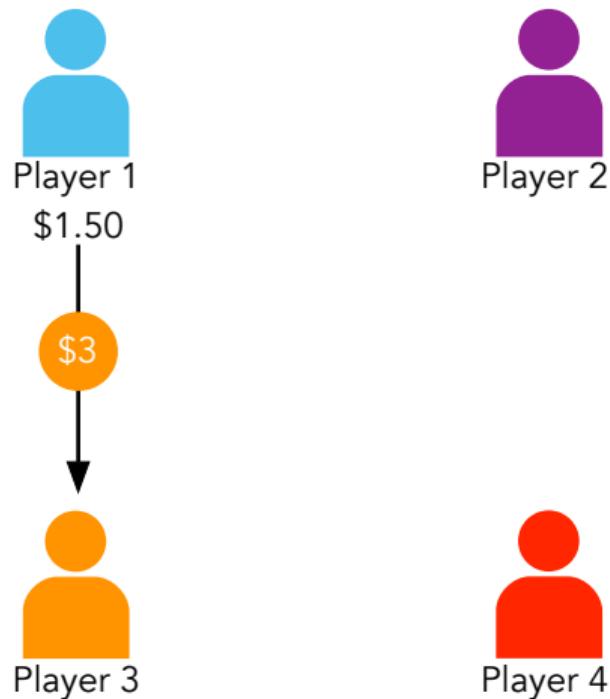
Cooperation Through Image Scoring (Wedekind & Milinski, 2002)

- Eight groups of ten students undertook the indirect reciprocity game
- Each student received a starting account of \$25
- Subjects played once per round (6 rounds in total) as a 'donor' and as a 'receiver'
- The benefit of giving for the receiver was \$3, whereas the cost for the donor was \$1
- Students knew they would never meet the same student again in alternated roles—direct reciprocity was excluded
- The choices of all players over all rounds was visible to everyone in the group

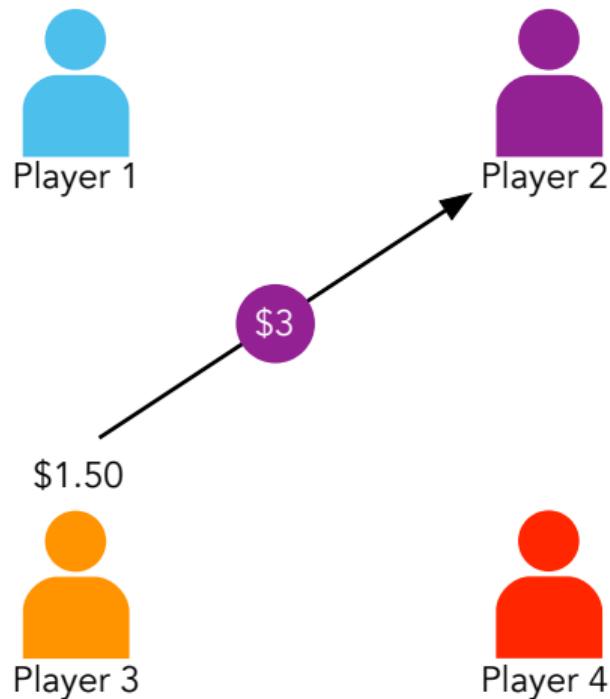
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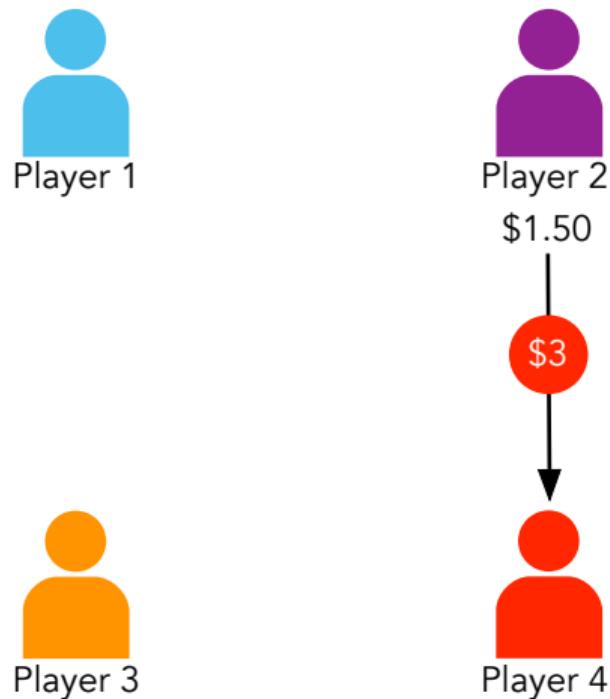
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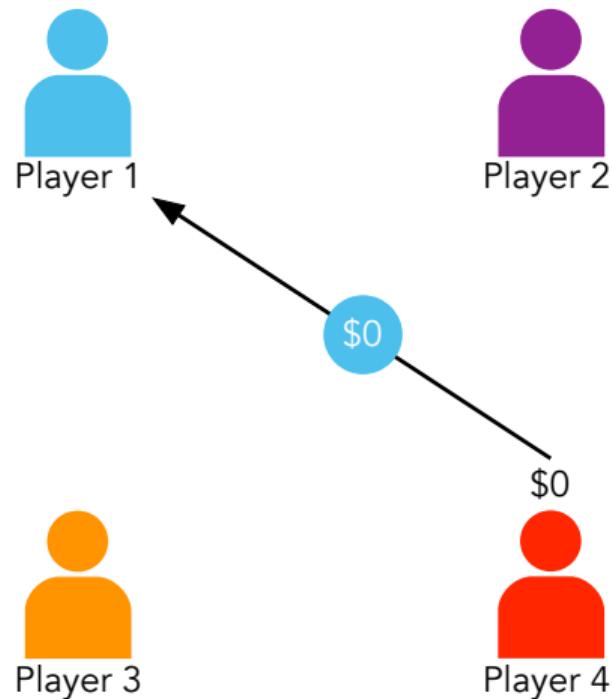
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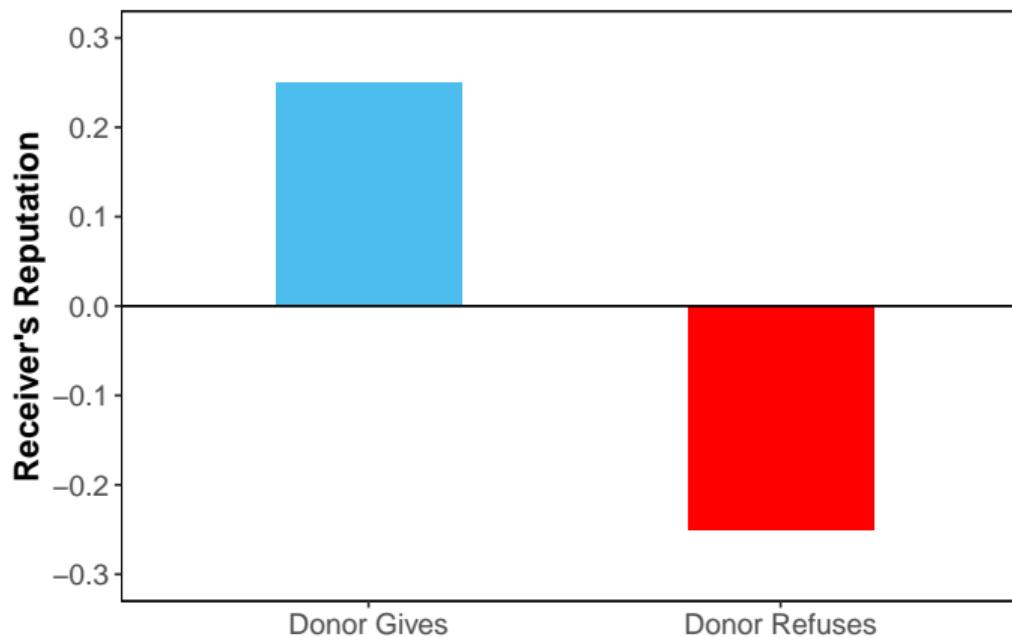
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Reputation Helps Solve ‘The Tragedy of The Commons’

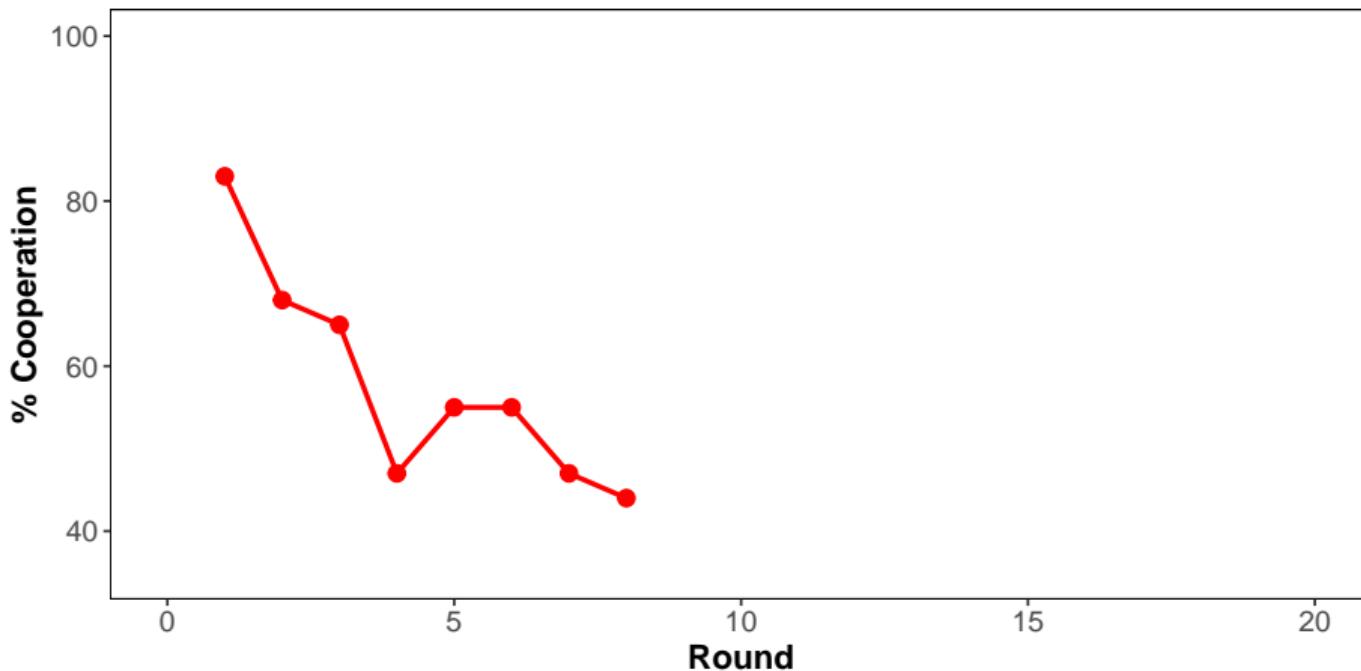
Reputation Helps Solve The ‘Tragedy of The Commons’ (Milinski et al. 2002)

- Individuals and groups often participate in multiple social games simultaneously
- The interaction of these games may provide a way to maintain a public resource
- To profit in indirect reciprocity situations, one must build up and maintain a good reputation (image score or standing)
- If public goods and indirect reciprocity alternate, it would be worth not damaging one's reputation in a public goods game by withholding help, because one meets the same co-players in both situations

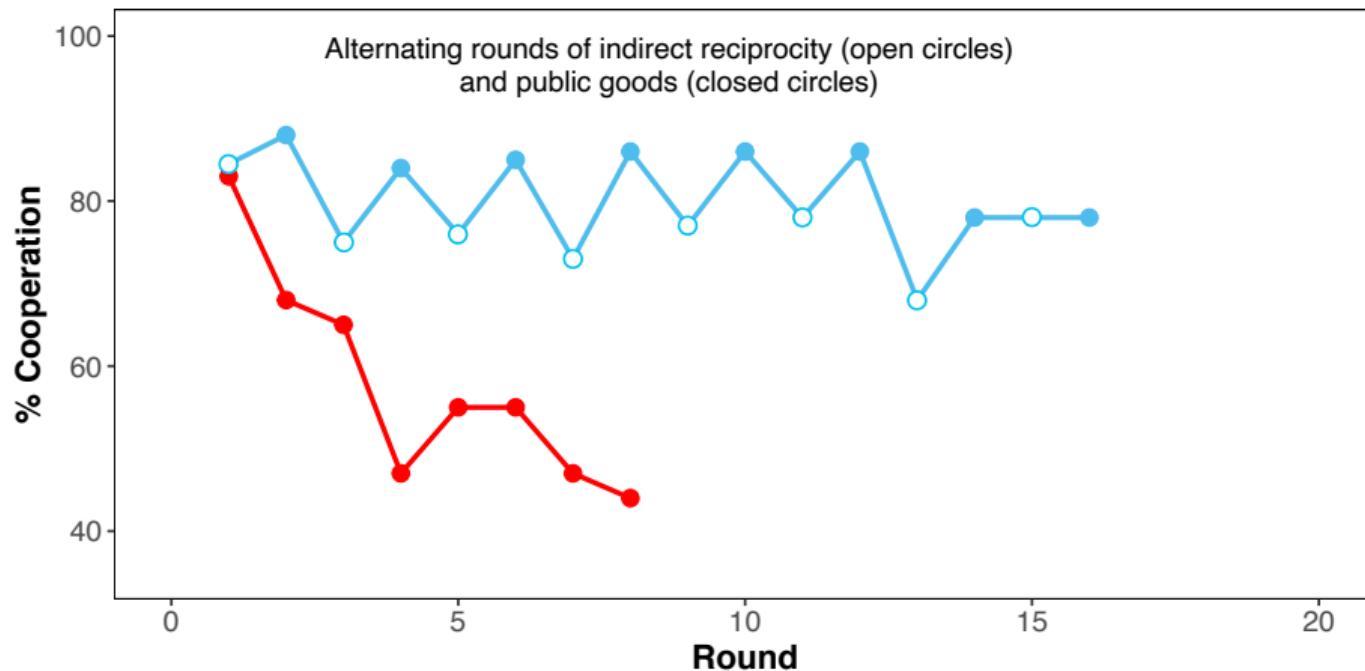
Reputation Helps Solve The ‘Tragedy of The Commons’ (Milinski et al. 2002)

- Ten groups of six students played **eight indirect reciprocity rounds alternated with eight public goods rounds**
- The rules of the games and the complete game itself were projected on a screen for all to see
- Thus everybody had complete information about everything except for the real identity of the players
- All players had individual pseudonyms that lasted through the games permitting reputation transfer from public goods to the indirect reciprocity game

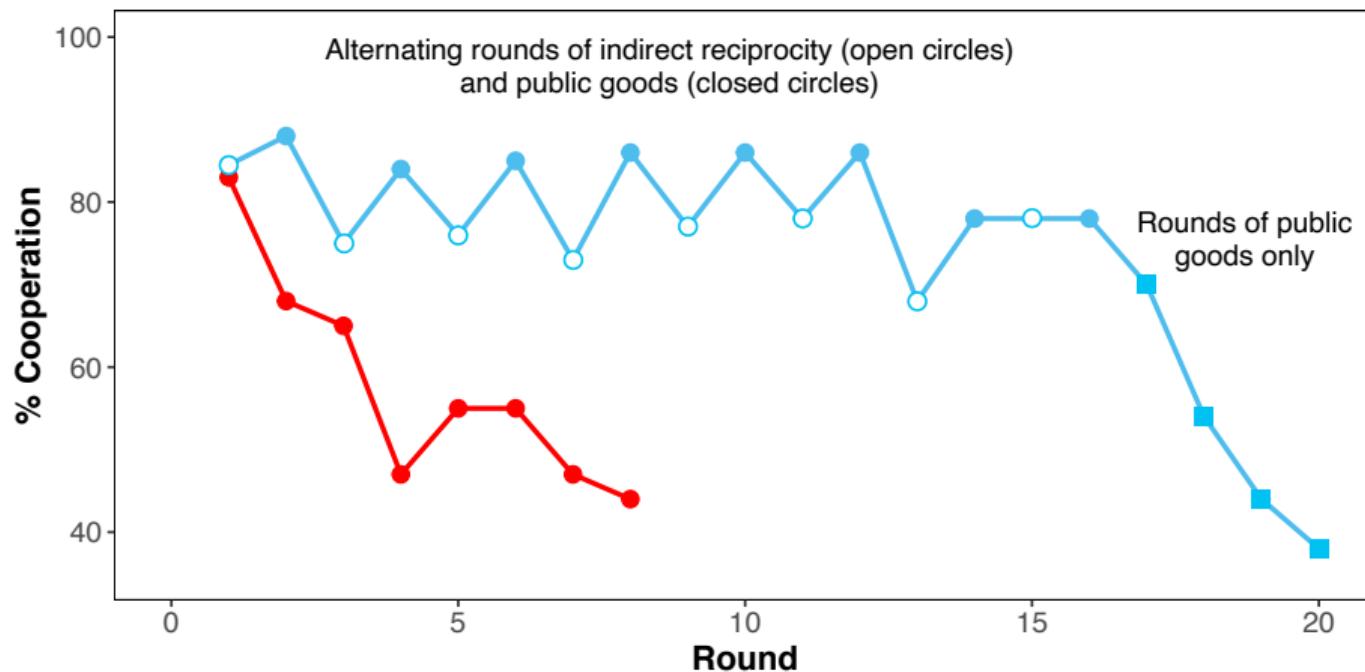
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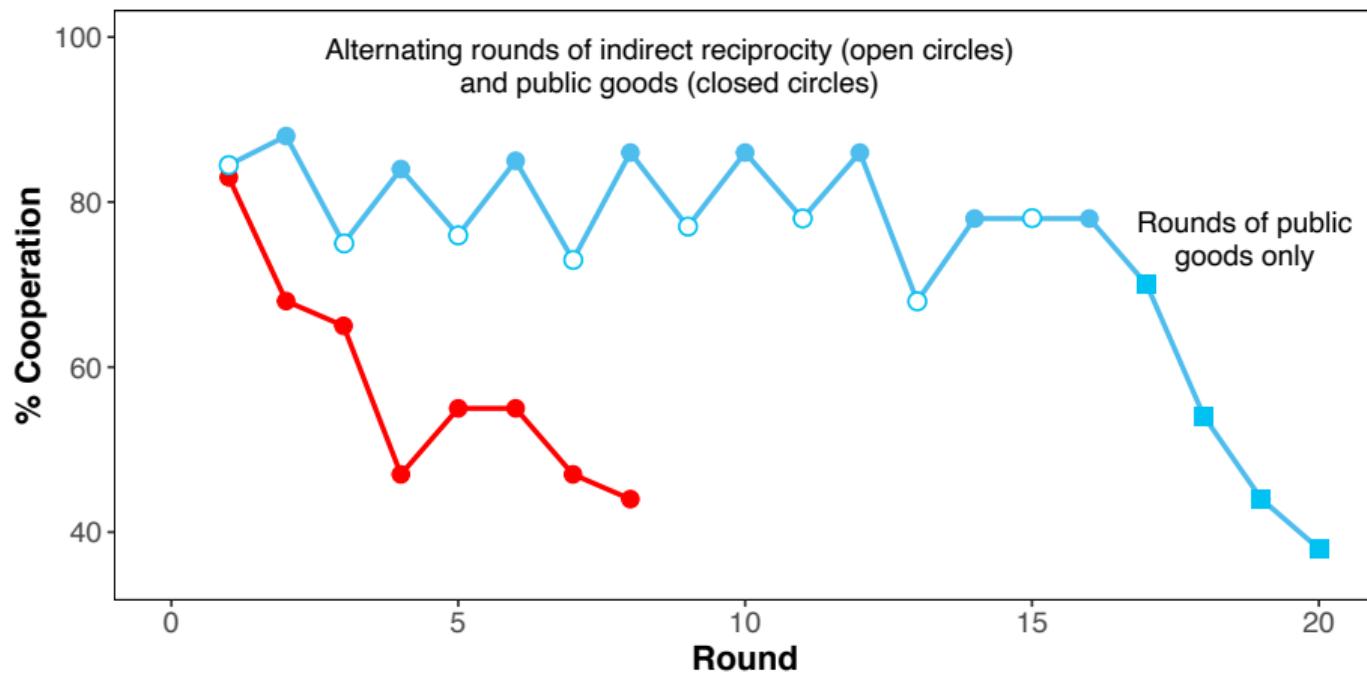
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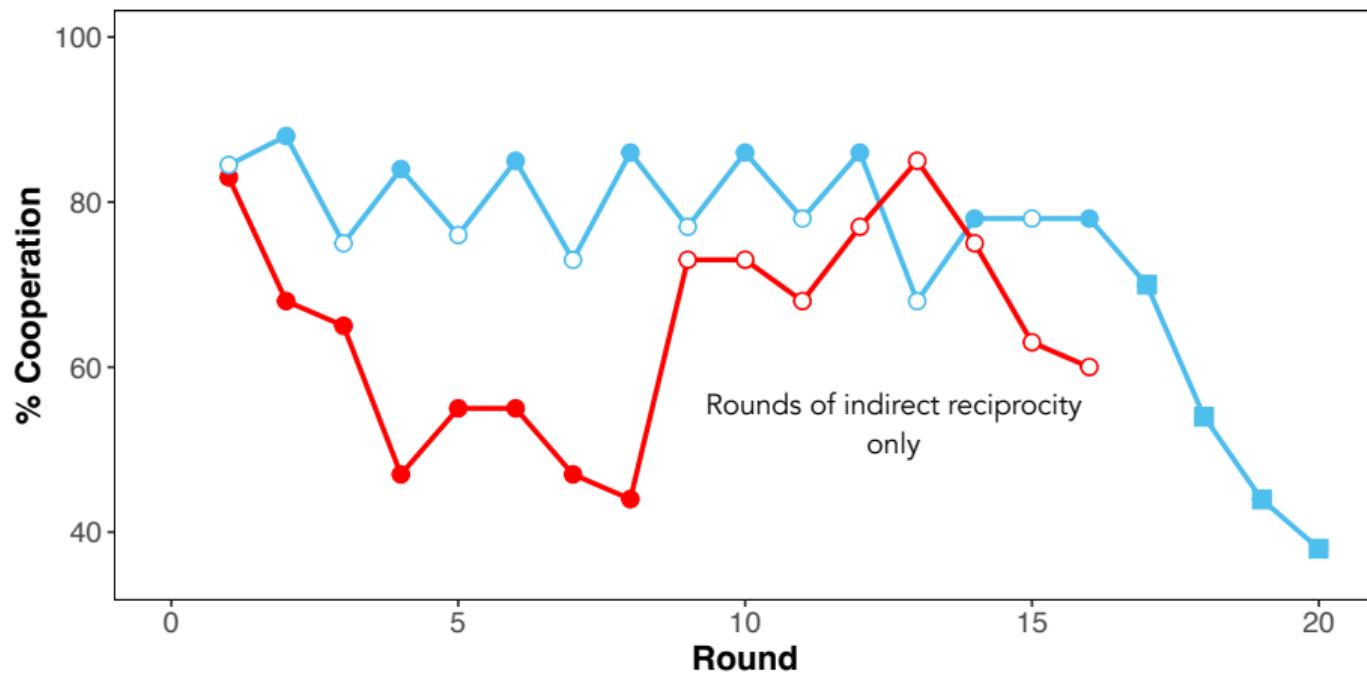
Reputation Helps Solve The ‘Tragedy of The Commons’ (Milinski et al. 2002)

- Another nine groups of six students played **eight rounds of public goods followed by eight rounds of indirect reciprocity**

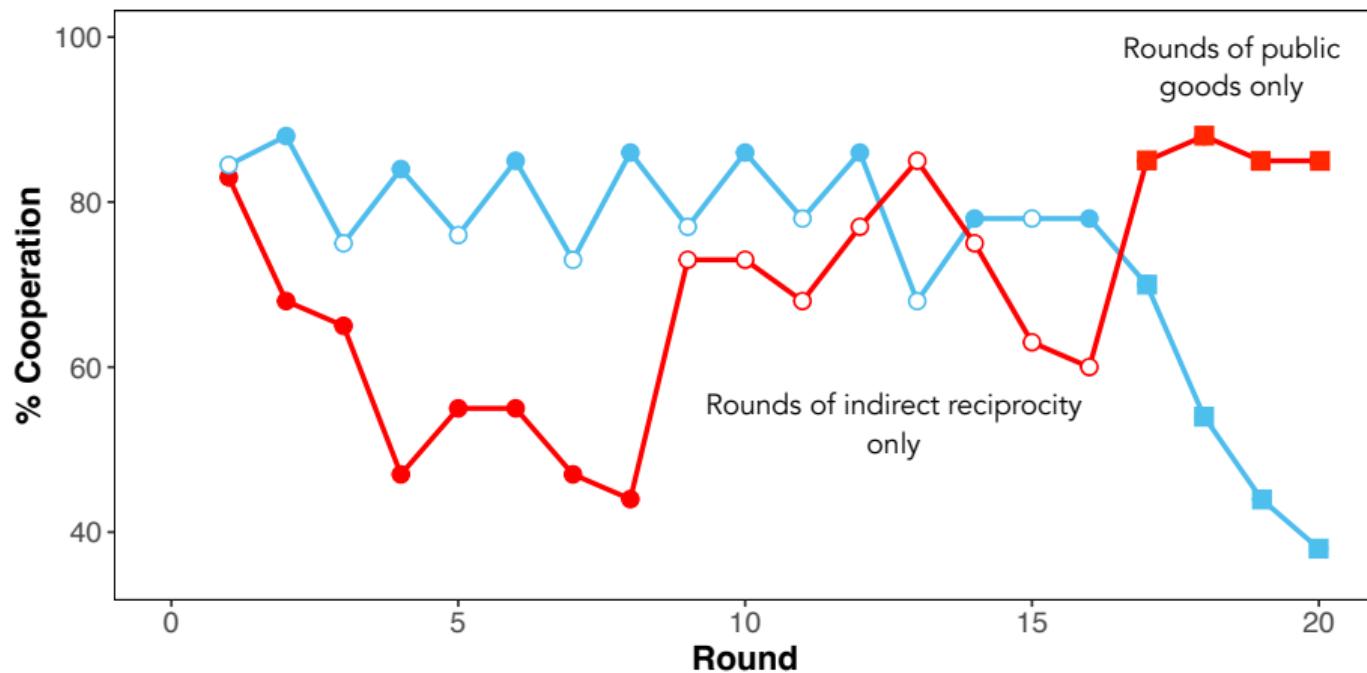
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Reputation Helps Solve The ‘Tragedy of The Commons’ (Milinski et al. 2002)

- Reputation can maintain all-around contributions to public goods in the absence of a special punishing rule
- The potential donor actually saves money by refusing to give, whereas punishing would be costly
- Other studies show that cooperation in the prisoners’ dilemma increases when randomly selected partners can observe one another’s reputation for cooperating on the previous round (Pfeiffer et al., 2012; Wedekind & Braithwaite, 2002)
- The need for becoming trustworthy in a future trust game maintains cooperation during a preceding public goods game (Barclay, 2004)

Strategic Investment in Reputation

Strategic Investment in Reputation

- People are aware their current behaviour might affect future gains depending on whether their reputation for helping can be observed in some future scenario
- If people know their reputation for cooperating in one situation will be unobservable in a future situation, will they cooperate less than if they know that their reputation is observable?
- In other words, do people invest strategically in their reputation?

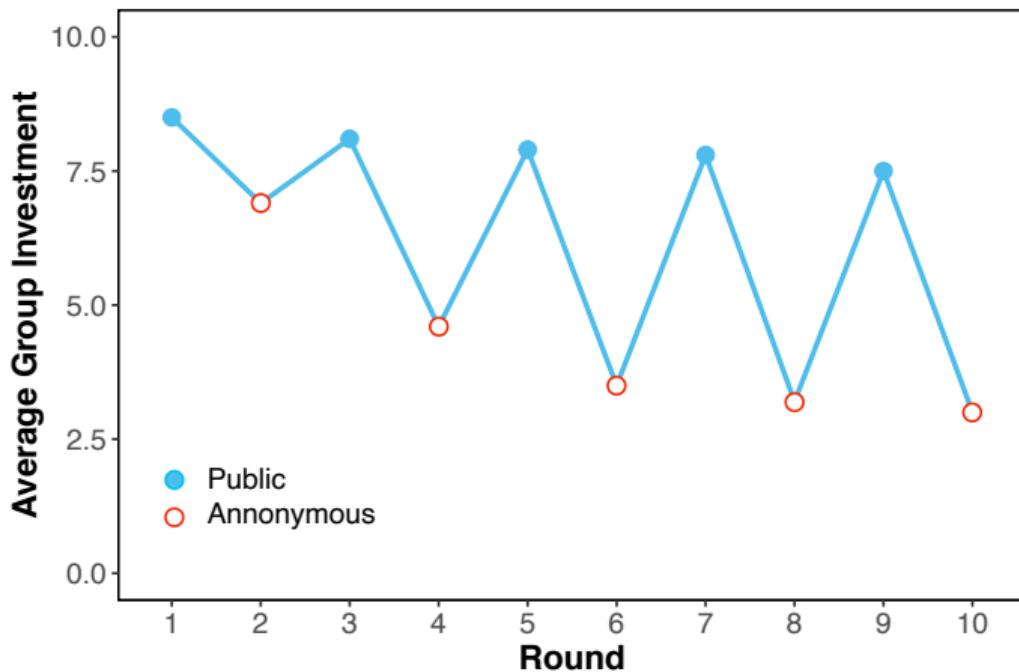
Strategic Investment in Reputation: Milinski et al. (2006)

- Climate cooperation game:
 - Groups of six players given \$12 operating fund and could invest \$0, \$1, or \$2 into a climate account over 10 rounds
 - Any money invested in the climate account was doubled in value and used to fund a press advertisement on climate protection
- Indirect reciprocity game:
 - On each round, players adopted the role of 'donor' or 'receiver' once
 - When given the role of donor, a player had to decide whether to give a reward of \$3 to another player at a cost of \$1.50 to themselves
 - When given the role of receiver, a player could potentially receive a \$3 reward from another player

Strategic Investment in Reputation: Milinski et al. (2006)

- **Reputation transfer manipulation:** on 'odd' rounds of the climate game, investments were made public, whereas on 'even' rounds they were anonymous
 - On **public rounds**, there was an incentive for players to invest in their reputations
 - On **anonymous rounds**, there was no incentive for players to invest in their reputations

Strategic Investment in Reputation: Milinski et al. (2006)



Gossip Helps Indirect Reciprocity and Increases Contributions to the Public Good

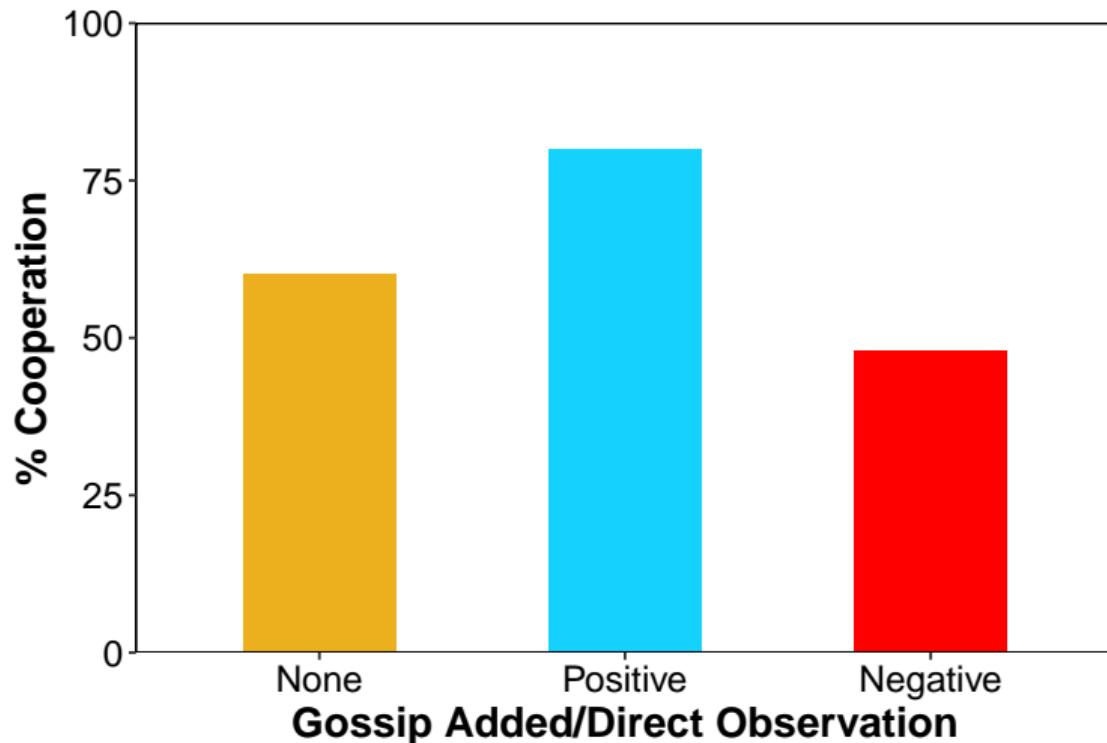
Can Gossip Substitute for Direct Observation?

- Sometimes we must choose whether to cooperate with someone whose reputation is unknown to us because we have not directly observed their social interactions with others
- Can gossip—spread by those who have observed that person's interactions with others—replace direct observation?

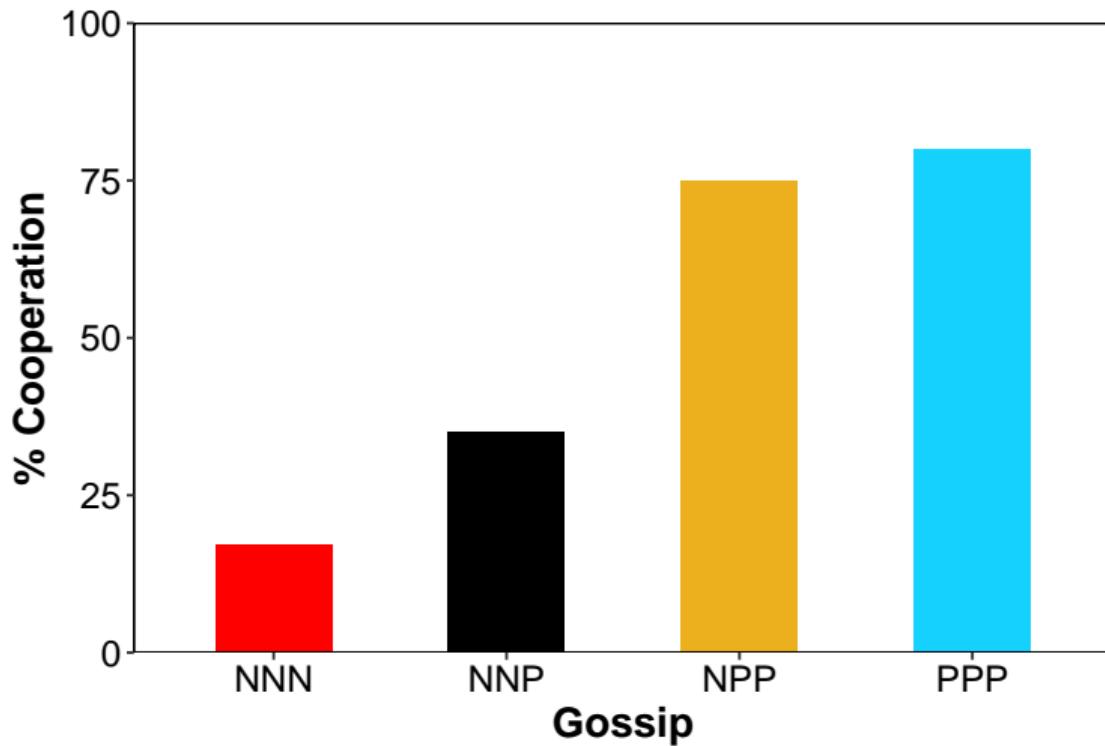
Gossip Helps Indirect Reciprocity (Sommerfield et al., 2008)

- Groups of twelve students played the indirect reciprocity game
- **Initial indirect reciprocity rounds:** donors informed about all previous decisions of their receivers (e.g., 'YES', 'NO', 'YES')
- **Gossip rounds:** each subject given all previous decisions of another subject and asked to write a short comment about that person
- **Subsequent indirect reciprocity rounds:**
 1. **Direct observation condition:** all six previous YES/NO decisions of their receiver
 2. **Gossip condition:** a set of three gossip statements about their receiver written by three different subjects on their YES/NO list

Gossip Helps Indirect Reciprocity (Sommerfield et al., 2008)



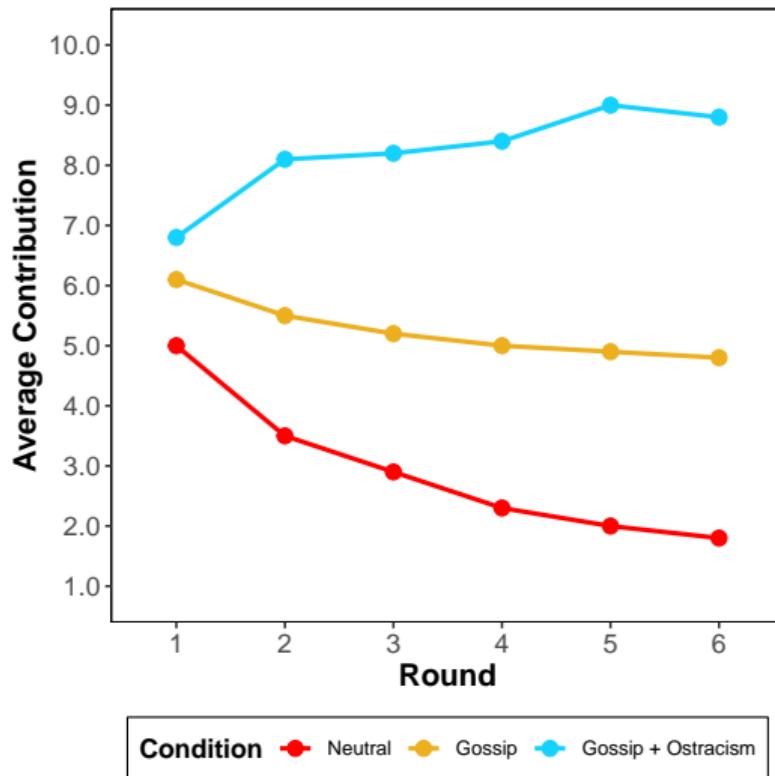
Gossip Helps Indirect Reciprocity (Sommerfield et al., 2008)



Gossip in Public Goods Games

- Two studies (Feinberg et al., 2004; Wu et al., 2016) had groups of four subjects play a public goods game, with subjects exchanged such that no two met again
- After each round, subjects learned how much each co-player had contributed
- Both studies include a pure public goods game (control) and a public goods game after which participants wrote gossip about one (Feinberg et al., 2014) or up to three (Wu et al., 2016) individuals that were presented to those others new group members
- Feinberg et al. (2014) had an extra condition combining gossip with ostracism—one subject could be excluded by an anonymous majority vote from playing the upcoming round after group members received gossip from subjects from the previous round

Gossip in Public Goods Games (Feinberg et al., 2014)



Reputation Effects Outside The Laboratory

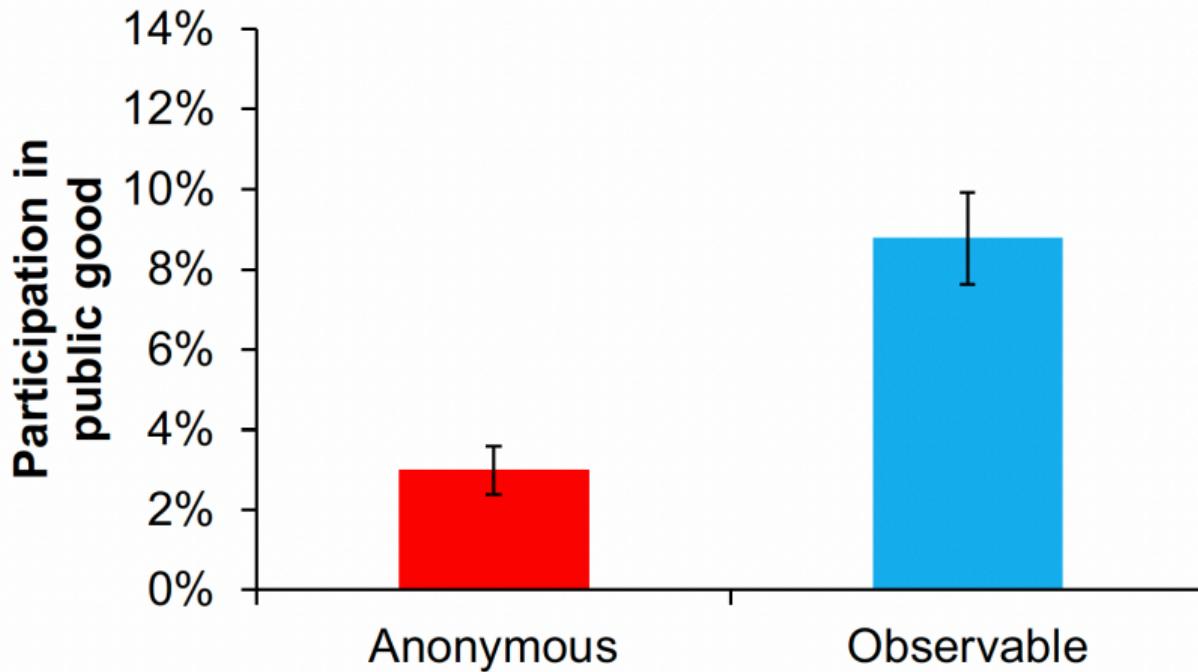
Powering Up With Indirect Reciprocity (Yoeli et al., 2013)

- Studied household participation in a voluntary “demand response” program—a real-world public good—to prevent energy blackouts in California
- Volunteers were solicited by delivering paper advertisements to residents asking them to participate
- Sign-up sheets were posted in a communal area near their home, usually by a shared mailbox kiosk
- **Key manipulation:** vary whether resident’s neighbours could tell who had signed up for the program
 - **Observable treatment:** residents print their name and unit number
 - **Anonymous treatment:** residents print a code that does not reveal their identity

Powering Up With Indirect Reciprocity (Yoeli et al., 2013)



Powering Up With Indirect Reciprocity (Yoeli et al., 2013)



Publicising Names of Donors Increases Blood Donations (Lacetera & Macis, 2010)

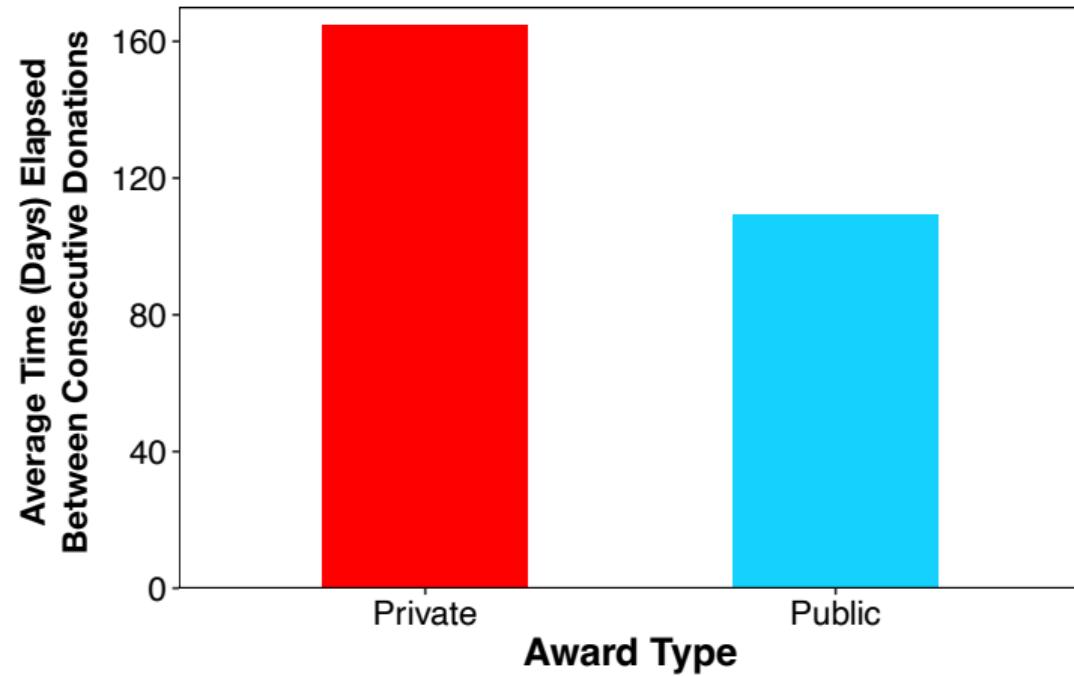
- Examined longitudinal data on the entire population of blood donors in an Italian town
- Participation is encouraged using a nonlinear award scheme that rewards donors with symbolic prizes (medals) when they reach certain donation quotas
- Initial awards, which require smaller numbers of accumulated donations, are “private”—donors collect their award at a local office
- Subsequent awards, which require larger numbers of accumulated donations, are “public”—donors collect their award at a public ceremony and their name is published in a local newspaper

Publicising Names of Donors Increases Blood Donations (Lacetera & Macis, 2010)

Category	Award	Required accumulated donations
Private	Merit certificate	8
	Bronze medal	16
	Silver medal	24
Public	Golden medal	50
	Golden pin	75
	Golden cross	100

Note—the minimum required number of days between consecutive donations is 90

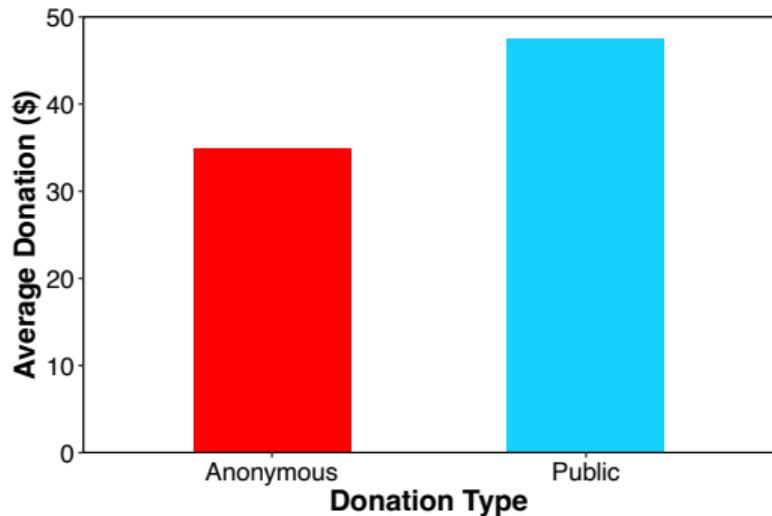
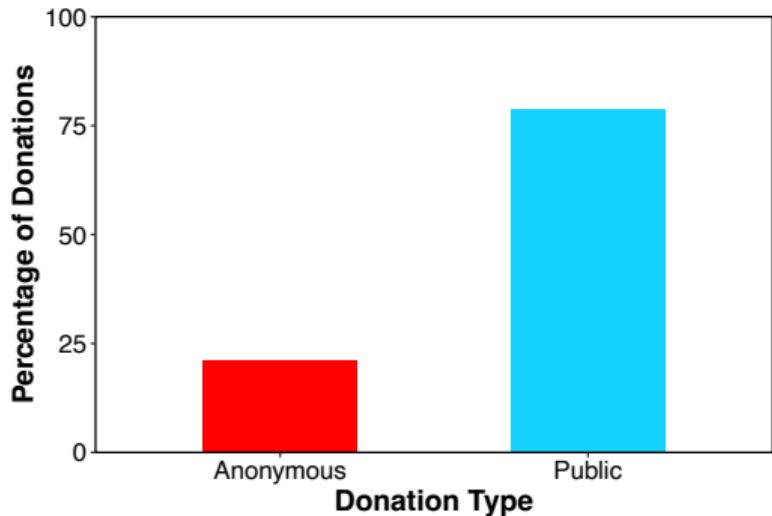
Publicising Names of Donors Increases Blood Donations (Lacetera & Macis, 2010)



Publicising Names of Donors Increases Charitable Donations (Sisco & Weber, 2019)

- Analysed donations made on the GoFundMe platform between 2011 and 2016
- A dataset of 558,067 online donations worth more than \$44,000,000
- Donors can choose to make their donations anonymous or public
- Compare the frequency and amounts of anonymous and public donations

Publicising Names of Donors Increases Charitable Donations (Sisco & Weber, 2019)



Summary and Conclusions

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- When individuals, groups, or countries are free to overuse a public good, they usually overuse it
- Reputation provides a solution to this ‘tragedy of the commons’ problem:
 - When maintaining a public resource is alternated with another social game for which a good reputation is profitable, the public good is sustained
- People strategically invest to preserve their good reputation dependent on whether their decisions are known or unknown in another social situation
- A person’s reputation does not have to be directly observable—gossip is also a powerful tool to promote trust and cooperation

Summary and Conclusions

- There are many examples of reputation effects in real-world settings
- Relief organisations can collect more money and other resources by offering a way by which donations can be made public
- A good reputation is a valuable currency accumulated during observable actions
- Direct observation, gossip, and modern communication systems can transmit the signal
- Many social interactions are based on a person's trustworthiness, which has a name, reputation

Don't Lose Your Reputation