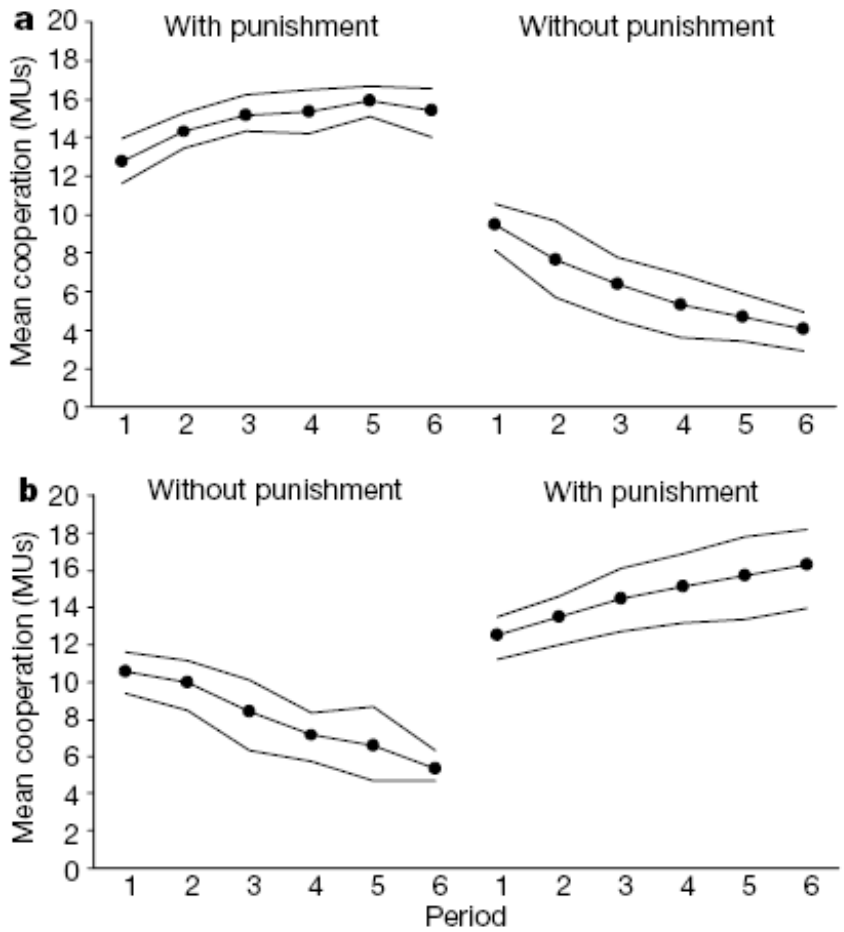
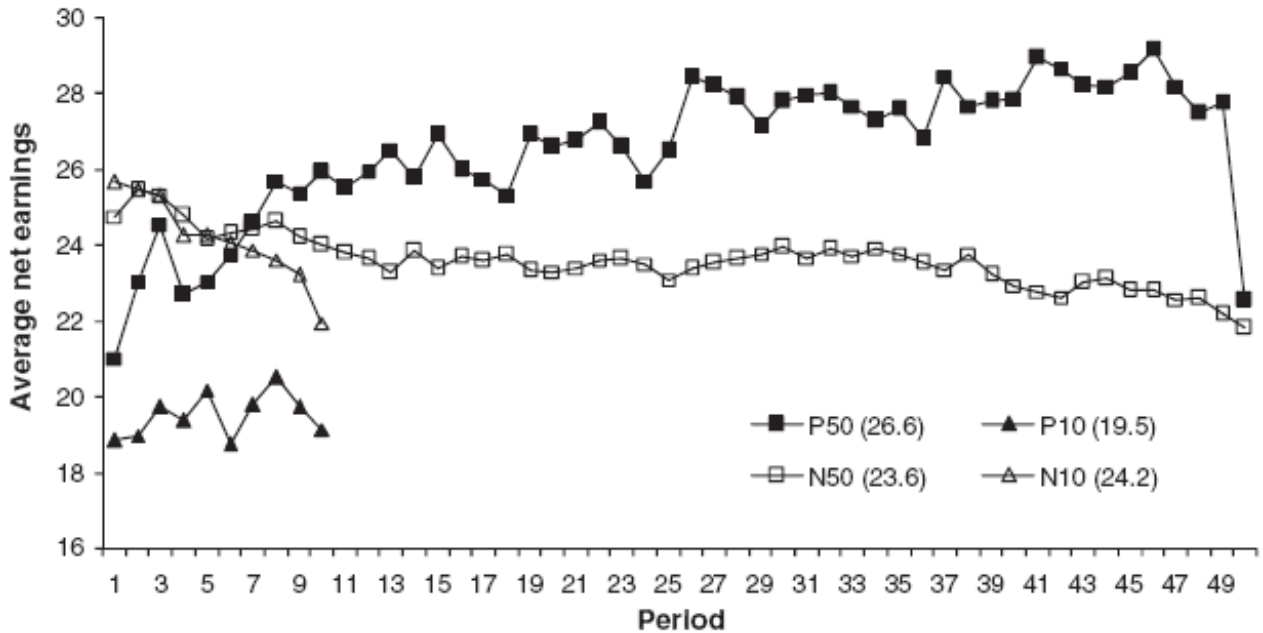
Punishment

- **Altruistic Punishment** Fehr & Gächter 2002
- Design
  - VCM: $n = 4$, $e = 20$, 20 periods, MPCR = 0.4, perfect strangers matching
  - Treatment 1: no punishment
  - Treatment 2: punishment
    - The costs 1 to inflict 3 points of damage
- Result
  - Punishment increases cooperation
    - But not necessarily earnings



Benefits of Punishment

- **The Long-Run Benefits of Punishment** Gächter et al. 2009
- Design
  - VCM: $n = 3$, $e = 20$, MPCR = 0.5, partners matching, costs 1 to damage by 3
  - Treatment variation 1: punishment / no punishment
  - Treatment variation 2: 10 periods / 50 periods
- Result
  - Punishment increases earnings in the long run but not the short run

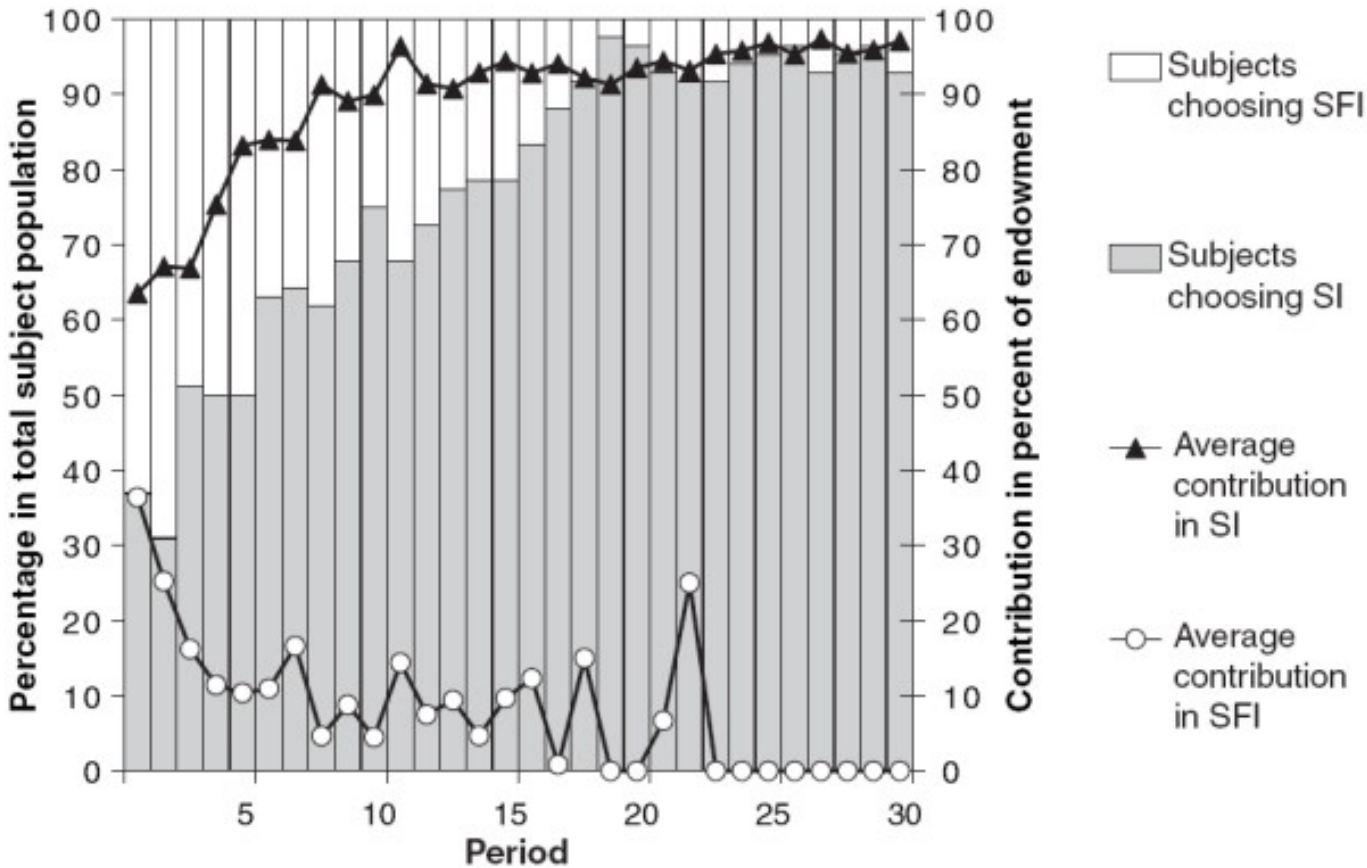


Implementing punishment

- **Choosing to be in a punishing society** Gürerk et al. 2006
  - Punishment works but do subjects choose to live in a world with punishment?
- **Design**
  - VCM: n = 1-12, e = 20+20, 30 periods, MPCR = 1.6 / n
  - 2 institutions/groups
    - Punishment
    - No punishment
  - 3 stages
    - Stage 0: choose group
    - Stage 1: contribution stage
    - Stage 2: punishment stage (only in punishment group)
      - The cost of punishment is 1 point for 3 points of damage

Implementing punishment

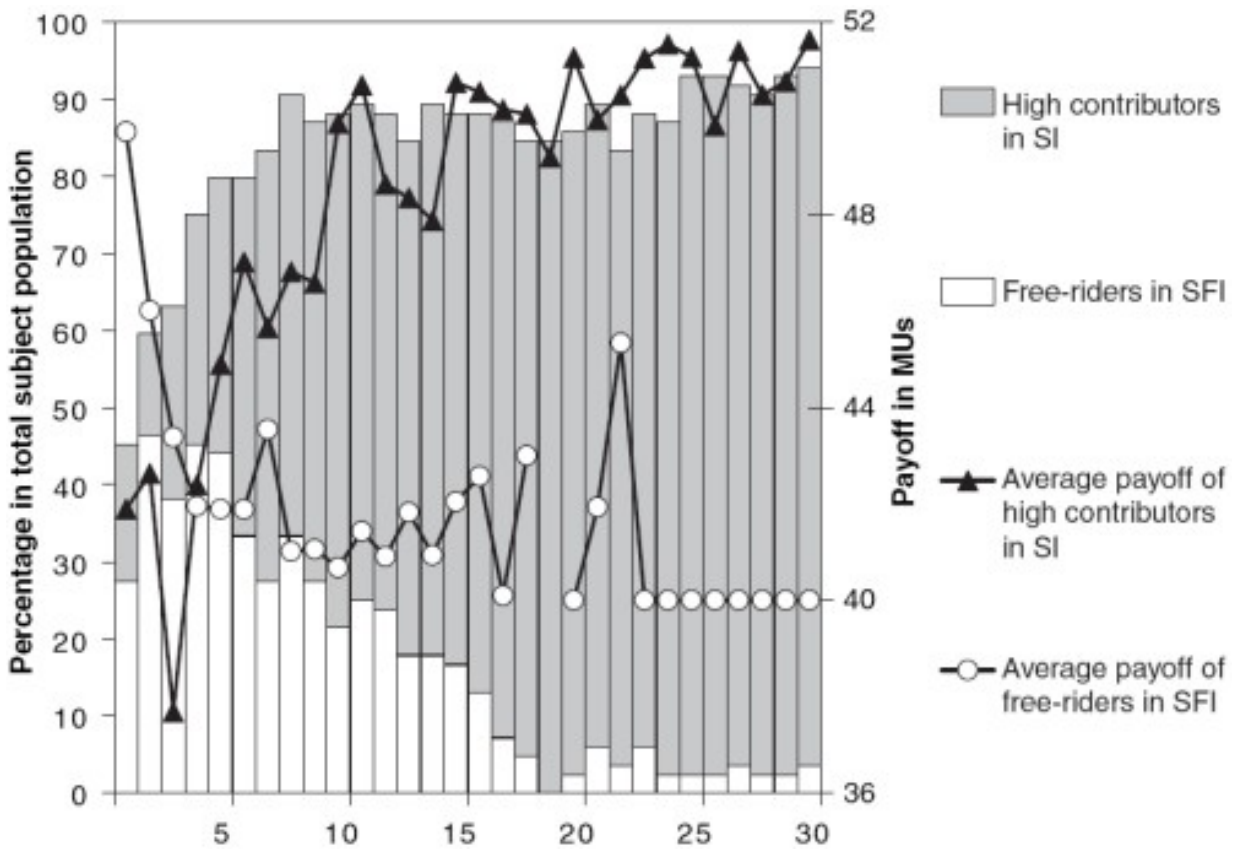
- **Choosing to be in a punishing society** Gürerk et al. 2006



- **Results**
  - By the end of the game almost everyone 'lives' in the punishment group and is cooperating fully

Implementing punishment

- **Choosing to be in a punishing society** Gürerk et al. 2006



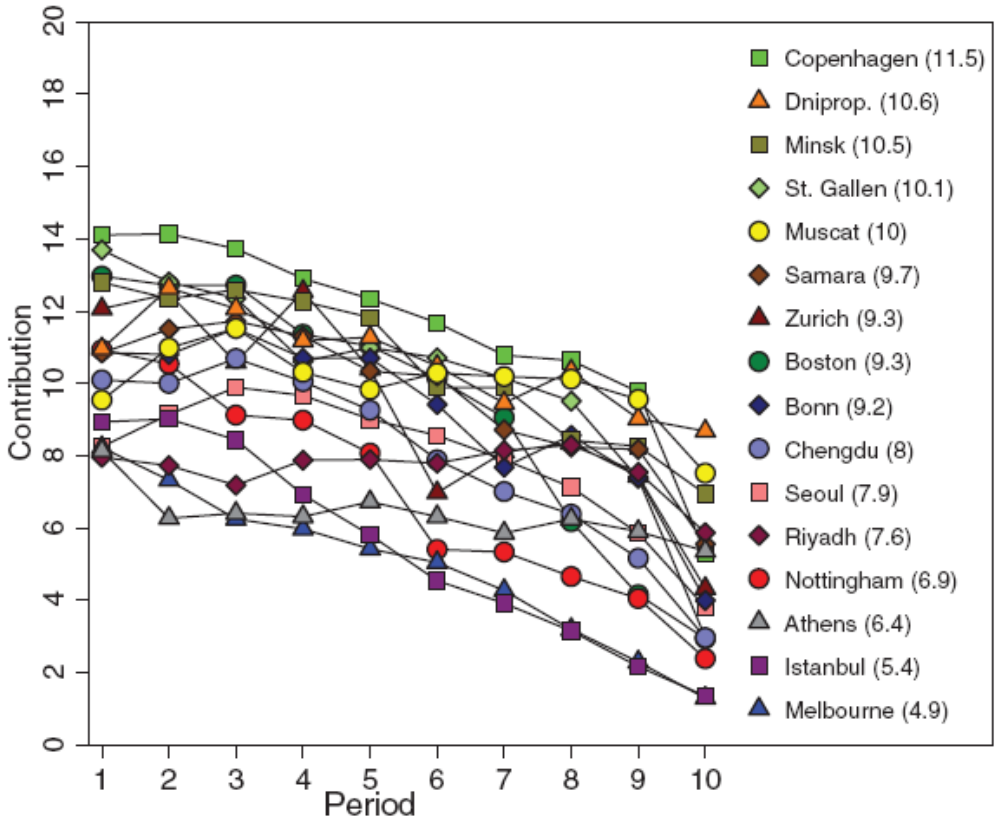
- **Results**
  - As of period 4, high contributors make higher earnings in the punishment group than free-riders in the non-punishment group

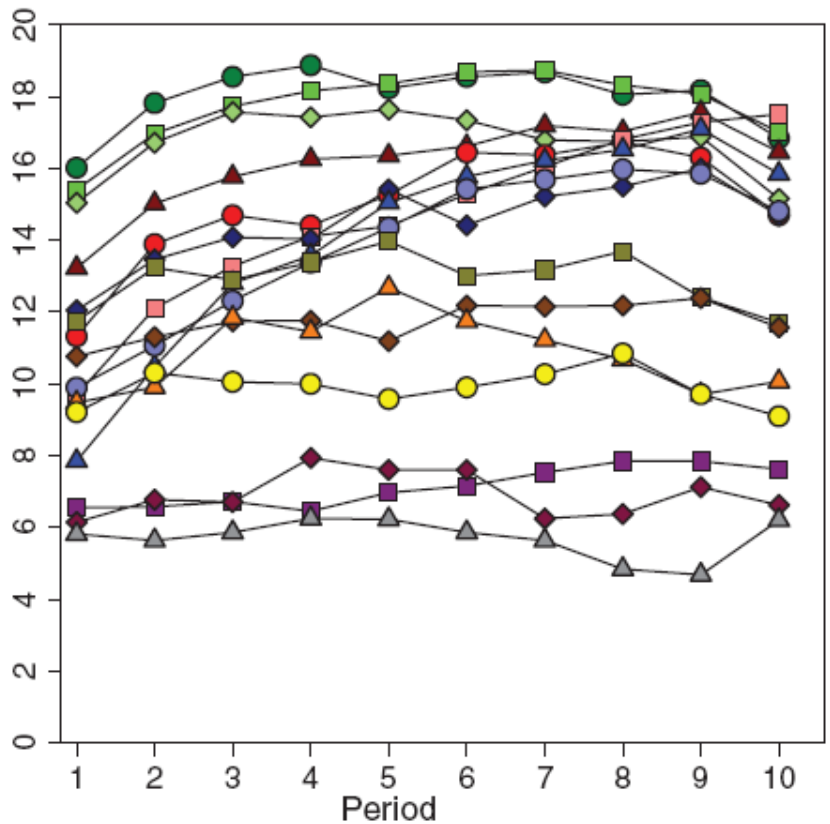
Punishment across societies

- **Is punishment pervasive across societies?** Herrmann et al. 2008
  - Most experiments are done in western countries
  - Is punishment used and does it increase contributions in other societies?
- Design
  - VCM: $n = 3$, $e = 20$, MPCR = 0.5, partners matching, costs 1 to damage by 3
  - Treatments: punishment / no punishment
  - Run in various cities
    - Boston, Nottingham, Copenhagen, Bonn, Zurich, St. Gallen, Minsk, Dnipropetrovs'k, Samara, Athens, Istanbul, Riyadh, Muscat, Seoul, Chengdu, Melbourne

Punishment across societies

- **Is punishment pervasive across societies?** Herrmann et al. 2008
  - Punishment is pervasive but it does not always increase contributions
    - Works: Boston, Nottingham, Copenhagen, Bonn, Zurich, St. Gallen, Minsk, Seoul, Chengdu, Melbourne
    - Did not work: Dnipropetrovs'k, Samara, Athens, Istanbul, Riyadh, Muscat





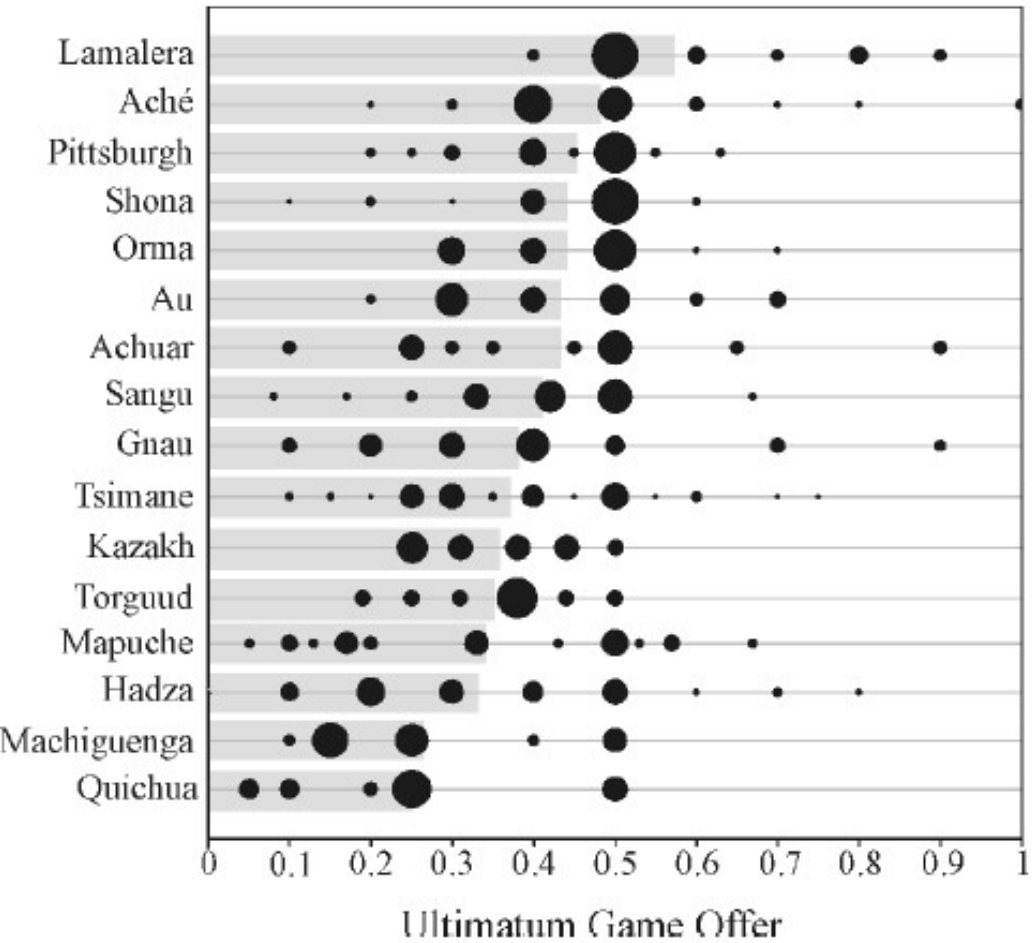
15 small-scale societies

- **Ultimatum games in small-scale societies** Hendrich et al 2001
  - Large variation in living styles
    - From nomadic foragers to sedentary farmers,
    - From tropical forests to a high-altitude desert

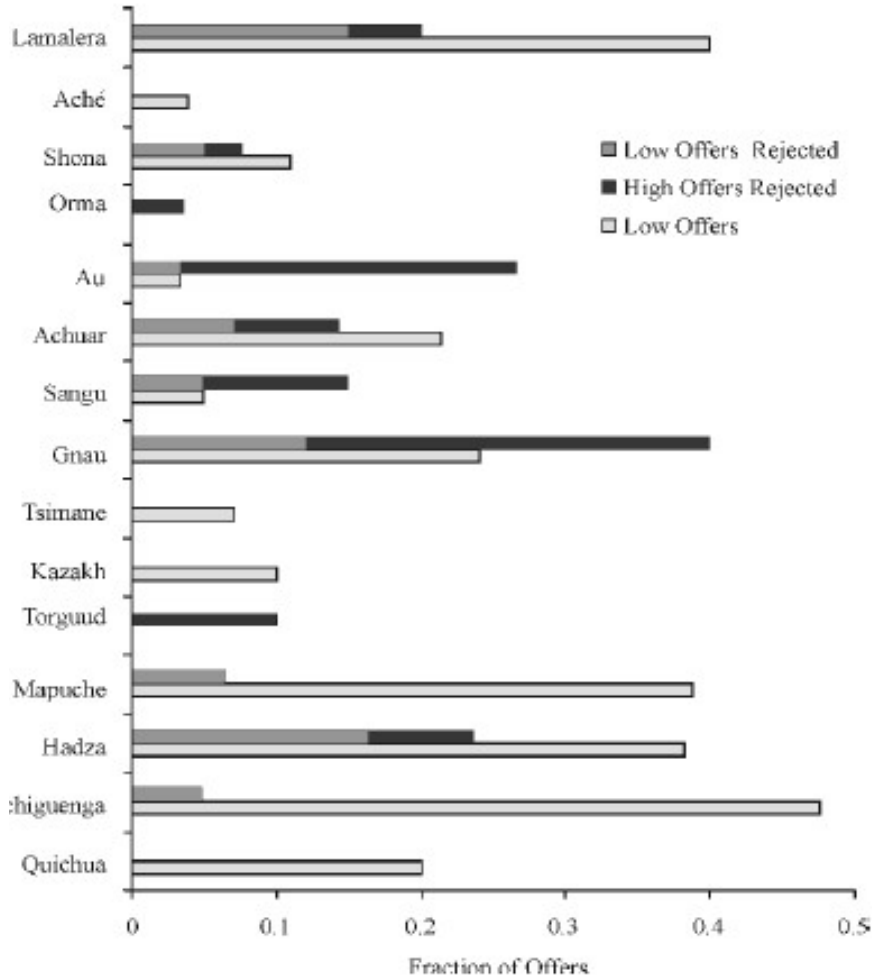
15 small-scale societies

- **Ultimatum games in small-scale societies** Hendrich et al 2001
  - Results

Offers

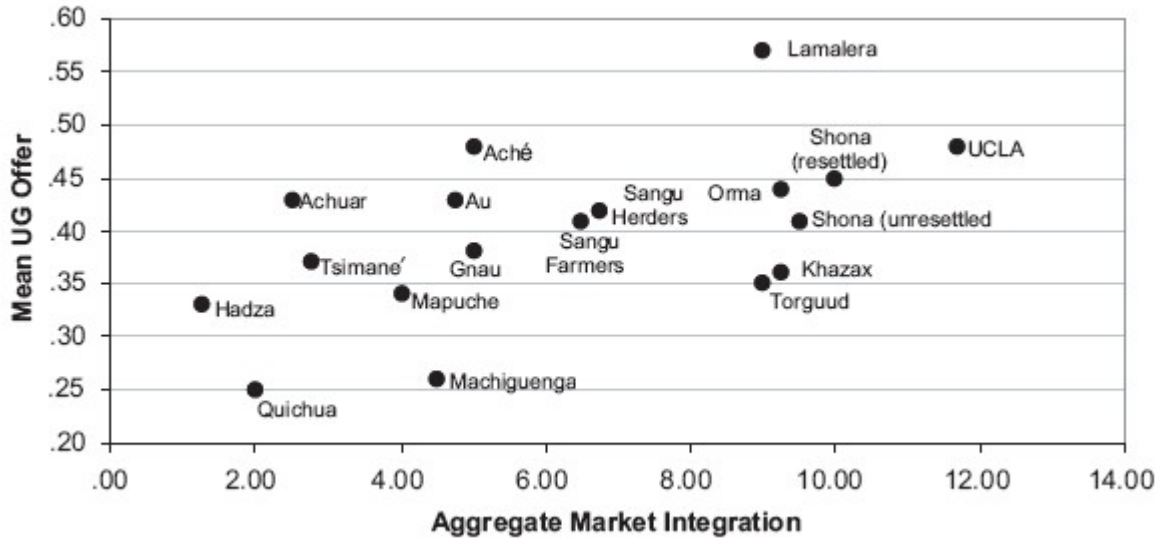


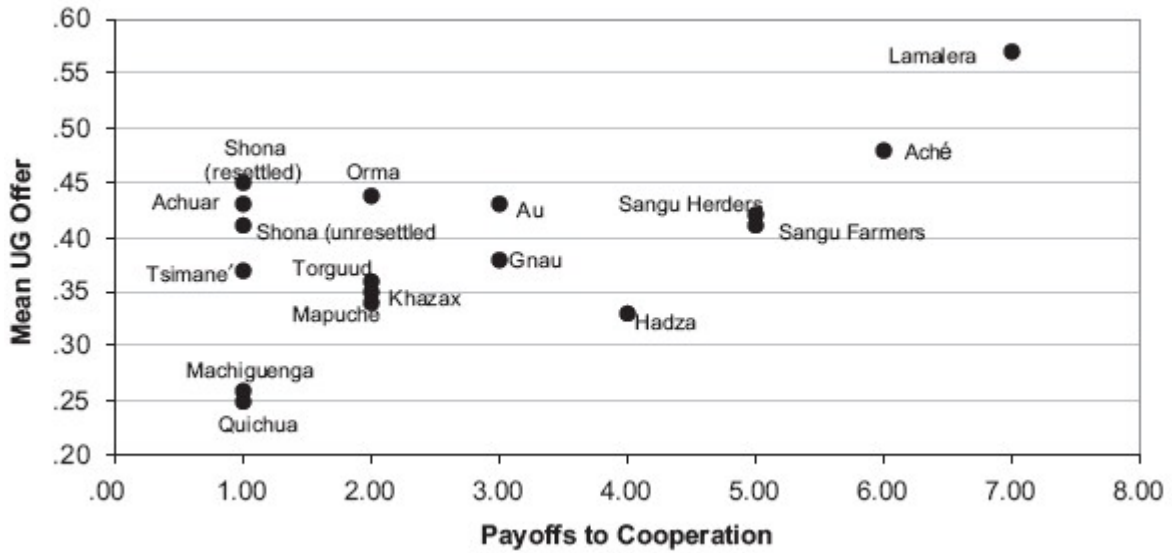
Rejection



15 small-scale societies

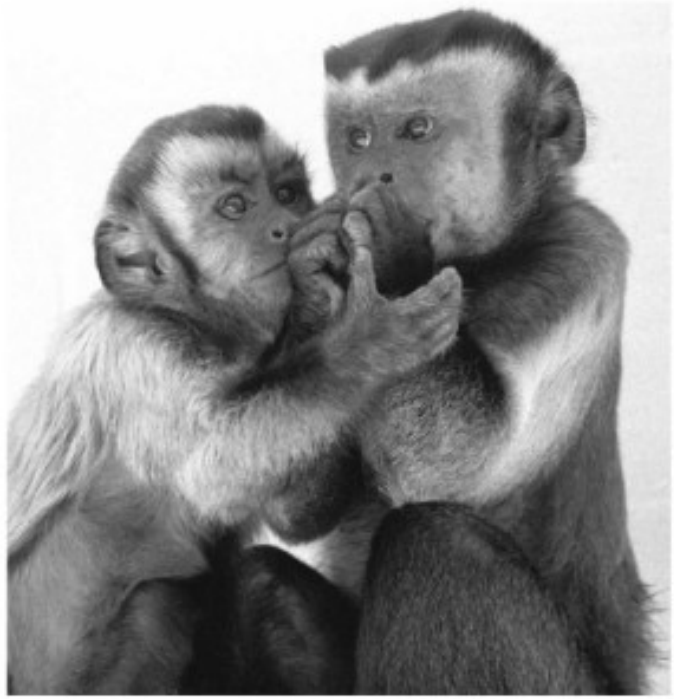
- **Ultimatum games in small-scale societies** Hendrich et al 2001
  - Results
    - Positive relationship between importance of cooperation and high offers
    - Positive relationship between market integration and high offers





Punishment across societies

- **Conclusion**
  - Can something be concluded about culture with unrepresentative samples?
    - Gächter & Herrmann (2006) find more variation between rural Russian subjects and Russian students than between the latter and German students
  - We can still say that punishment is a robust phenomena across cultures
    - Even monkeys reject "Unequal Pay" (Brosman & de Waal 2003)

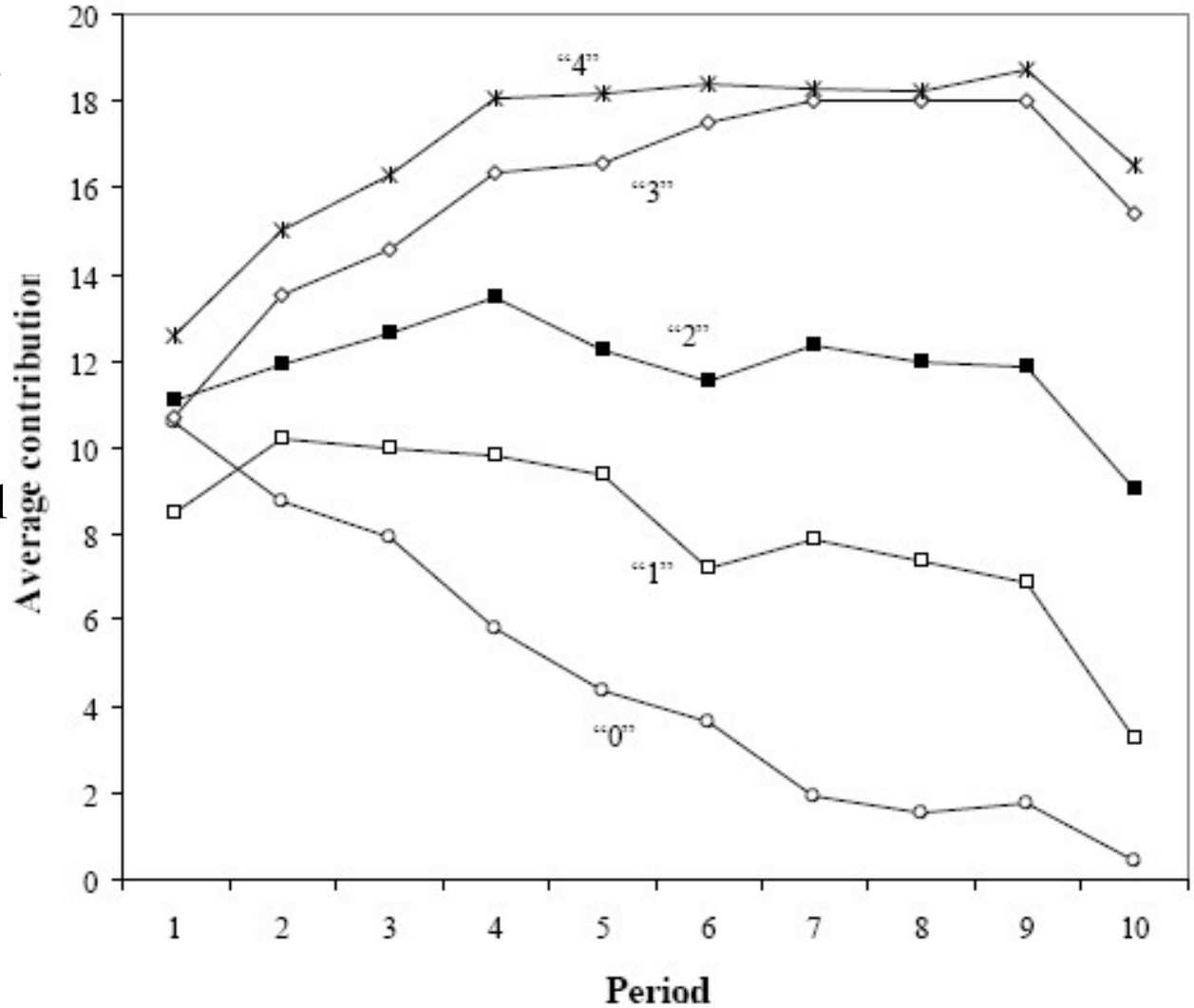


The economics of punishment

- **The effectiveness of punishment** Nikiforakis and Normann 2008
  - How sensitive is the effect of punishment to price changes
- **Design**
  - Public good game with punishment
    - $e = 20$, $n = 4$, MPCR = 0.4, 10 periods, partners matching
  - 5 treatments
    - No punishment
    - Costs 1 to punish by 1
    - Costs 1 to punish by 2
    - Costs 1 to punish by 3
    - Costs 1 to punish by 4

The economics of punishment

- **The effectiveness of punishment** Nikiforakis and Normann 2008
- **Results**
  - Punishment sustains cooperation with a damage/cost ratio greater than 2/1
  - Punishment increases welfare with a damage/cost ratio greater than 3/1

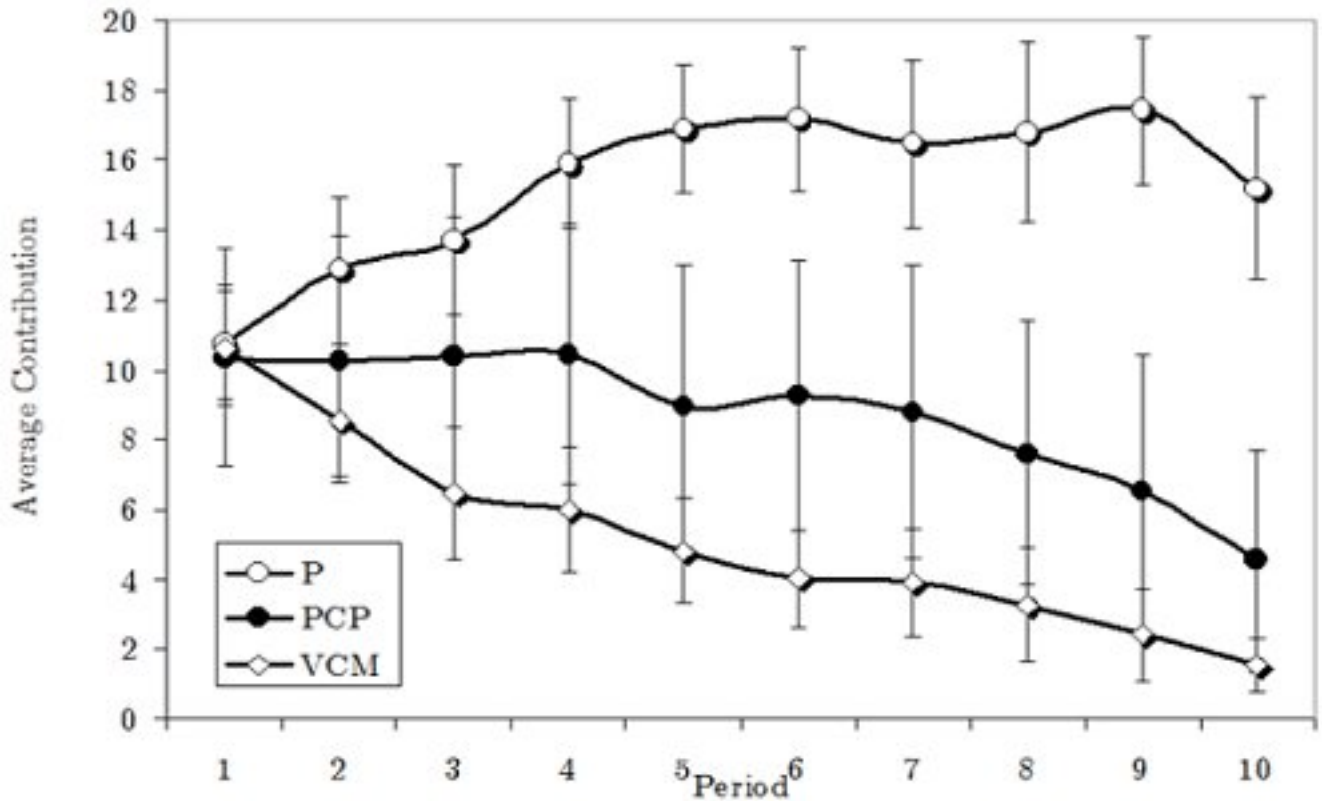


Counter-punishment

- **Retaliation** Nikiforakis 2008
  - The effect of retaliation on cooperation
- **Design**
  - Public good game with punishment
    - $e = 20$, $n = 4$, MPCR = 0.4, 20 periods
  - 3 treatments
    - No punishment
    - 1 round of punishment
    - 2 rounds of punishment

Counter-punishment

- **Retaliation** Nikiforakis 2008
  - Results
    - The availability of retaliation reduces the amount and effectiveness of punishment

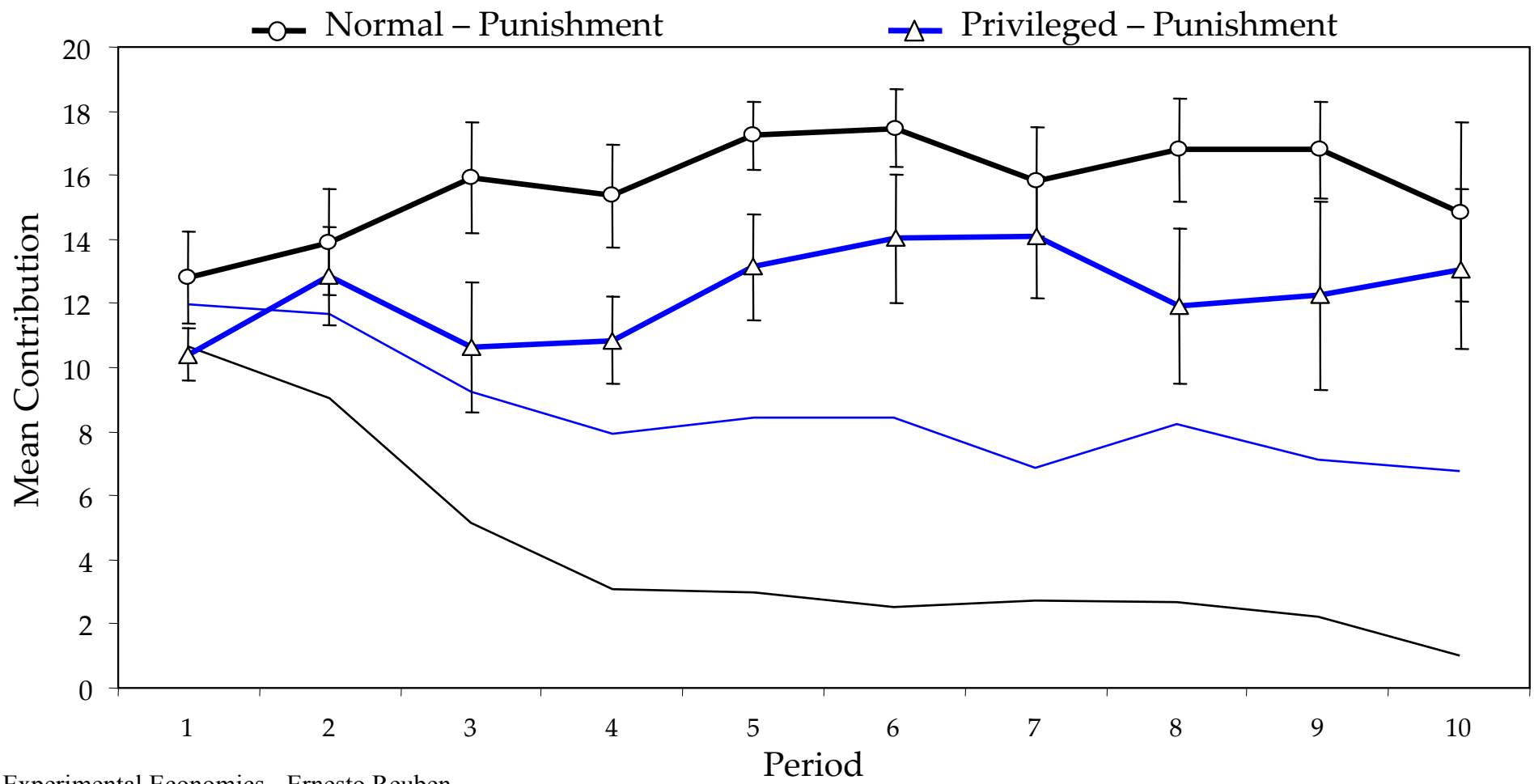


Punishment and intentions

- **Privileged groups** Reuben and Riedl 2008
  - Privileged groups are those in which some members do not have an incentive to free ride
- **Design**
  - Public good game with/without punishment
    - 10 periods, $n = 3$, $e = 20$, partners matching
  - 2 treatments
    - Normal groups: all have an MPCR = 0.5
    - Privileged groups
      - For 2 group members (low-benefit): $\pi_L = 20 - c_i + \mathbf{0.5}\sum c_j$
      - For 1 group member (high-benefit): $\pi_H = 20 - c_i + \mathbf{1.5}\sum c_j$
  - Conflict in privileged groups
    - High-benefit: My contributions help others, they should reciprocate
    - Low-benefit: The high-benefit will contribute anyway, why reciprocate?

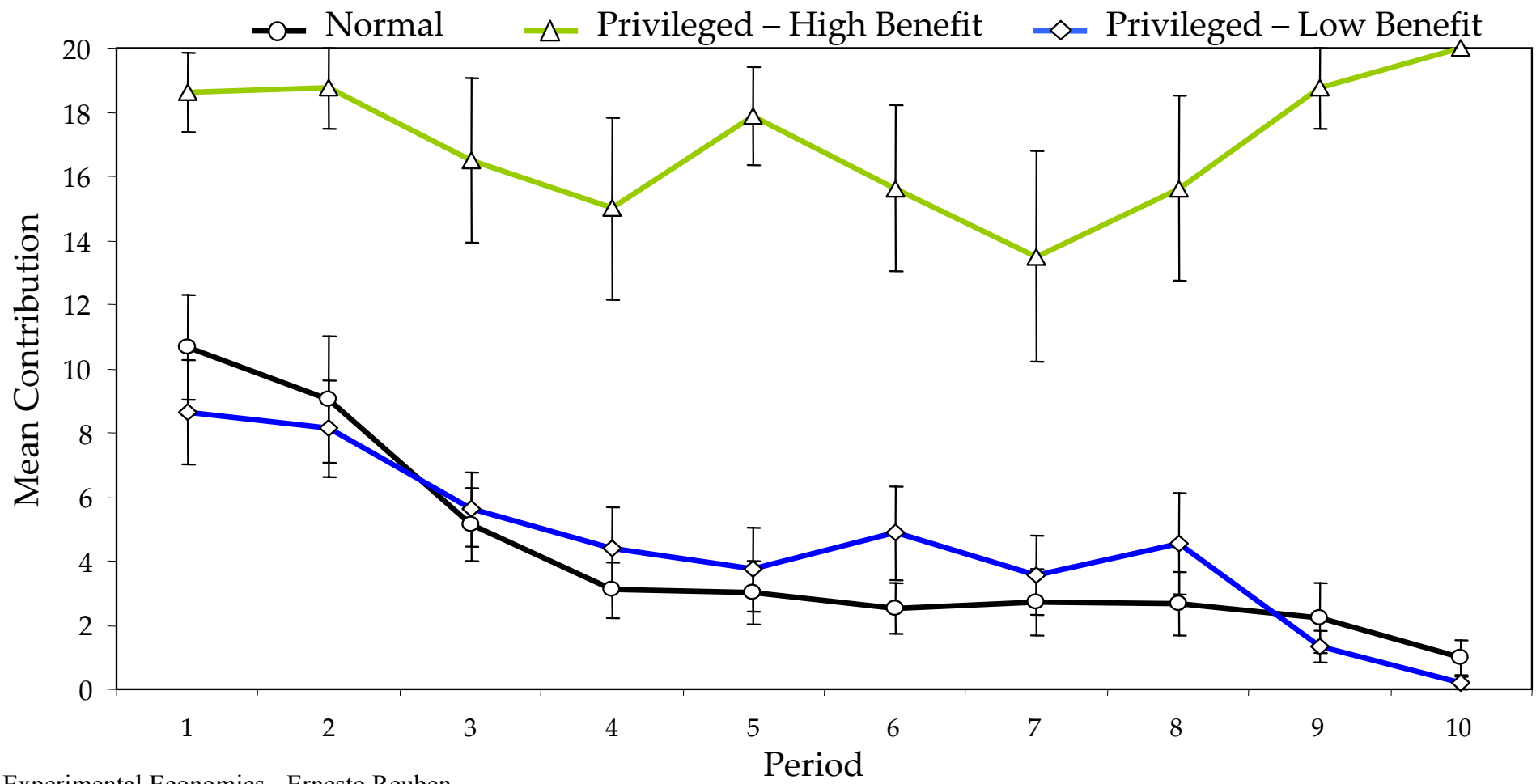
Punishment and intentions

- **Privileged groups** Reuben and Riedl 2008
  - Punishment works better in normal groups



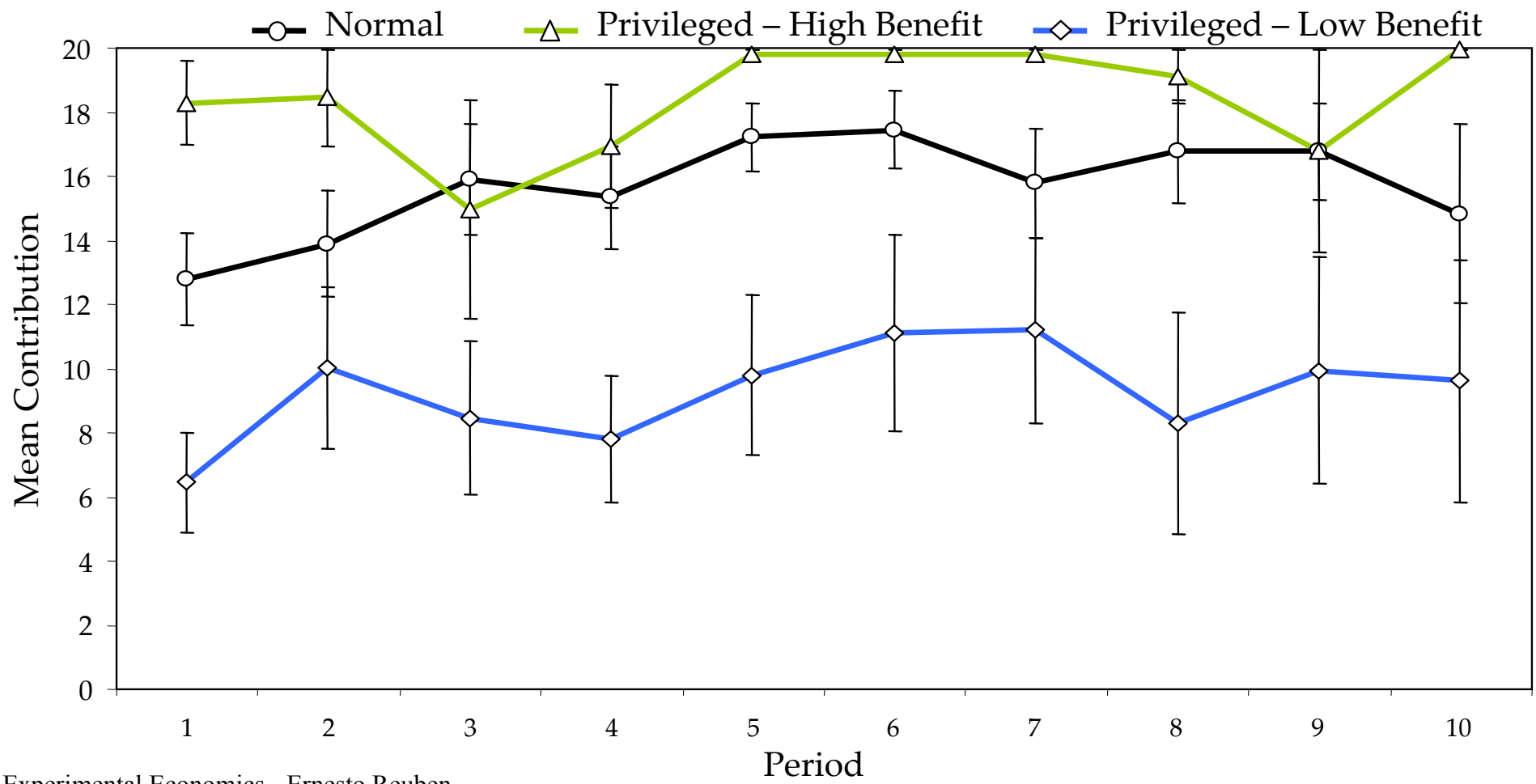
Punishment and intentions

- **Privileged groups** Reuben and Riedl 2008
  - Without punishment: higher contributions due to high-benefit subjects



Punishment and intentions

- **Privileged groups** Reuben and Riedl 2008
  - Smaller willingness of low-benefit subjects to contribute

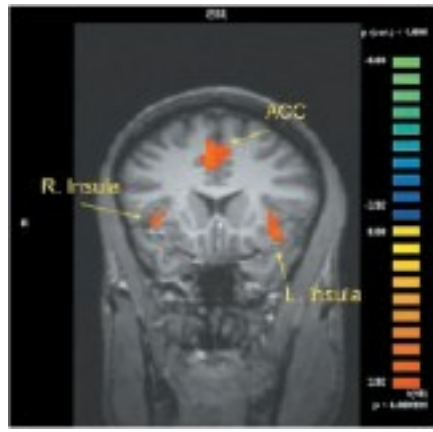


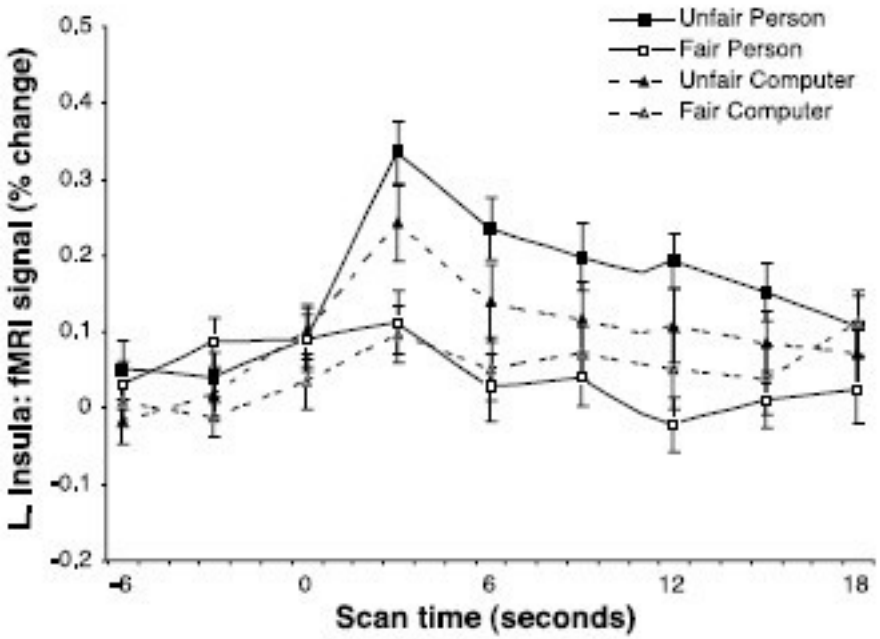
Why punish?

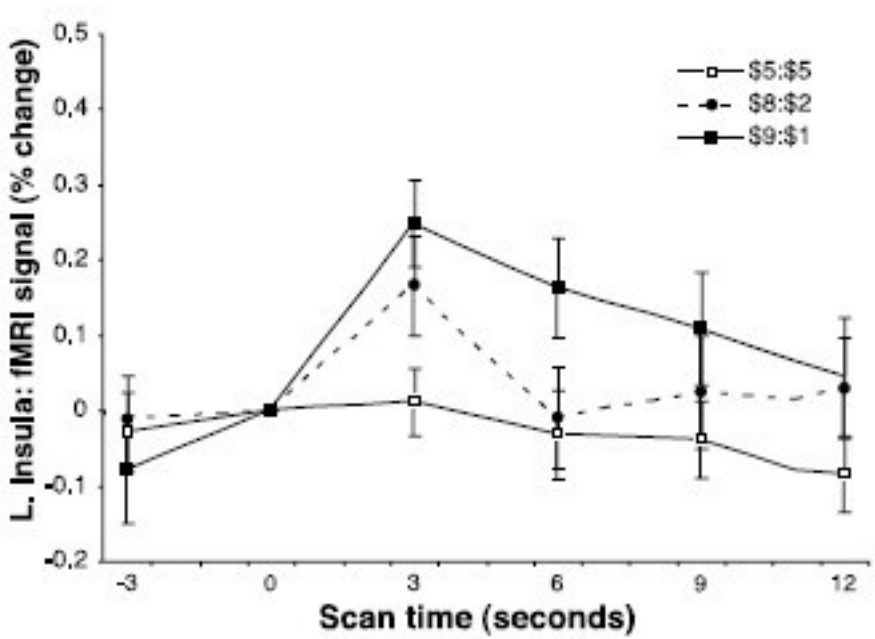
- **To punish or not to punish** Sanfrey et al. 2003
  - Subjects play and ultimatum game 30 times, $10 pie
  - Scan responders during rejection decision
  - 3 treatments
    - Proposer is a 'human'
    - Proposer is a computer
    - No proposer
  - Same offer distribution between human and computer
  - Problems
    - Deception
    - Showed pictures of human players

Why punish?

- **To punish or not to punish** Sanfrey et al. 2003
  - Results
    - Higher activation in anterior insula for unfair human offers
      - Activation is higher with degree of unfairness



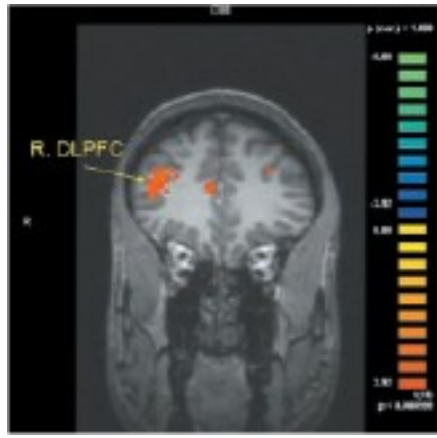


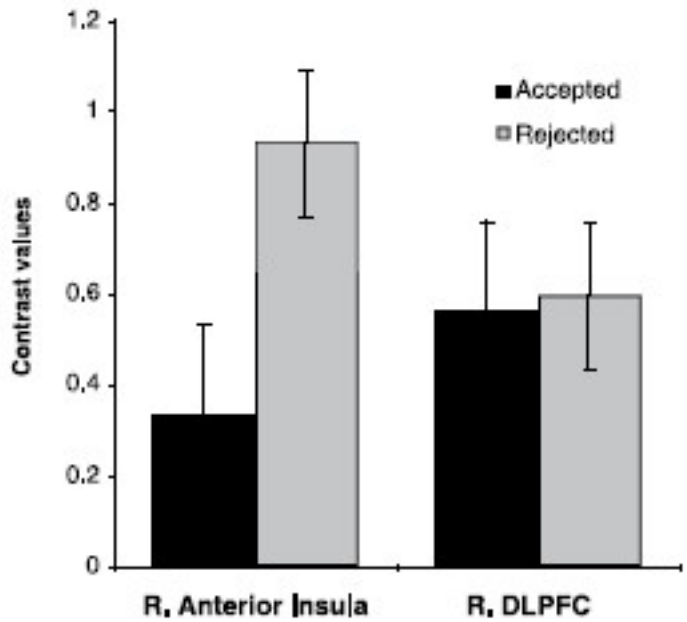


Expe

Why punish?

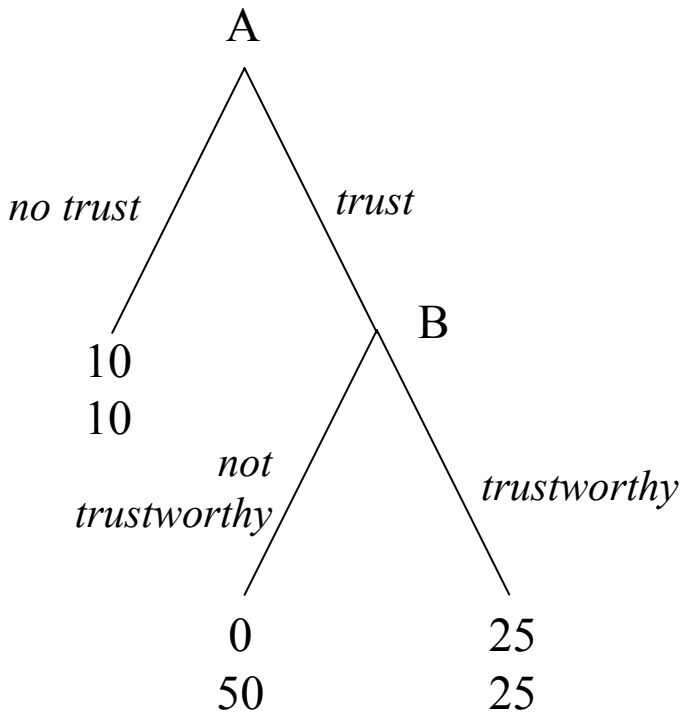
- **To punish or not to punish** Sanfrey et al. 2003
  - Results
    - Higher activation in anterior insula for unfair human offers
      - Activation is higher with degree of unfairness
      - Activation is highest with rejection
    - Higher activation in right dorsolateral prefrontal cortex
      - Not sensitive to rejection





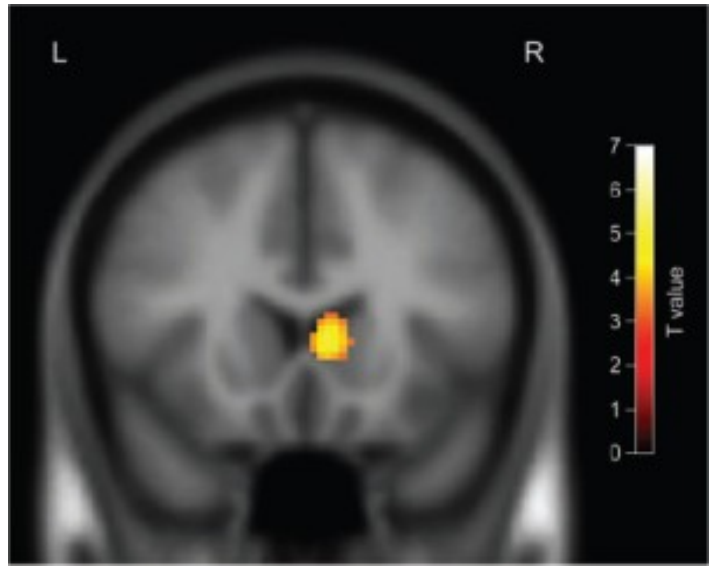
Why punish?

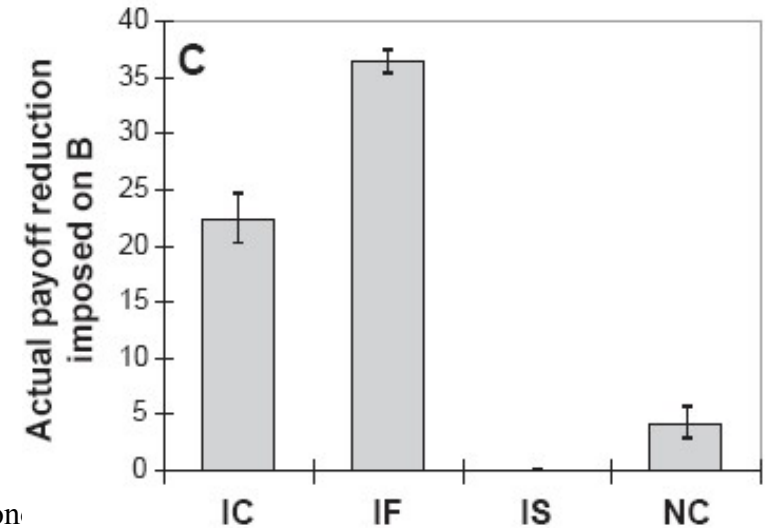
- **Sweet taste of revenge** Quervain et al. 2004
  - Subjects play a trust game with punishment (repeated 4 times)
  - PET scan A while making the punishment decision (up to 20 points)
  - 4 treatments (within subjects)
    - Intentional & Costly
      - Costs 1 point to reduce 2 points
    - Intentional & Free
      - Punishment is free
    - Intentional & Symbolic
      - Punishment is free but harmless
    - Non-intentional & Costly
      - B's decision determined by computer
      - Costs 1 point to reduce 2

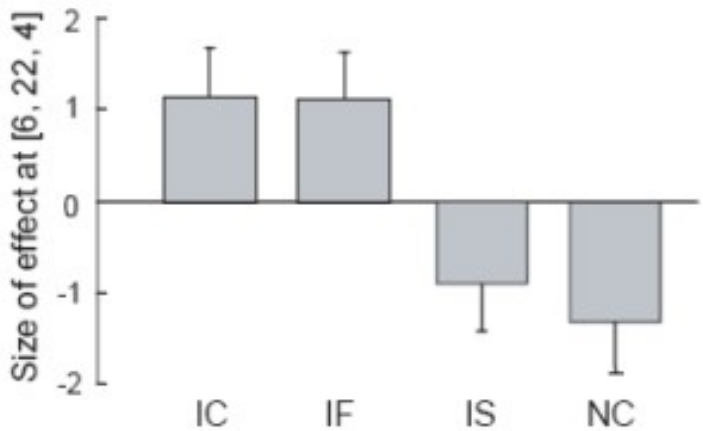


Why punish?

- **Sweet taste of revenge** Quervain et al. 2004
  - Results
    - Higher activation in the caudate nucleus if punishment is effective and desirable (IC + IF) – (IS + NC)
    - Higher activation correlated with more punishment (IC)
    - Higher activation in the ventromedial prefrontal cortex if punishment is costly IC – IF





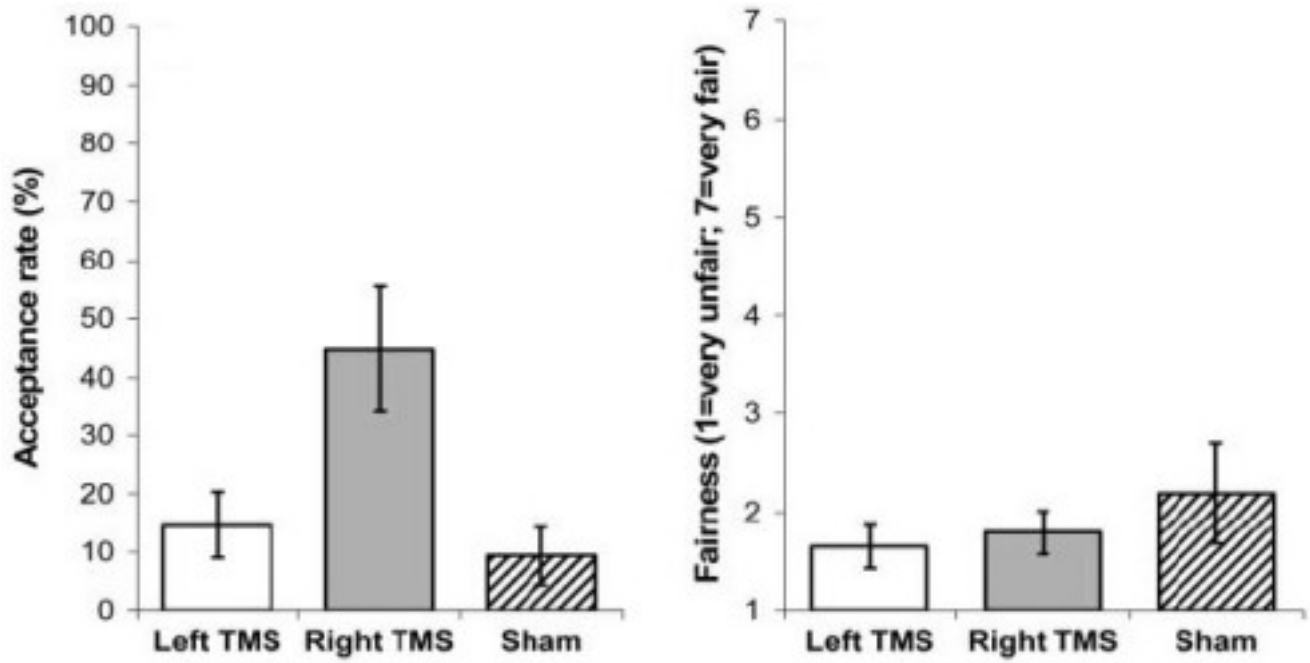


Why punish?

- **Primitive instinct or social skill?** Knoch et al. 2006
  - The role of the prefrontal cortex
  - Subject play an ultimatum game 20 times
    - Offers restricted to 50%, 40%, 30%, and 20%
  - Responders are subjected to transcranial magnetic stimulation
  - 2x2 design
    - Between subjects
      - Inhibit right dorsolateral prefrontal cortex
      - Inhibit left dorsolateral prefrontal cortex
      - Sham
    - Within subjects (10 periods each)
      - Human chosen offer
      - Computer chosen offer

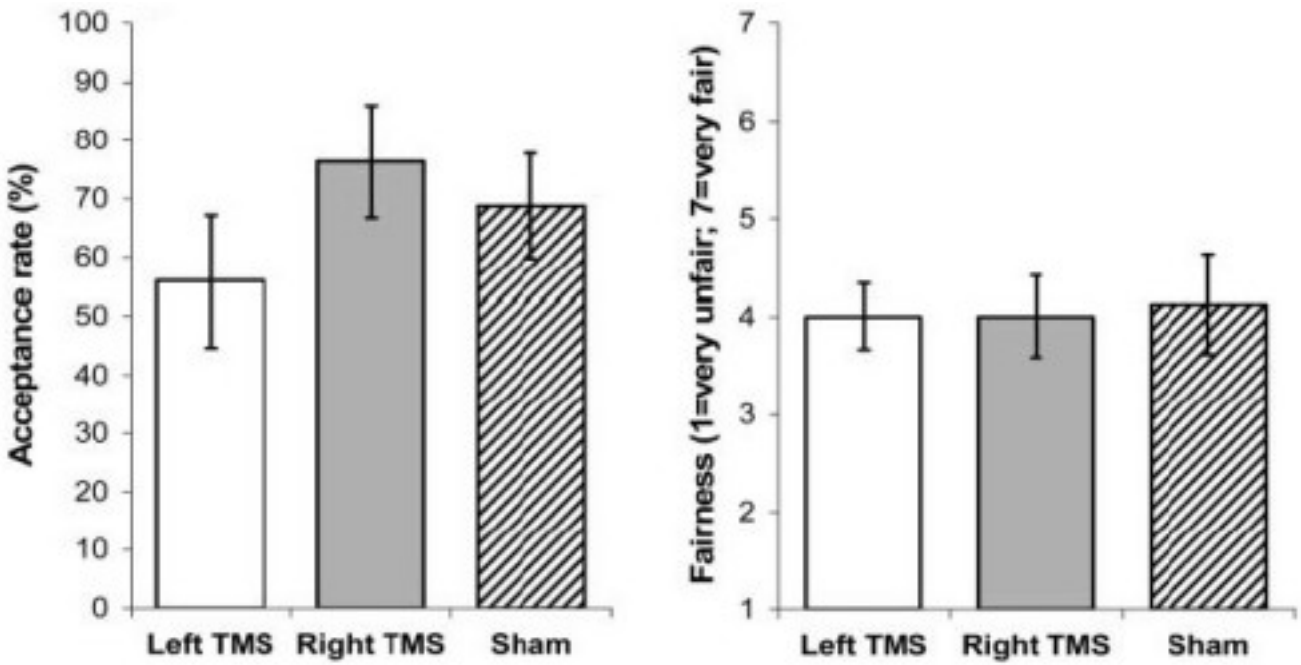
Why punish?

- **Primitive instinct or social skill?** Knoch et al. 2006
  - Results
    - For human-generated offers, disruption of the RDPC *increases* acceptance rates
      - Does not change the perceived unfairness of the offer



Why punish?

- **Primitive instinct or social skill?** Knoch et al. 2006
  - Results
    - For human-generated offers, disruption of the RDPC *increases* acceptance rates
      - Does not change the perceived unfairness of the offer
    - No such effect for computer-generated offers

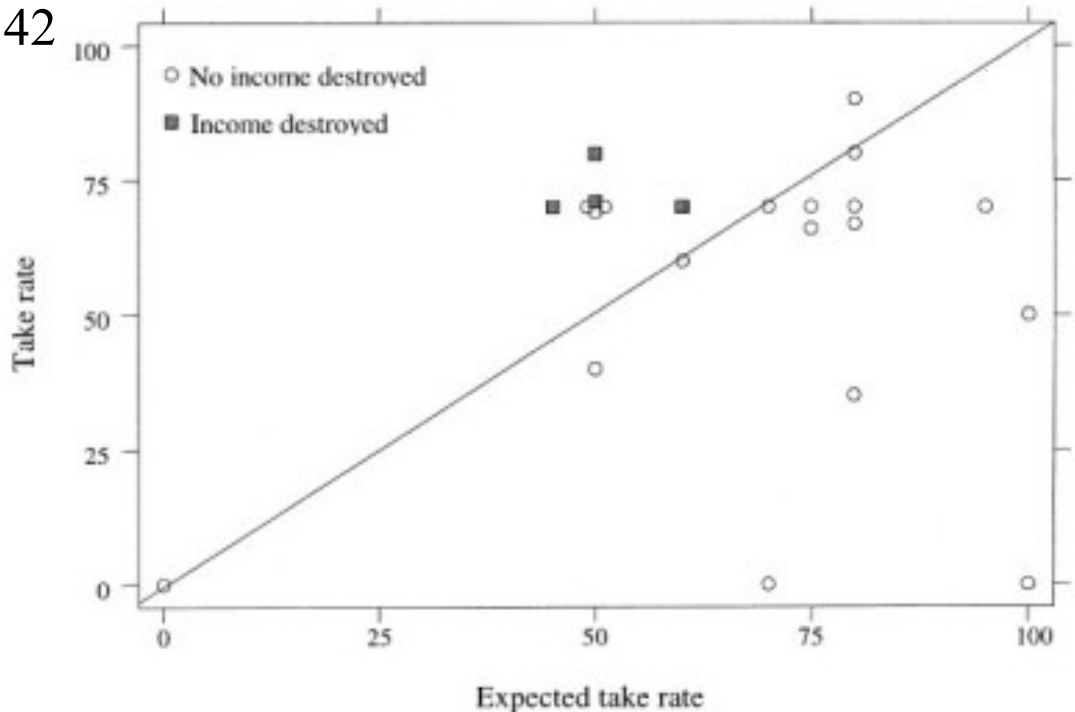


Why punish?

- **Role of expectations** Bosman and van Winden 2002
  - Power-to-take game
    - Proposer and responder get 10 euros
    - Proposer chooses take rate t
    - Responder observes t and chooses destruction rate d
    - Payoffs are: $\pi_p = 10 + t(1-d)10$ and $\pi_r = (1-t)(1-d)10$
    - After choosing d responders are asked:
      - how they felt when they saw t
      - what their expectation of t was
      - what would be in their opinion a fair t
    - One-shot game

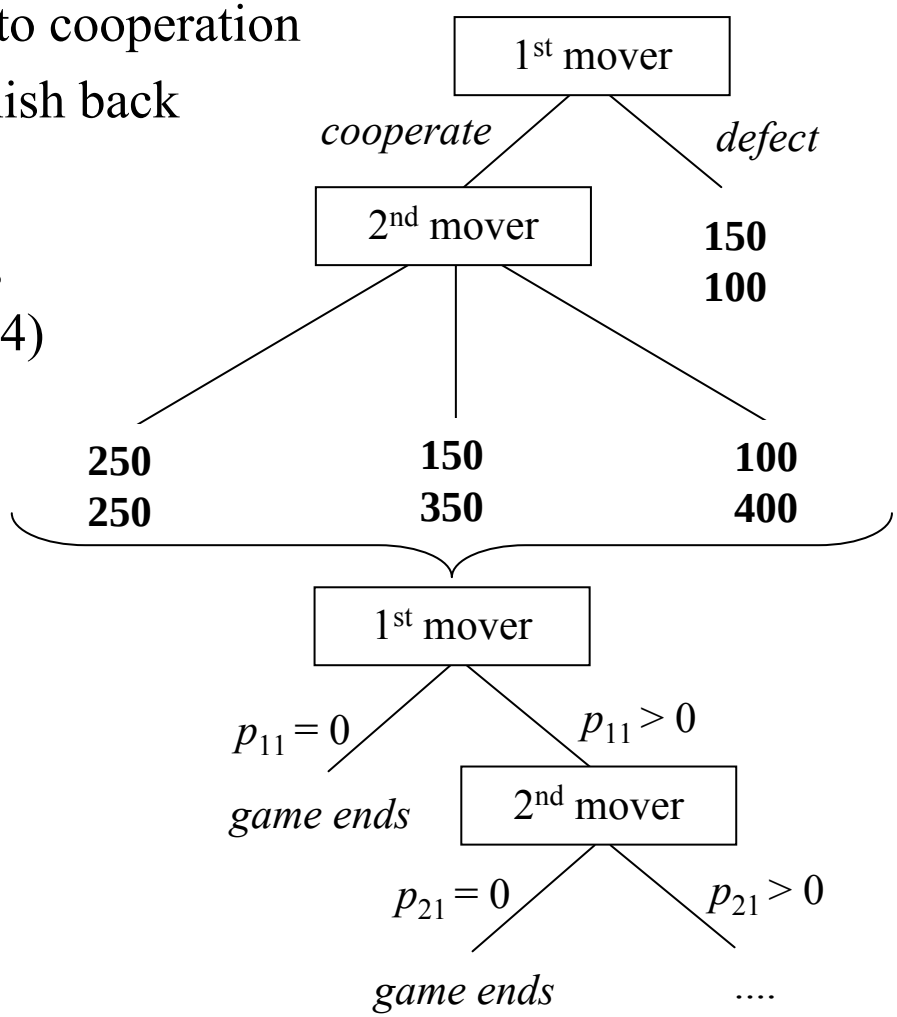
Why punish?

- **Role of expectations** Bosman and van Winden 2002
- **Results**
  - Anger-like emotions are the best predictors of destruction
    - Intensity depending on $d > 0$ or $d = 0$
      - Anger: 4.00 / 3.32
      - Irritation: 5.88 / 3.58
      - Contempt: 5.25 / 2.42
      - Envy: 4.00 / 3.58
  - Anger is triggered by
    - High t
    - Low expected t



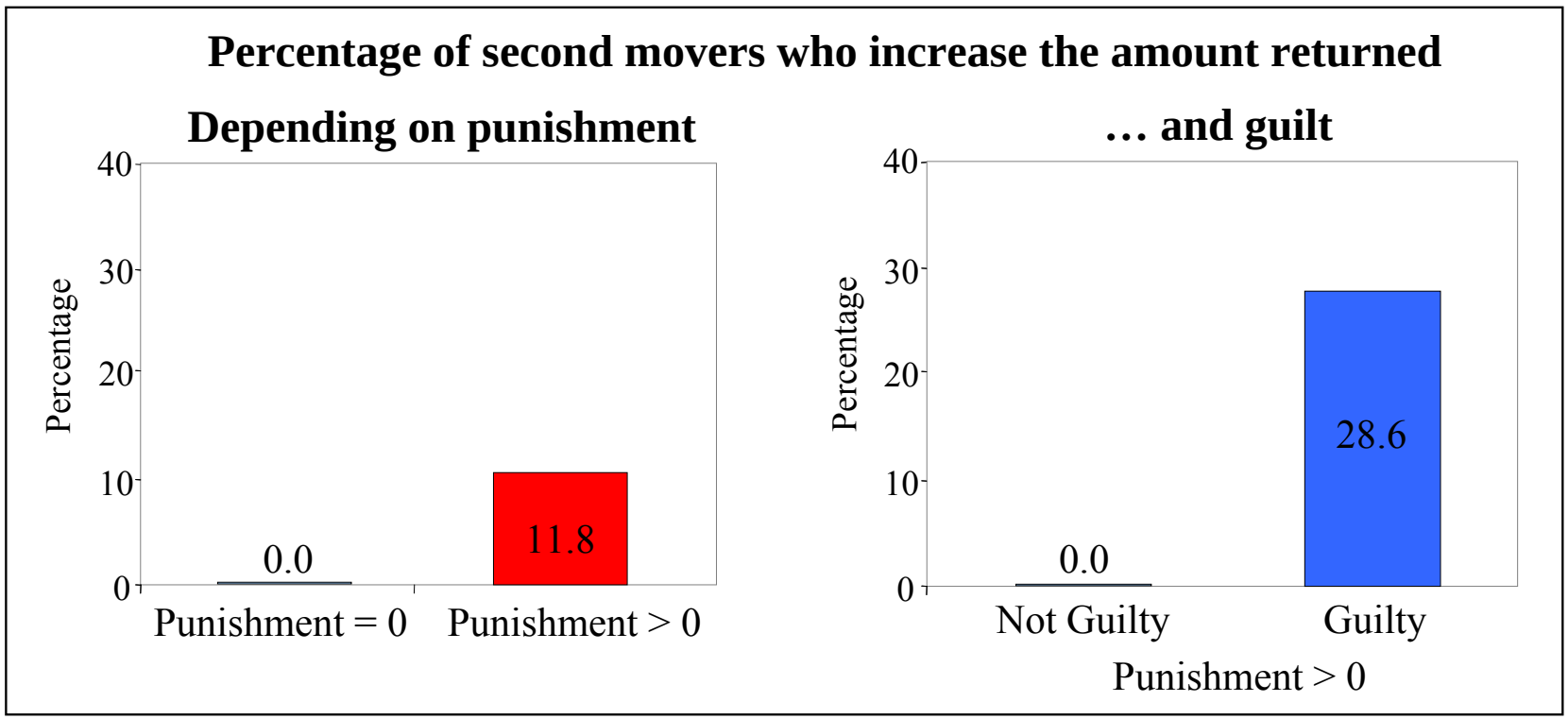
Why punishment works?

- **Prosocial emotions** Hopfensitz and Reuben 2009
  - For punishment to be effective:
    - Punished subjects should switch to cooperation
    - Punished subjects should not punish back
  - Design
    - Trust game with 'infinite' rounds of punishment (costs 1 to reduce 4)
    - 2 periods, perfect strangers
    - emotions are measured before making decisions



Why punishment works?

- **Prosocial emotions** Hopfensitz and Reuben 2009
  - Results
    - 2nd movers cooperate after being punished only if they feel guilt



Why punishment works?

- **Prosocial emotions** Hopfensitz and Reuben 2009
  - Results
    - Considerable retaliation after receiving punishment
      - 40% of second movers punish back if punished
      - retaliation lowered the damage/cost ratio of punishment from 4/1 to 3/1
    - 2nd movers retaliate because:
      - They are angry and feel no guilt