

# The co-evolution of social behavior and social institutions: A combined theoretical and experimental approach

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# The co-evolution of social behavior and social institutions: A combined theoretical and experimental approach

Two research groups at University of Amsterdam:

- at CREED, Faculty of Economics and Econometrics
- at IBED, Faculty of Science

Arno Riedl at Maastricht University

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A combined theoretical and experimental approach

Human behavior and institutions

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Human behavior and institutions

## **Social behavior:**

- behavior in interaction with others
- “kind behavior” (trust, reciprocity, cooperation)
- driven by “other-regarding” preferences (fairness, altruism)

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## **Social institutions:**

- formal (legal systems, markets)
- informal (norms, conventions, reputation, social networks)

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(formal rules of engagement, social pressure)
2. Institutions are *man-made* and affected by behavior  
(institutions adapt and differ across time and societies)

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## **Dynamic relationship:**

- Social environment and behavior affect each other
- Feedback loop

Both effects typically studied in isolation.

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## 1. **Laboratory experiments** (economics):

- actual social behavior of human subjects
- controlled laboratory environment
- “real” incentives and institutions

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The methodologies of research of our two groups:

## 1. **Laboratory experiments** (economics):

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- controlled laboratory environment
- “real” incentives and institutions

## 2. **Theory** (biology):

- models of adaptation and co-evolution
- framework for experimental design
- explanation of experimental observations

# Current research

## Current research

- **Exclusion and cooperation in networks**

Experiments (Riedl&Ule, Ule 2005) and theory (Ule; Spichtig 2005)

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- **Environmental determinants of trust and cooperation**  
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Future: indirect punishment, heterogeneity
- **Environmental determinants of trust and cooperation**  
Experiments (Egas&Riedl 2005)  
Future: group competition, networks versus markets

# Workshops

2004 **Cooperation and Social Norms in Humans and Other Primates**

*Frans de Waal, Simon Gächter*

2005 **Evolution of Social Institutions and Cooperation**

*Manfred Milinski, Andrew Schotter*

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  - **influence of environmental variables?**

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- Two players play only if both select each other
  - mutual linking formation
  - linking is costless
- Action in PD is not neighbor contingent

(screen)

## The Basic Network Game - 2

- Examples: Exchange networks, International trade, File sharing

( screen )

- A player's payoff:  $\pi_i(s_i, s_{-i}, L_i) = \sum_{j \in L_i} u(s_i, s_j)$

where  $L_i \longrightarrow$  neighbors of  $i$  after links are formed

and  $s_i \in \{C, D\} \longrightarrow$  decision of  $i$  in the PD game

## The Network Game

- **Multi-player** generalization of the PD-game with **outside option**.

	<i>Cooperate</i>	<i>Defect</i>
<i>Cooperate</i>	50, 50	10, 70
<i>Defect</i>	70, 10	30, 30

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- $n$  player generalization: PD embedded in an endogenous network
  - refusing a game = refusing a link
  - exclusion is possible, but is costly
  - two-sided linking, uniform action

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Prediction:

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( 2x repeated )

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$o = 0$	Low (6)
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# Experimental Design and Procedures

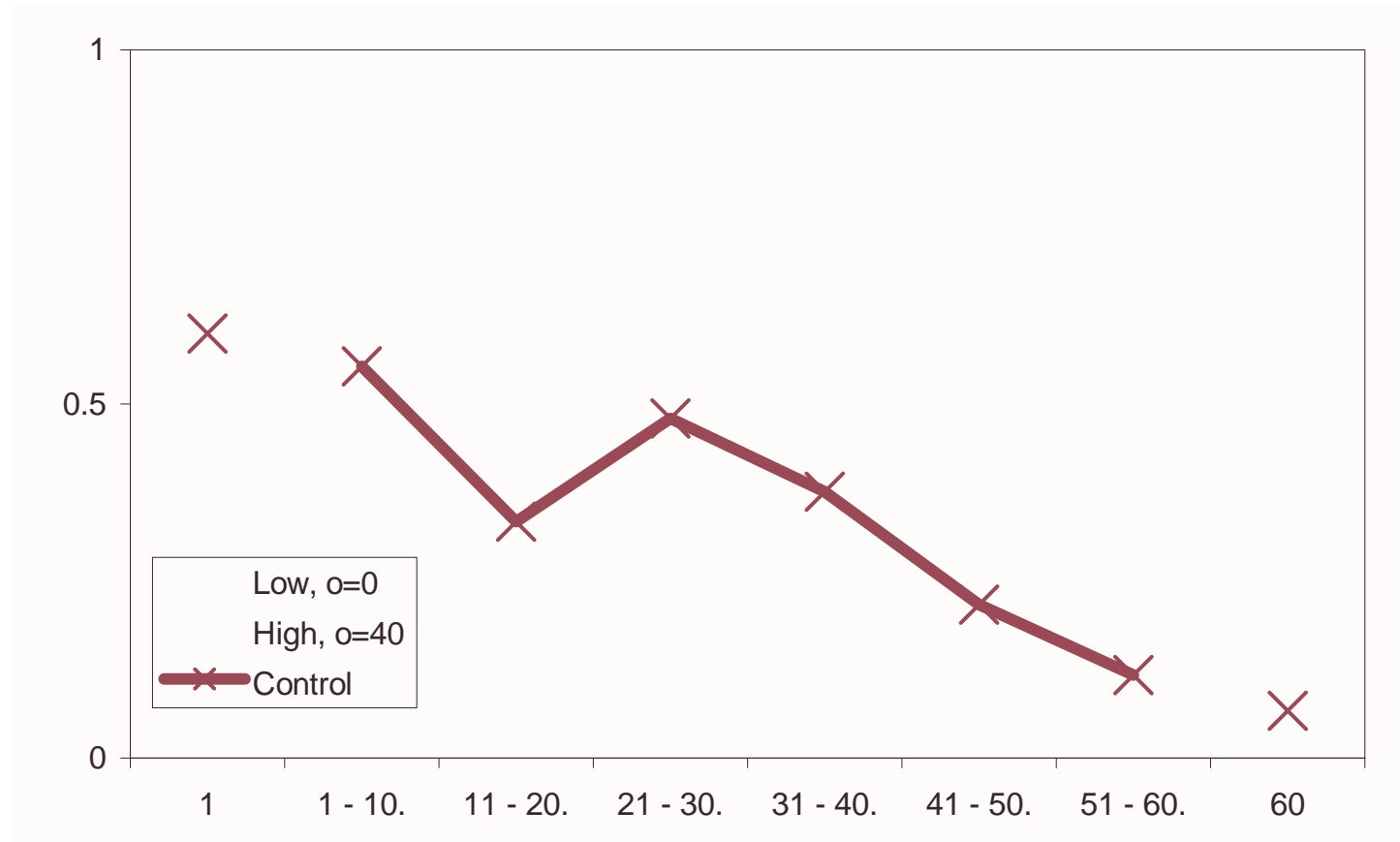
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- Each session took approximately two hours
- Average earning per subject: 24.12 Euro
- Computerized experimental sessions at CREED laboratory

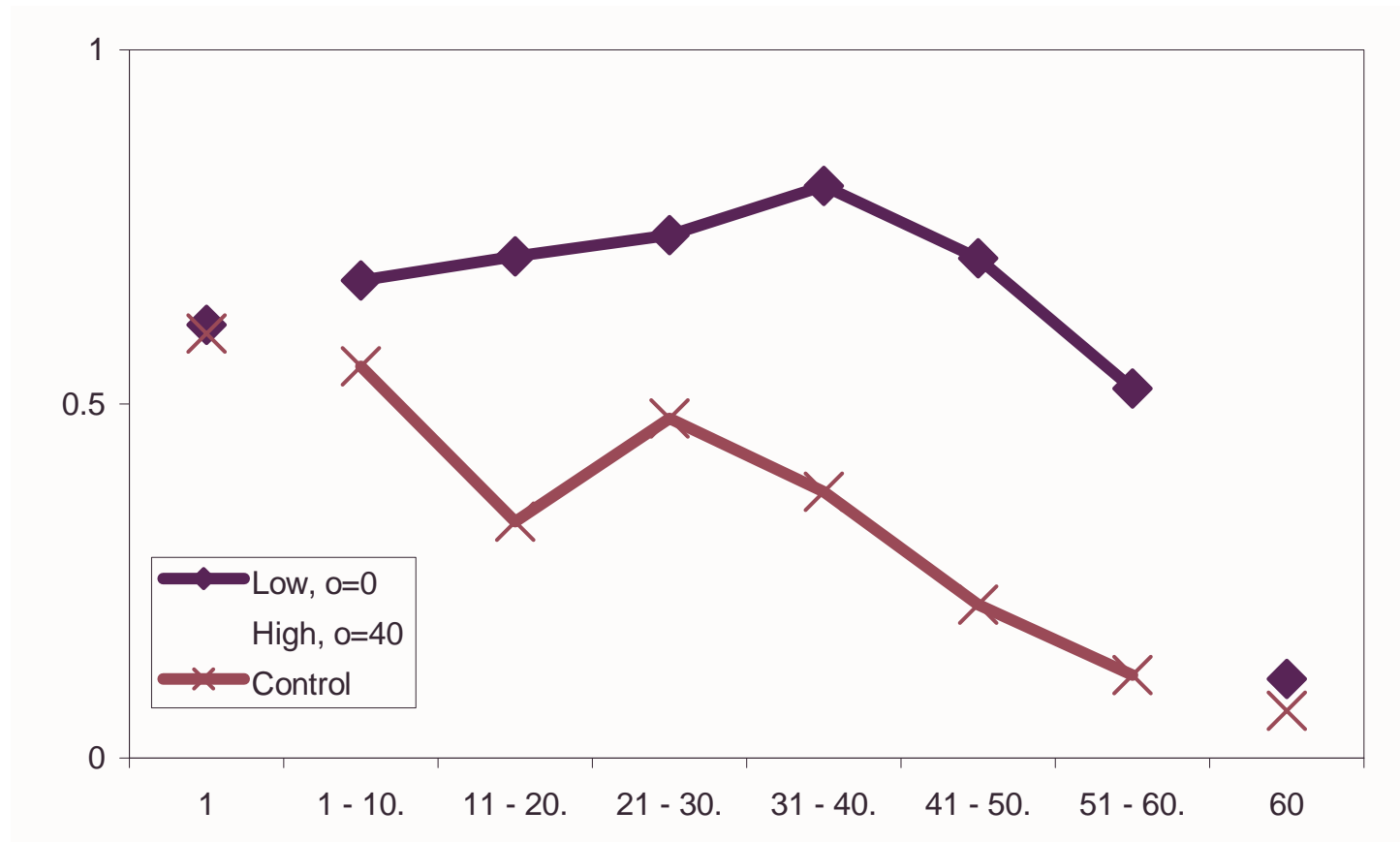
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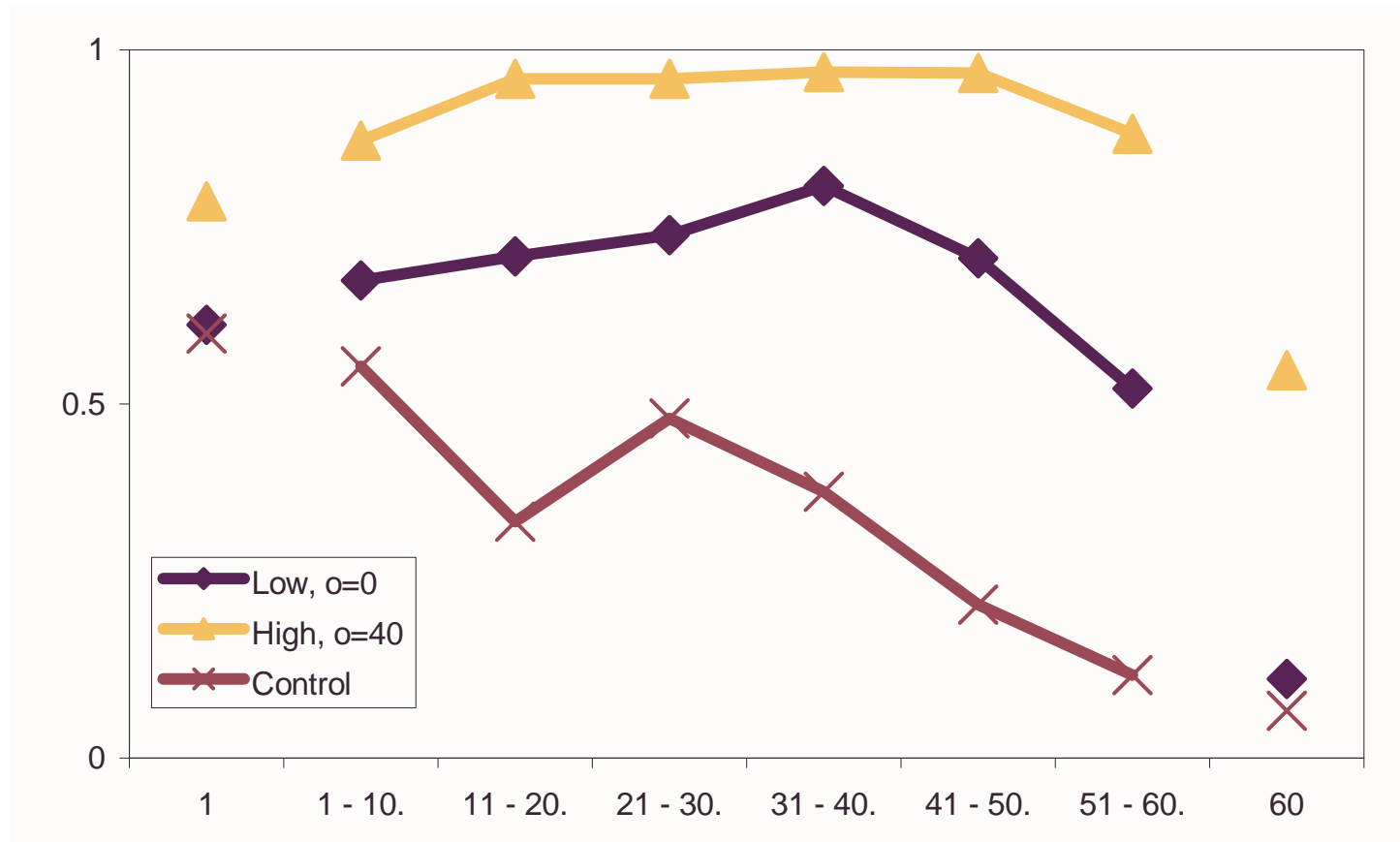
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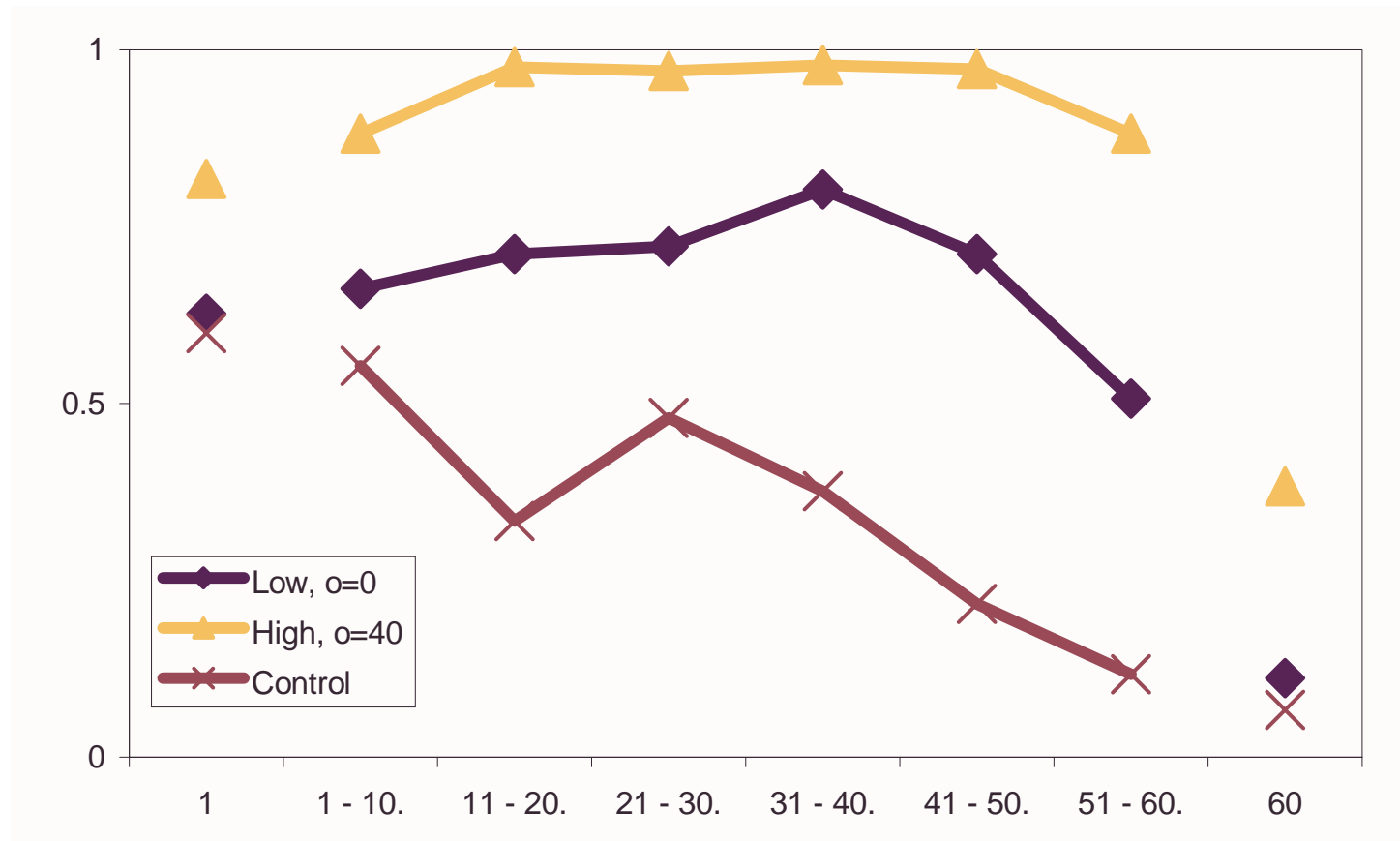
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## Experimental Results - 2

- **Cooperative plays:** fraction of cooperative actions in played games.

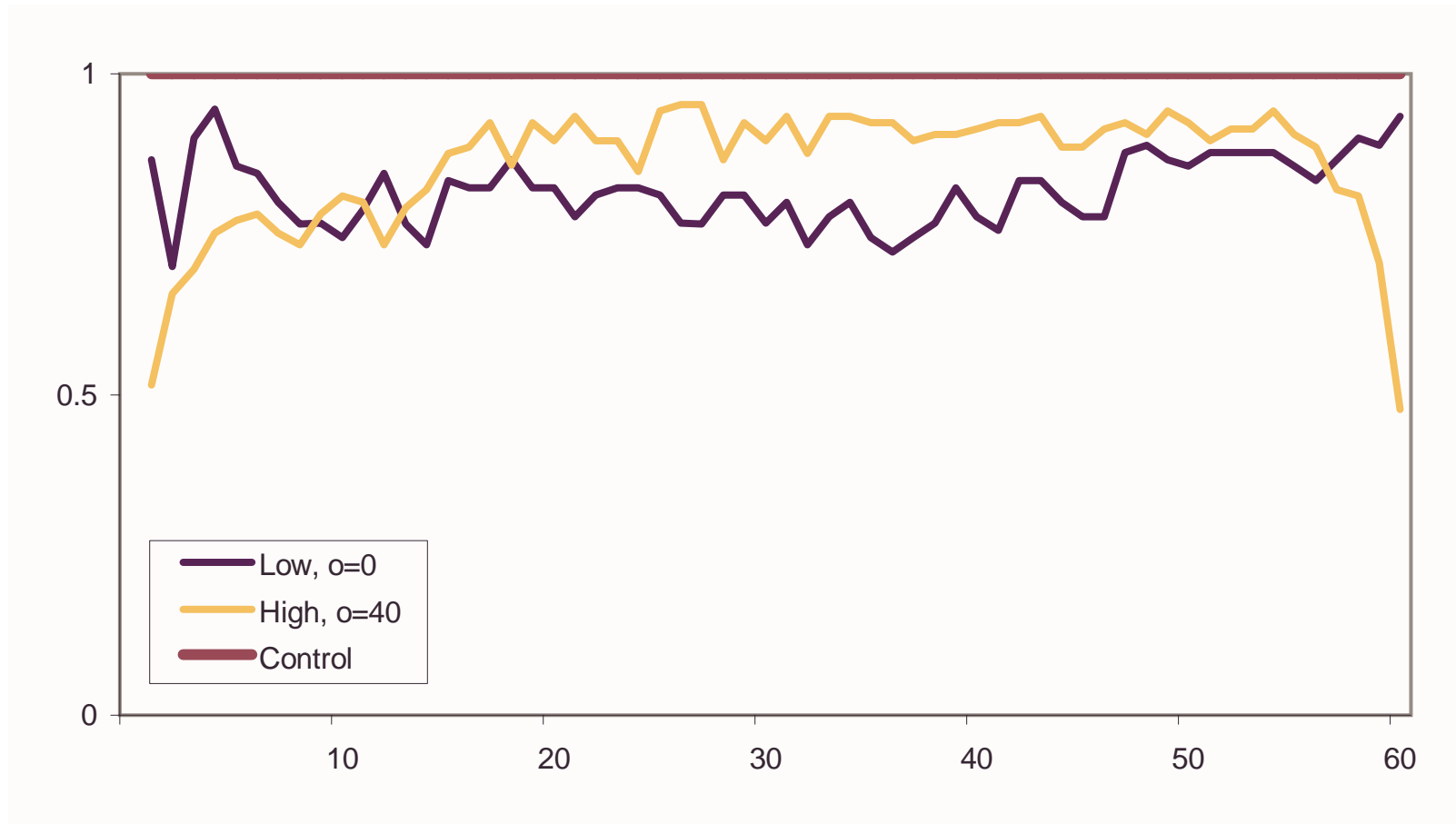


## Experimental Results - 3

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## Avoidance vs. punishment

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- 4 related [laboratory](#) experiments, and an [internet](#) experiment