



# What does “clean” really mean? The implicit framing of decontextualized experiments



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## HIGHLIGHTS

- Economic experiments typically use neutral frames.
- We ask what frames subjects implicitly project onto neutrally framed games.
- We find no difference in Prisoner’s Dilemma play in neutral and cooperative frames.
- A competitive frame significantly reduces cooperation relative to neutral.
- This suggests that by default subjects assume a cooperative frame.

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## ABSTRACT

It is standard in experimental economics to use decontextualized designs where payoff structures are presented using neutral language. Here we show that cooperation in such a neutrally framed Prisoner’s Dilemma is equivalent to a PD framed as contributing to a cooperative endeavour. Conversely, there is substantially less cooperation in a PD framed as a competition. We conclude that in a decontextualized context, our participants by default project a cooperative frame onto the payoff structure.

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## 1. Introduction

Laboratory experiments are becoming an increasingly popular element of the economist’s toolkit, as they help to solve for identification problems. When working with field data, reverse causality can often not be excluded, and omitted variables are a pervasive

concern. Arguably, lab experiments get rid of both. When stripping the situation down to a set of options and associated payoffs, and randomly assigning participants to treatments where this payoff structure is varied, identification is straightforward. The treatment effect results from the experimental manipulation, not the other way round, and not from anything else.

As variation in payoff structures is at the heart of experimental economics, experiments are typically presented to participants in neutral language: the options and associated payoffs are objectively described, and the interaction is as decontextualized as possible. This is because it is well known that ‘framing effects’, phrasing incidental to the payoff structure, can have dramatic

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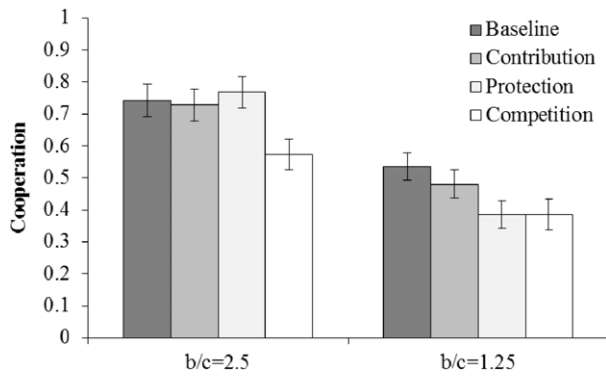


Fig. 1. Mean cooperative choices. Shown as fraction of the population.

effects on behaviour.<sup>1</sup> Neutral frames are therefore attractive, as they seem to offer a clean assessment of treatment effects by focusing participants on the payoff structure without biasing their choices.

However, when a neutrally framed payoff structure can be interpreted in multiple ways, participants must engage in sense making. It has been shown that participants achieve this by reasoning about the evidence, rather than by using an algebra-like process (Pennington and Hastie, 1988). Participants attempt to create a narrative story from the information they receive (Pennington and Hastie, 1986, 1988, 1993). They construct a mental model (Johnson-Laird, 1983).

In strategic games, behavioural uncertainty strengthens the need for sense making. Most participants realize that many other experimental participants do not behave like textbook agents. Yet they do not know the composition of the type space. The problem is exacerbated by conditional cooperation being the dominant preference (Fischbacher et al., 2001). This forces participants to even estimate types conditional on their own action.

If participants have to translate context-free incentive structures into more colourful stories to resolve uncertainty, this raises a fundamental question about the neutrally framed games so central in economics: What contexts do participants project onto such games? When left to their own devices, which types of stories do participants tell themselves?

Here we explore this issue in the context of social dilemmas. We ask how play in a decontextualized baseline Prisoner's Dilemma (PD) compares to PDs contextualized as cooperation among team members, or competition in a market. We find that play in the baseline is very similar to play under two different cooperative frames, whereas cooperation is substantially lower under the competitive frame. These results suggest that by default, our participants interpret social dilemma games through a cooperative lens.

## 2. Experimental design

To compare the neutral frame with cooperative and competitive frames, we run an experiment using Amazon Mechanical Turk (for evidence of methodological validity, see Horton et al. (2011)) to recruit American participants. Participants play a single one-shot simultaneous PD. For robustness, we randomize participants into

<sup>1</sup> We can only sketch the rich framing literature (seminal papers include Deutsch, 1958; Tversky and Kahneman, 1981). In the context of social dilemmas, which are our focus, frames may trigger a norm (Dufwenberg et al., 2011), and affect beliefs (Ellingsen et al., 2012). Thus, given the right frame, participants may be willing to dissolve a social dilemma (Andreoni, 1995; Ellingsen et al., 2012; Fleishman, 1988; Park, 2000) and to contribute to a public good (Cookson, 2000; Cubitt et al., 2011; Rege and Telle, 2004; Sonnemans et al., 1998).

one of the two following payoff matrices, where the benefit-to-cost ratio ( $b/c$ ) of cooperation is varied<sup>2</sup>:

$b/c = 2.5$	C	D
C	\$0.20, \$0.20	\$0.00, \$0.28
D	\$0.28, \$0.00	\$0.08, \$0.08
$b/c = 1.25$	C	D
C	\$0.20, \$0.20	\$0.00, \$0.36
D	\$0.36, \$0.00	\$0.16, \$0.16

Before the PD, comprehension is assessed by asking participants which choice by them and by their partner maximizes their earnings and their partner's earnings. Measures of beliefs, risk preferences, personality and demographics were included after the PD, but are not analysed here due to space constraints.

Within each payoff specification, we have four experimental conditions, which differ only in their framing. The *Baseline* is presented using neutral language. In the *Contribution* treatment, participants are told they are on a team with the other player. In the *Protection* treatment participants are told they can jointly protect themselves against possible losses. In the *Competition* treatment, participants are told they are competing with the other player setting prices in a market. Thus we vary both the cooperative versus competitive framing and the gain versus loss framing.

Using the  $b/c = 2.5$  ( $b/c = 1.25$ ) payoff specification, in the *Baseline* we have 101 (99) independent observations, in *Contribution* 103 (102), in *Protection* 99 (101), in *Competition* 103 (101). Participants on average earned \$0.16 (\$0.18) in the PD, plus a \$0.50 showup fee. For further details about the design, we refer to Appendix A.

## 3. Results

As Fig. 1 shows, we find a pronounced effect of treatment on choices. Across both payoff specifications, cooperation is substantially less likely in the *Competition* frame compared to the *Baseline* (Chi<sup>2</sup> test:  $b/c = 2.5$ ,  $N = 204$ ,  $p = 0.011$ ;  $b/c = 1.25$ ,  $N = 200$ ,  $p = 0.034$ ). Conversely, cooperation is equally likely in the *Contribution* frame and the *Baseline* for both specifications (Chi<sup>2</sup> test:  $b/c = 2.5$ ,  $N = 204$ ,  $p = 0.815$ ;  $b/c = 1.25$ ,  $N = 201$ ,  $p = 0.436$ ).<sup>3</sup> The effect of the *Protection* frame varies by specification: when cooperation is cheap (and common), there is no significant difference from the *Baseline* (Chi<sup>2</sup> test:  $b/c = 2.5$ ,  $N = 200$ ,  $p = 0.68$ ); but when cooperation is expensive (and less common), the *Protection* frame decreases cooperation relative to *Baseline* (Chi<sup>2</sup> test:  $b/c = 1.25$ ,  $N = 200$ ,  $p = 0.034$ ). Thus it seems that the loss framing of the *Protection* frame makes subjects more sensitive to the reduction in others' cooperation at  $b/c = 1.25$ .

Model 2 in Table 1 confirms that the effects of the *Competition* and *Contribution* frames do not differ across payoff specifications, whereas the *Protection* frame results in less cooperation when  $b/c = 1.25$ .<sup>4</sup> Models 3 and 4 show that the treatment effects are robust to controlling for comprehension of the payoff structure.<sup>5</sup>

<sup>2</sup> The  $b/c = 1.25$  condition was included to reduce the overall level of cooperation compared to  $b/c = 2.5$ , excluding possible ceiling effects. Payoffs are commensurate with standard wages on Mechanical Turk.

<sup>3</sup> Assuming normality, using a two-sided  $t$ -test, a power of .8, for each treatment comparison and payoff specification our sample would have been big enough to find an effect of standardized size .39.

<sup>4</sup> Evaluating the net coefficient of *Protection* at  $b/c = 1.25$  shows a significant negative effect ( $p = 0.035$ ).

<sup>5</sup> When excluding the 39.3% of participants who failed at least one comprehension question, we continue to find evidence that the default frame is cooperative.

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