Killing the (coordination) moment: How ambiguity eliminates the restart effect in voluntary contribution mechanism experiments

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HIGHLIGHTS

- The restart effect is a behavioral regularity in public goods experiments.
- This stems from simultaneous revision (of some kind) that promotes cooperation.
- This experiment posits that knowledge of when revision occurs produces the restart.
- When there is ambiguity over when revision occurs the restart effect is not obtained.
- This research is related to focal points that generate mutual recognition.

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ABSTRACT

The restart effect occurs in linear voluntary contribution mechanism (VCM) experiments when there is an upward pulse in contributions to the group account following a stoppage and then restarting of the VCM experiment. Although the restart effect is a well-known empirical regularity little research has been conducted regarding its causes. However, other scholars have noted that some kind of revision takes place during the stoppage that promotes cooperation. This research posits that certain common knowledge about when the stoppage occurs creates a "coordination moment" where group members simultaneously engage in revision and attempt to re-coordinate on a higher contribution level. Following Schelling's description that such coordination comes from focal points that are both "prominent and conspicuous" I design a VCM experiment that reproduces the standard restart result and then compares those sessions to sessions where the exact pattern of stoppages is unknown. I find that this subtle manipulation of ambiguity (over the when stoppages will happen) eliminates the restart effect.

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1. Introduction

The linear VCM framework (Isaac et al., 1984) has been a workhorse for testing different economic and behavioral phenomena based on cooperation (Ledyard, 1995). One of several empirical regularities from that framework is a term coined the "restart effect" from Andreoni (1988). This effect is said to occur when there is an upward pulse in contributions to the group account following a stoppage in the game. Surprisingly, despite the widespread acknowledgment of this phenomenon, there has been no rigorous experimental research regarding the cognitive and social mechanisms or institutions that support the restart effect.

Andreoni (1988) viewed the restart effect as an attempt to re-establish norms of high cooperation. Meanwhile, Burlando and Hey (1997) viewed the restart effect as "cognitive dissonance" where the individual realizes their non-cooperative actions do not reflect their identity as a cooperator. Other ideas include the restart effect stemming from beliefs and limited foresight (Mengel, 2014).[1] The common thread of these explanations is that individuals in a social dilemma (like public goods games) are engaged in reflection during the stoppage. The experiment presented here is not primarily interested in the cognitive mechanisms or norms through which revision occurs. Rather, the research presented here asks what causes individuals to simultaneously engage in revision?

If we consider that the stoppage in the public goods game generates a focal point and that focal point culminates in a "coordination moment" among group members that leads them toward

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[1] In this paper individuals form beliefs about future play from their past experience. Given those beliefs, individuals optimize expected utility across k-periods where k is the economic actor's foresight.

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revision, there must be some attribute of the stoppage that promotes that happening. Consider the following quotation from Thomas Schelling,

> "Most situations…provide some clue for coordinating behavior, some focal point for each person's expectation… Finding the key, or rather finding a key – any key that is mutually recognized as the key becomes *the* key – may depend on imagination more than logic… A prime characteristic of most of these 'solutions' [or key] to the problems, that is, of the clues or coordinators or focal points, is some kind of prominence or conspicuousness". (Schelling, 1980, p. 57)

Thus, this experiment is less focused on the mechanism of revision and more on the attributes of the stoppage – or the "keys" Schelling wrote about – that seem to support some kind of revision among the players. I posit two subtle experimental interventions: ambiguous language and the number of periods prior to stoppage.

The first intervention regards language. Participants are told the number of stoppages but, depending on whether the treatment is exact or ambiguous, individuals may not be told the interval at which those stoppages occur. These treatments are called exact or ambiguous language treatments. This subtle intervention should matter if the "key" to the restart effect is salience about when revision can take place. As Schelling wrote about focal points, there should be some kind of "prominence or conspicuousness" that leads to mutual recognition that *this stoppage* represents a coordination moment where everyone will engage in revision that promotes cooperation.

The second intervention regards the contribution level. This is a data-driven intervention since previous public goods experiments suggest that the contribution level must be below about 40–50 percent of the social optimum to induce a restart effect (see Appendix A). With standard preferences a contribution level prior to stoppage should not matter; however, there might be a kind of "rock bottom hypothesis" where group members are not incentivized to engage in revision unless cooperation is quite low. While low MPCR would induce low contributions there will be less impetus to pulse upwards. Instead, I opt to take advantage of the natural tendency toward free-riding by increasing the number of periods prior to each stoppage while fixing the total length of the experiment.

Section 2 provides more detail on the 2×2 experimental design based on language and periods prior to stoppage. Section 3 provides results from the aforementioned 2×2 experimental design. Those results focus on the "change in contribution level" which is intuitive since the restart effect is concerned with the change in level following the stoppage. I conduct Wilcoxon Rank Sum Tests of the hypotheses. The results demonstrate that ambiguous language significantly dampens the restart effect compared to exact language. Section 4 provides discussion related to the results and implications for organizational change.

2. Experimental design

Participants in the experiment were recruited to the XS/FS laboratory at Florida State University using the ORSEE announcement system (Greiner, 2004) and the experiments were conducted using the z-Tree interface (Fischbacher, 2007). The experimental design was the familiar VCM (Isaac et al., 1984) with four person fixed groups and an MPCR equal to .5 such that the profit function for the stage game was $\Pi_i = 20 - x_i + .5 \Sigma x_i$. In all experiments there are 36 periods but the number of stoppages and knowledge of the precise pattern of these stoppages are varied depending on the experimental treatment.

Consider whether the precise pattern of stoppages is known. In such a case each participant would receive information about these stoppages through exact language in the instructions. These are written as follows.

The experiment will be sectioned into 6 blocks of 6 periods. After each 6 periods of decision-making are completed there will be a 90 s stop. During the stop you will be asked to remain silent with your electronic devices turned off until the experiment resumes. After that 90 s stop decision-making will resume.

On the other hand, participants could be told the number of stoppages but not when those stoppages are scheduled to happen. In this case the distribution of those stoppages across the 36 period game could be expressed using ambiguous language. Instructions with ambiguous language are written as follows:

This experiment will consist of 41 periods which are divided into two types: decision and non-decision periods. During the 36 decision periods you will make contributions decisions governed by the rules as described above. During the 5 non-decision periods you are asked to remain silent with your electronic devices turned off. After that 90 s stop decision-making will resume.

Note that all language from the instructions can be found in Appendix B. Turning to the treatment regarding contribution levels there were two avenues that could push contributions to low levels. The low MPCR would undoubtedly produce lower contributions than the high MPCR case there is potentially a behavioral effect that might work against observing a restart effect when contributions are low.[2] On the other hand, having a fixed MPCR at .5 and extending the number of periods prior to stoppage should provide variation in how low the contributions levels are at the time a stoppage occurs. Thus, I opt to maintain a fixed 36 period game but have either 6 blocks of 6 periods or 3 blocks of 12 periods. The combination of periods prior to stoppage and ambiguous versus exact Language form a 2×2 experimental design. All experimental manipulations are conducted as between-subjects design.

3. Results

All comparisons in 2×2 construction will use pooled data from the 6 Blocks of 6 Period (6_6) ambiguous with and without a pre-experimental exercise. All subsequent experiments did not feature a pre-experimental exercise due to financial reasons. Thus, with the pooled 6_6 ambiguous data there were 12 four-person groups while each other cell in the 2×2 design contains 6 four-person groups. The variable of interest in this analysis is the *change in contribution level*. This is a natural variable to consider given that the restart effect regards a change in level. Fig. 1 displays the average change in contribution for the restart periods in each treatment. From this figure there appears to be a sizable difference between the ambiguous and exact treatments and more pronounced given the longer time horizon.

To evaluate these data I conduct Wilcoxon Rank Sum Tests on individual change in contribution levels for restart periods.[3] The question is what are the most appropriate comparisons (i.e. should changes in contributions levels in like periods or like restarts

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[2] Since numerous individuals do not free ride there must be some other strategy that they are employing; for example, a person might consider the strategy of conditional cooperation after the stoppage in play. The player following such a strategy might consider cooperating if others also cooperate; however, they will also consider the overall likelihood that cooperation is even worthwhile. Suppose a player is in a four person group and the MPCR was adjusted from .5 down to .3. Now it is more costly for a person to employ a conditional cooperation strategy because it requires almost full contributions from all players whereas an MPCR equal to .5 requires one other person at full contributions and some residual from the other players.

[3] There are 48 individuals in the 6_6 ambiguous treatment and 24 individuals in all other treatments.