COVID-19 Dilemma: The Effect of Polarized Information on Cooperative Behavior

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Abstract

Inspired by the phenomenon of panic buying in the face of the COVID-19 pandemic, this paper studies the effect of information cherry-picked to signal cooperation or noncooperation on outcomes of Prisoner's Dilemma games. The study explores the question of how presenting polarized pieces of information before decision making affects subjects' behavior using anonymous, randomly-matched, one-shot Prisoner's Dilemma games conducted virtually on Amazon Mechanical Turk. With a sample size of 243 observations, the study finds that positive information aimed to increase confidence in cooperation does not have any significant relationship with Prisoner's Dilemma games' outcomes. On the other hand, the data suggests that when subjects were presented with a negative piece of information lowering their confidence in cooperative behavior, they were 14.6 percentage points less likely to cooperate, compared to people in the control group who did not receive any information other than the Dilemma's rules. The study also finds that certain income brackets, panic buying experience during COVID-19, and taking care of a dependent have positive relationships with cooperative behavior.

	You don't panic buy	You panic buy
Most don't panic buy	Shortages unlikely.	Congrats, you've just wasted your money.
Most other panic buy	Congrats, you're now hungry.	You're likely to get some food due to earlier buying.

Table 1:

EXPERIMENTAL DESIGN

- The study includes two experiments in which participants participate in a one-shot game of prisoner's dilemma.
- All participants participate anonymously in an online survey. They do not meet, communicate, or know of their game partners or other participants in anyway.
- Each participant enter the game separately, get introduced to the game, answer a quiz to understand the game, choose their strategy (play the game), and only learn of the outcomes after they have completed every part of the study, including the demographic survey at the end.
- The study paid participants a flat rate of $0.75 for survey completion, and either of $0.75, $0.50, $0.25, or $0 in bonus depending on their games' outcome.
- To determine the outcome of the game, each participant is randomly matched with another partipant playing the same condition.
  - If both participants cooperate, they each receive $0.50 in bonus or $1 total.
  - If both participants defect, they each receive $0.25 in bonus or $0.50 total.
  - If one cooperates while the other defects, the cooperative player gets $0 in bonus, while the defect player gets $0.75, or $0.75 in total.
- This design corresponds to the classic Prisoner's Dilemma:
  - Assuming self-interest maximization, the dominant strategy is to defect.
  - If both players defect, this yields the least social surplus ($0.50 in total).
  - The socially optimal outcome is where both players cooperate ($1 in total bonus).

RESULTS

- 56.45% of observations in the dependent variable DECISION are cooperative.
- Twelve regressions were conducted to analyze the effect of the independent variables. The main independent variable is information priming – positive prime, negative prime or no prime.
- Regressions results show that after controlling for 11 demographic factors, people are less likely to cooperate if they received the negative priming treatment compared to the priming treatment before choosing a game strategy.
  - Participants primed with negative information were 14.6 percentage points less likely to cooperate compared to people who did not receive any priming information.
- Seven income brackets had significant marginal effect on the decision to cooperate or defect (compared to the base condition).
  - Participants with household income of $60,000 to under $70,000 a year were 46.7 percentage points more likely to cooperate than people in the base bracket making less than $10,000.
  - Participants with household income of $100,000 to under $150,000 a year were 47.4 percentage points more likely to cooperate than people making less than $10,000.
- Participants who claim to be "not sure" if they bought more goods during February and March 2020 were 28.3 and 37.5 percentage points more likely to cooperate compared to people who did panic-buy.
- Having a dependent during February and March 2020 was associated with 15.7 percentage points increase in the likelihood to cooperate compared with not having a dependent (with confidence level of 95%).

CONCLUSION

- The statistically significant relationship between the negative priming information and the outcome of the Prisoner's Dilemma partially supports the a priori hypotheses.
  - This shows that consuming negative information regarding cooperation before engaging in social dilemmas might induce less cooperation (compared to not consuming).
  - This could be the starting point for further research into ways to minimize the cherry-picking, sensationalization by the media that might have worsened the panic buying phenomenon in March and February of 2020.
- The positive priming information did not have a statistically significant relationship with the behavioral outcome's marginal changes. However, all the coefficients are positive, meeting the expected direction of relationship between the dependent and the independent variable.

LIMITATIONS AND FUTURE DIRECTIONS

- There is room for improvement with replication and increasing of the sample size.
- At the same time, there is possibility that subjects react to positive and negative information to differing degrees.
- Apart from the sample size, the demographic of the sample was also skewed with significantly more male and white subjects for both experiments. More tests should be conducted to find out if this is due to Amazon Mechanical Turk contractors' demographic and if there are tools to minimize the non-representative sampling.
- Significant relationships between decision outcomes and demographic variables such as income, having a dependent, and being married also pose interesting future directions for research.

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