Trolley Problem Decisions Follow the Laws of Inclusive Fitness

Jonathan Baker, Lyndsay Nelson, Kimberly Melby, Mark Remiker, Sarah Brandt, and April Bleske-Rechek
University of Wisconsin-Eau Claire

Overview

In the long-standing study of moral reasoning, philosophers have used an ethical thought experiment known as the *Trolley Problem* to understand implicit rules that guide humans' moral decisions. The original Trolley Problem forces the reader to decide whether he/she would save the lives of five people tied to a track by flipping a switch to sacrifice the life of one person tied to an alternate track. The Trolley Problem is useful because attributes of the "one person" on the alternate track can be manipulated to shed light on how people reason about a moral dilemma. Past research, for example, has shown that people are less likely to flip the switch on a family member or friend, and more likely to flip the switch on a nonhuman target or a member of the Nazi party (Petrinovich, O'Neill, & Jorgensen, 1993). According to the rules of W. Hamilton's (1964) formulation of kin selection, people's moral decisions should, on average, be biased toward favoring the well-being of those who are both reproductively viable and who share genes with them. In this study we tested two hypotheses about implicit rules that guide people's decisions in the Trolley Problem. First, we hypothesized that participants would be less likely to flip the switch on genetically related targets. Second, because youth is an indicator of reproductive viability, we also hypothesized that participants would be less likely to flip the switch on younger targets.

Method

A total of 659 men and women participated. Participants ranged in from 15-86 years of age, with a mean age of 32. Questionnaires were distributed to people passing through two different locations in a Midwestern city: a local park downtown, and the city's regional college campus. Individuals completed a consent form, reported their age and biological sex, and then read one of 32 hypothetical moral decision-making dilemmas. Each dilemma utilized the classic thought experiment from philosophy known as the "Trolley Problem" (see top center of poster). The original Trolley Problem forces the reader to decide whether they would save the lives of five people tied to a track by flipping a switch to sacrifice the life of one person tied to an alternate track. We created 32 different versions by manipulating the sex (male vs. female), age (2, 20, 45, and 70 years old), and genetic relatedness (0, .125, .25, and .50) of the one person tied to the alternate track. Participants filled out the questionnaire anonymously and after completion were asked to fold their response and place it in a secured box to ensure confidentiality. Participants were debriefed upon their completion of the moral dilemma.

The Original Trolley Problem

Imagine the following scenario: A trolley is running out of control down a track. In its path are 5 people who have been tied to the track by a madman. Fortunately, you can flip a switch that will lead the trolley down a different track to safety. Unfortunately, there is a single person tied to that track.

Would you flip the switch in this situation? (Yes/No)

* In the current study, we took the phrase "there is a single person tied to that track" and modified it to one of 32 different conditions, as indicated in table at right. For example, "...your 20-year old sister is tied to that track."

Table 1. Display of variables that were combined to form 32 different conditions of the moral dilemma.

Level of Genetic Relatedness	Age	Person Representing Age and Level of Genetic Relatedness
0	2	Stranger (Male/Female)
	20	Stranger (Male/Female)
	45	Stranger (Male/Female)
	70	Stranger (Male/Female)
.125	2	Cousin (Male/Female)
	20	Cousin (Male/Female)
	45	Cousin (Male/Female)
	70	Great Uncle/Great Aunt
.25	2	Niece/Nephew
	20	Half Brother/Half Sister
	45	Aunt/Uncle
	70	Grandmother/Grandfather
.50	2	Son/Daughter
	20	Sister/Brother
	45	Mother/Father
	70	Mother/Father

Figure 1. Effects of Participant Sex and Target's Genetic Relatedness on Likelihood of Flipping the Switch on Target

Figure 2. Effects of Participant Sex and Target's Age on Likelihood of Flipping the Switch on Target

Figure 3. Effects of Target Age and Genetic Relatedness on Likelihood of Flipping the Switch on Target

Results

We conducted logistic regression analyses to test the effects of participant sex, target sex, target age, and target relatedness on likelihood of flipping the switch on the target. Participant sex and target sex were treated as categorical predictors (0, 1); target age and target relatedness, each with four levels, were treated as continuous variables. The most parsimonious model with acceptable fit included three main effects and no higher order interactions, $-2 \log \text{likelihood} = 799.924$; Cox & Snell R Square = .144; Nagelkerke R Square = .193. In this model, female participants were less likely than male participants to flip the switch ($\beta = .402$, Wald's $\chi^2 = 13.85$, $p < .001$); across sex participants were less likely to flip the switch on targets of increasing levels of genetic relatedness ($\beta = -.608$, Wald's $\chi^2 = 59.67$, $p < .001$); and across sex, participants were less likely to flip the switch on targets at lower levels of age ($\beta = .402$, Wald's $\chi^2 = 26.40$, $p < .001$). These effects are displayed in Figures 1, 2, and 3 at left. This model correctly predicted 61.2% of "No" responses and 71.6% of "Yes" responses, for an overall correct prediction rate of 66.7%, well above the chance cut rate of 50%.

Discussion

We have replicated past studies showing that, when faced with an ultimatum of saving five lives or one life, people often choose five. However, when the one person is young or genetically related, people are less likely to sacrifice that one person for five others. These effects are additive: As seen in Figure 3, participants were most likely to flip the switch on a 70 year old stranger and least likely to flip the switch on a 2 year old close relative. Future research may expand this line of study through investigations of direct versus peripheral relations, wherein investment in direct relatives results in a higher likelihood of genetic transmission. Thus future research may test whether individuals will save the life of direct relatives more often than peripheral.

References

- Burnstein, E., Crandall, C., & Kitayama, S. (1994). Some neo-Darwinian decision rules for altruism: Weighing cues for inclusiveness fitness as a function of the biological importance of the decision. *Journal of Personality and Social Psychology*, 67, 773-789.
- Petrinovich, L., O'Neill, P., & Jorgensen, M. (1993). An empirical study of moral intuitions: Toward an evolutionary ethics. *Journal of Personality and Social Psychology*, 64, 465-478.
- Hamilton, W. D. (1964). The genetical evolution of social behavior. I and II. *Journal of Theoretical Biology*, 7, 1-52.

Acknowledgments

We thank the UWEC Office of Research and Sponsored Programs for supporting this research.