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The Chinese and American Students and the Trolley Problem: A Cross-cultural Study

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Abstract: People are routinely faced with making decisions. Some decisions are made quickly and easily while others may take reflection and research. Scholars in numerous disciplines such as behavioral economics, marketing, philosophy, psychology, and sociology have attempted to identify the variables that impact people's ethical/moral choices in the decision-making process. Still, the question of whether people use their heads (rationale) or their hearts (emotions) to make decisions remains unanswered. The present exploratory study hopes to contribute to the discussion on the influence of culture on people's choices. Working with samples from two cultures (China and USA) and using three variants of the Trolley Problem (Foot 1967), the participants' responses are used to identify the similarities and differences between their choices. The data suggest that moral decisions are linked to culture. The Chinese participants who are raised in a collectivistic culture seem to have a greater concern for others; the American respondents as products of an individualistic culture are less inclined to interfere in the lives of other people. The data also reveal that gender plays a role in altruistic behavior. Women are more likely to engage in helpful behavior than man. Lastly, the paper discusses the inconsistencies in choices by the respondents.

Keywords: decision making, Trolley Problem, inconsistency of choices, rational choice theory, utilitarianism.

1. Introduction

Although the Trolley Problem was introduced half a century ago, it has constantly drawn attention from scholars in several disciplines and generated hundreds of studies and thousands of citations. Philosophers, psychologists, neuroscientists, and other cognitive scientists have created different versions of the "kill-one-to-save-five" scenarios to understand the way people think about the distinction between killing and letting die. The quantity of literature belonging to "trolleyology" is impressive (Edmonds 2014). The critics of the Trolley Problem argue that it presents an unreal and imaginary situation and produces data of little scientific value. The critics also charge that what people may say in response to the trolley scenario may not be applicable in real life as people say one thing and do something entirely different, or that people will say what they think researchers want to hear. This is an argument that may be levied against all social and behavioral research using surveys, interviews, and focus groups: the frequently used tools in voter behavior, audience research, and consumer behavior.

The Trolley Problem may be a theoretical thought experiment conducted in the safety of a classroom or a laboratory, where no one gets hurt and the choices of the decision-makers (the participants) have no direct costs to them. However, it's an experiment that generates lively (at times, heated) discussions after the surveys are collected. It's an experiment that engages the participants and makes them evaluate their personal moral/ethical convictions.

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How close to reality is the situation of sacrificing one to save five? We argue that it is something the policymakers and individuals face frequently. Each political decision that results in redistribution of resources brings benefits to certain groups of citizens whereas certain other groups are economically "punished".

In recent times, the developers and programmers of self-driving automobiles have faced a “trolleyological” moral conundrum. A young mother pushing a baby-carriage suddenly steps in front of the self-driving car. Should the car swerve away from the mother and her baby and into the oncoming traffic, causing a massive multi-vehicle pileup killing and hurting a dozen people and the passenger in the self-driving car, or should the car stay on course and apply the brakes slowly, hitting the mother and her baby carriage? (Goodall 2016, Nyholm & Smids 2016)

In January 2019, the U.S. International Trade Commission (ITC) and Donald Trump had to decide on tariffs on parts and modules needed in the assembly of solar panels. The parts are imported from China. The panels are assembled and used in the U.S. The import of the parts impacted a handful of importers and the manufacturers in China. The tariffs that would result in a higher price of the panels would impact the U.S. solar industry, its workers, and the consumers. The ITC commissioners and Trump were not going to be impacted by the tariff decisions. On one track, there were the Chinese manufacturers and the importers, and on the other track, the American workers and consumers. Trump’s rationale: “China imposes tariffs on U.S. imports, there should be equivalent tariffs on the Chinese imports”. Consequently, the ITC commissioners recommended a tariff. The trolley was diverted to the track where the entire U.S. solar industry was tied to it (Mints 2019).

We contend that the Trolley Problem is neither outdated nor irrelevant in present times; however, our concern is not the choices made by the decision-makers but the variables that may influence people’s responses.

Rational choice theory (Arrow 1963, Savage 1954) assumes that, if an individual prefers red over green apples, they will always choose red apples if both types are available. Similarly, if one believes that action *X* is more efficient (saves time and money) than action *Y*, a rational person will always choose *X* if both courses of action are possible to take to reach a given goal. One is assuming that a rational actor has all the information about the costs and benefits of the two choices. To this classical idea of rationality, Simon (1957, 1972) offered an alternative: the notion of bounded rationality. Simon argued that, since people never have all the information about the costs, benefits, outcomes, and risks of each choice, they frequently fail to make the best decisions.

Kahneman and Tversky (1974, 1996) offering the concepts of heuristics and cognitive biases propose that humans are not rational creatures and make choices that most of the time shun logic. Gigerenzer (2002) warns that there is a major flaw in any system that tries to be overly rational in a highly unpracticable world. Neurobiologist Damasio (1999) notes that people who, due to some cognitive or developmental challenges, are unable to feel emotions are unable to make rational decisions. The implication: experiencing emotions is essential to decision-making. In stark opposition to moral philosophy, neuroscience holds that decision making is not logical but emotional.

We are interested in studying the consistency of choices when there is no reward, and when the recipients are total strangers. Our research aims to contribute to the discussion of the moral choices of the respondents to three scenarios based on the Trolley Problem introduced to the ethical and social science literature by Foot (1967) and elaborated by Thomson (1976, 1985).

2. The Trolley Problem

The Trolley Problem demonstrates the inconsistency of choices. It refers to a hypothetical situation in which one is supposed to be the driver of a trolley with jammed brakes. The trolley is charging down a steep hill with no way to stop it. On the track ahead, the driver sees five workers. At the last moment, the driver sees a spur track to one side and realizes that the trolley can be diverted to it to save the five workers. However, there is one worker repairing the spur track. The moral dilemma pointed by Foot (1967: 10–11) was: Is it morally right for the driver to divert the trolley and kill one worker instead of letting five workers die?

The situation described above was comparable to another, somewhat similar thought experiment, the Organ Transplant, in which five patients are waiting for organs at a hospital. A young man arrives for his annual physical check-up. His organs are a perfect match for the five waiting patients. The participants in the experiment are supposedly extremely gifted and lucky surgeons with a 100% success rate with organ transplants: i.e., no organ that they transplanted was ever rejected by a recipient. In this experiment, the question is whether a surgeon may kill a perfectly healthy person to save five lives (Thomson 1976:205–206, Thomson 1985:1395).

In both cases, the choices are identical: saving several lives at the "cost" of taking one. Yet, the typical reactions of respondents in these two situations are different: whereas the participants are likely to save the five workers in the Trolley case, they are strongly opposed to a similar option in the Organ Transplant scenario (Lanteri, Chelini & Rizzello 2008).

Numerous variations of the problem were coined by Thomson (1976; 1985) who proposed, for instance, to modify the Trolley case by assuming that the decision maker was not the driver but a bystander who could push a lever to divert the trolley from track A to track B. This version that increased the neutrality of the agent was named *Bystander at the Switch* (Thomson, 1985:1397). Over the years, scholars and theorists such as Singer (2005:339) have come to regard this scenario as the standard Trolley Problem. The choices in this scenario are letting one person die or letting five people die. Some scholars have phrased the alternatives as "killing one" or "letting five die" (Thomson 1976, Steinbock & Norcross 1994).

Another version, the Footbridge Dilemma, moves the decision maker to a footbridge over the trolley track. The runaway trolley is moving towards a group of five people. However, in this case, there is a chance to stop the trolley and save the workers by putting a massive object in the path of the trolley. Conveniently, an excessively overweight person is leaning over the footbridge looking at the trolley. If given a push, the obese person's body would stop the trolley. As in the previous experiments, the options are to save five lives by sacrificing one or to refrain from acting and let five persons die (Thomson 1976:207–208; 1985: 1409).

There are strong parallels between the Trolley Driver and Bystander at the Switch scenarios; in these two situations, either the driver changes the path of the trolley, or the bystander switches the trolley to a different track by pushing a lever. There is no contact with another human. There are also parallels between the organ transplant and the footbridge quandary. In these two cases, an individual must interact with another human – either by pushing a person to his death or killing a person to perform five transplants.

3. The Study

This article reports on the opinions of two samples: 52 Chinese and 70 American students. The data were collected through a self-administered paper-and-pencil survey. Prior to the survey, a focus group was conducted on the American campus to develop the test items on the instrument used for the data collection. The Chinese sample consisted of the Chinese students attending a university in Poland where all their lectures and coursework were conducted in

English. The Chinese students had been living in Poland for about one year before the survey was run. The American sample came from a university in Texas. All participants in the two sub-samples were undergraduate students. The data from Chinese students in Poland was collected in June 2017; the data from the American sample was collected in April 2017.

The instrument contained closed-ended items only. However, several of the respondents added their thoughts and comments on the survey forms. Some of these comments are presented in a later section of the paper.

Theoretical debates over the Trolley Problem have focused on explaining why the responses are different or inconsistent. We took a different approach. Instead of making attempts to provide acceptable reasons for such inconsistencies of choices, we focused on identifying the variables that may influence these decisions.

In our study, we used three versions of the Trolley Problem. In our versions, the trolley does not have a driver. Instead, it's a runaway trolley. We also removed the workers from the tracks and replaced them with helpless individuals tied to the tracks, unable to escape. This adjustment was made to eliminate responses such as: "I would shout at the workers to warn them and make them run away."

In the first scenario, the trolley is coming to a point where it can either go on track A or track B. On track A, a person is tied to the tracks unable to escape. If the trolley remains moving on track A, this person will be killed. The respondent – the participant in the study – is standing by a lever. By pushing the lever, they can change the trolley's path from track A to track B and save the person who is tied to the tracks. Since not much of track B is visible and one can't tell where it leads, we dubbed this version *Ill-informed Bystander*.

In the second version, we added five people to track B. These five are also tied to the tracks and unable to escape. If the trolley goes on track A, one person will die. If it goes on track B, five will die. The bystander must choose if they direct the trolley to track A and let one person die but save five, or direct it to track B and let five die. The bystander must make a choice: track A or track B. This was our version of Bystander at the Switch.

In the third scenario, the trolley is headed for five people on the tracks. Our respondent is standing on a footbridge, and at the edge of the bridge is an overweight person leaning over to watch the approaching trolley. The respondent can push the obese person over the bridge. The mass of his body will stop the trolley and save the five people. The fall and the impact of the trolley will kill the obese person. Respondents are told that they may not opt to throw themselves in front of the trolley as their body mass will not stop the trolley. This is essentially Thomson's (1976) Fat Man scenario.

Instead of verbal descriptions of the scenarios, we used drawings. Respondents were shown the first sketch (Ill-informed Bystander): one person tied to the track, and an empty track. Respondents were asked to record their response. Then, they were shown the second sketch where the trolley could be directed to tracks A or B with the outcome of saving five people at the cost of one or saving one and letting five be killed: i.e., Bystander at the Switch.

Respondents were asked to write their response. Finally, they were shown the third sketch, the Footbridge Dilemma that required pushing a person off the bridge and into the path of the trolley. While respondents recorded their response, they were neither allowed to go back and change their responses nor discuss the scenarios with other participants. Once the responses were turned in, participants were allowed to discuss the three scenarios.

4. The sample

The variables for the study were culture (individualist vs. collectivist), gender, and relational status: i.e., whether single or in relationship. Our rationale for choosing these two cultures was based on the difference in scores on the Individualism-Collectivism dimension (Hofstede, Hofstede & Minkov 2010) where, on a 100-point scale, the U.S. scores 91 points and China

20. Our intention is not to stereotype the 327 million Americans or 1.3 billion Chinese people as a homogenous group; however, the fact remains that, traditionally, Chinese culture has valued collectivism whereas American culture has valued individualism and self-reliance. We are fully aware that the Chinese culture is moving away from being a socialist to a capitalist system. At the same time, we realize that, with talk of free education and free healthcare for all, American society is moving away from being a purely capitalistic system toward social democracy. Even though Hofstede and colleagues' research results are highly controversial and not without their critics, common sense seems to dictate that Chinese culture, for the most part, is collectivist – at least more so than American culture.

Parents in almost all cultures raise boys and girls differently: not only in dressing them in boy and girl colors but also in the toys they give their boys and girls and the types of games they encourage them to play. The difference in treatment continues into the schools, universities, and workplace. Women are expected to play different kinds of roles than men and are expected to behave according to different sets of standards. Women's use of language differs from that of men; the emotion-display rules are different for men than for women. In most male-female relationships, the balance of power is tipped in favor of men. It is reasonable to stay that the worldview of women is different from that of men. Thus, it's reasonable to expect that the differences in the socialization of men and women may affect their decision-making.

We chose *relational status* as a variable to explore if being in a relationship or having a family might influence a person's attitude towards saving a life.

Assuming that culture, gender, and relational status may affect decision-making, we tested the following three hypotheses:

1. Culture has an impact on decision-making.
2. Gender has an impact on decision-making.
3. Relational status has an impact on decision-making.

The participants (N=122) were university students from the USA and China. The two samples consisted of 57 men and 65 women; 75 respondents were single, and 47 were in relationships. Since the data were of nominal and ordinal nature, Chi-square statistics were employed to make comparisons among and within the subsamples (Savage 1954, Moore 2010).

5. Data and results

As expected, in the case of the Ill-informed Bystander, most participants (79%) from both countries said they would push the lever to save a person's life. See Table 1.

Table 1: Will you save a person's life?

Country	Yes	No	Sample size
USA	45 (64.3%)	25 (35.7%)	70
China	43 (83%)	9 (17%)	52

Chi square = 36.089; the difference is significant at $p < .01$.

As noted, the U.S. scores 91 on the Individualism-Collectivism dimension (Hofstede, Hofstede & Minkov 2010), while China scores 20. This may explain why a large portion (34%) of the U.S. students choose not to interfere with another person's fate, the assumed thinking being: it's none of my business. China has a long tradition of being a collectivist culture, which may explain the greater level of concern for the well-being of a stranger. In regards to our first hypothesis, we may state that the individualism-collectivism dimension of culture affects decision-making. The Chinese respondents reported being more willing to help a person than the Americans did.

At this point, it is important to note that Hofstede and colleagues (2010) collected their initial data in the 1970s and '80s. In the past four decades, the United States has shifted closer to social democracy while China has embraced private ownership and some of the ideas that were strictly associated with capitalism and the market economy. We argue that, over the years, American culture has moved toward the collectivist end of the continuum while the Chinese culture has aligned more closely with individualist ideas. This is not to declare that the Chinese have abandoned their collectivist ideals or that the Americans have abandoned their individualism. It is likely that the differential of 71 points between China and the U.S. as was calculated in the '70s may have shrunk.

An alternative explanation, however, may be that Americans are less willing to act if the outcome of their action is uncertain (track B is not visible). In fact, in the second scenario (see below), their willingness to act was much higher.

When respondents from both cultures expressed an unwillingness to act to save a life when no apparent costs were involved, we felt that other variables might be at work. We analyzed the data on two variables: gender and relational status (see tables 2 and 3).

Table 2: Gender: will you save a person's life? Response: no.

Country	Men	Women	Differential
USA	41%	31.7%	9.3 p.p.
China	21.4%	12.5%	8.9 p.p.

The differences are not statistically significant.

Table 3: Relational status: will you save a person's life? Response: no. Single people.

Country	Yes	No
USA	29	16
China	25	5

Chi square = 3.1856; the difference is significant at $p < .10$.

For single people, the data showed that a slightly higher percentage of the Chinese sample said they would act to save a person. The difference is statistically significant at $p < .10$.

The overall comparison between the US and China samples did not reveal any significant differences in the variable *relational status*. However, among the American sample, those in relationships were slightly more inclined to save a stranger than single American students. There is partial support for the third hypothesis.

In making a choice between saving five people versus one in the second scenario, Bystander at the Switch, 110 persons (90%) said they would divert the trolley to the spur with one person to save the five tied to the main track. See Table 4.

Table 4: Will you save one life to save five?

Country	Yes	No	Total
USA	62 (88.6%)	8 (11.4%)	70
China	48 (92.3%)	12 (7.7%)	52
Total	110 (90.2%)	12 (9.8%)	122

No statistically significant difference between the American and Chinese samples was found.

In both cultures, a clear majority of respondents were willing to sacrifice one for the benefit of many: i.e., the utilitarian approach. In the case of the American sample, single respondents were more inclined to save five lives at the cost of one than respondents who were in relationships. The difference was significant at $p < .05$. Regarding gender, there were no differences between or among the two samples.

In the case of the Footbridge Dilemma – as reported in several previous studies – fewer respondents said they would push the man over to save five than in Bystander at the Switch.

Only 56 respondents (46%) said they would push the man over to stop the trolley and save the people on the track. The data are presented in Table 5.

Table 5: Will you push the fat man over to save five lives?

Country	Yes	No	Total
USA	43 (61.4%)	27 (38.6%)	70
China	13 (25%)	39 (75%)	52
Total	56 (46%)	66 (54%)	122

Chi square = 15.945; the difference is significant at $p < .001$.

Only 25% of Chinese respondents said they would push the person over to save five lives while 61.4% of American respondents said they would. This difference is significant.

There is no significant difference between the U.S. and Chinese samples based on gender or relational status. A previous study of Hispanic American students (Rehman & Dzionek-Kozłowska 2018) reported a difference of choices in the Footbridge scenario for single and in-relationship respondents. Single people were less likely to push the man over. However, our present data showed no such differences between the choices made by single students and those in relationships.

6. Discussion

In the second scenario, the choice was either to sacrifice one person to save five or save one and let five die. We assumed that most respondents would feel that the logical thing to do was to save five lives at the cost of one. Ninety percent of respondents used this rationale and said they would save five lives. It seemed the rational choice.

Responses to the Footbridge Dilemma have baffled psychologists and philosophers since the introduction of the Trolley Problem (Green et al. 2001). While most heart surgeons would not hesitate to perform a heart transplant if they knew that the donor was already dead and the procedure might give new life to the recipient, not many will agree to take the life of a healthy person to save five as in the Transplant Experiment. The decision to change the path of the trolley to save five people is a judgment based on logic and reason. To push a person to his death or to take the life of a healthy person becomes, for most people, a moral issue. Emotions, rather than reason, guide such moral decisions. Pushing a person in front of the trolley may be the rational thing to do, but most people would side with their emotions and act irrationally.

There is an academic difference between Bystander at the Switch and the Footbridge Dilemma. In case of the bystander, respondents were *required* to act: direct the trolley to track A or track B. In the Footbridge Dilemma, they *might* act: i.e., push the person over, or not act and let five people die. Even though the consequences of switching the trolley to track A and pushing the person are the same, the conditions are not. Only the utilitarian logic dictates that just as one should switch the trolley to save five lives, one should also act accordingly on the footbridge to save five lives. We do realize that the two scenarios are not exactly alike.

Some of the responses by participants shed light on how people rationalize their behavior:

- One of the students who chose not to do anything to save one person, in the first scenario, wrote: “it’s not my responsibility”.
- Another respondent commented: “I will not interfere with nature”.
- One respondent explaining his decision, in the second scenario, said: “it’s not for me to decide who lives and who dies”.

- In the case of the Footbridge Dilemma, several students (Chinese and American) wrote, "I cannot play God". One participant justified his non-action by saying, "I will not push the man. It's murder. It's against the law".

Mathematically, the outcomes in Bystander at the Switch and the Footbridge Dilemma are the same: sacrifice one person to save five. If that is the rational thing to do in Bystander at the Switch, the choices should be similar in the Footbridge Dilemma. The rational thing to do should be to save the five lives by pushing the obese person over. However, in the Footbridge scenario, more respondents are driven by their moral convictions rather than logic or reason. Table 6 presents the inconsistency in people's decision making. Two important observations may be made.

First, the percentages are lower in every category for the Footbridge Dilemma. Second, in all the five categories, the differentials are noticeably higher for the Chinese sample than the American.

Second, the differentials based on gender are not significant for respondents from either culture. The three highest differentials are in the Chinese sample.

Table 6: Inconsistency in decision making.

	Push the lever to save five lives	**Push a person to save five lives**	**Inconsistency in decisions (in percentage points)**
American sample	88.57%	61.42%	27.15 p.p.*
Males	86.2%	65.5%	20.7 p.p.
Females	90.24%	58.54%	31.7 p.p.
Singles	95.6%	64.4%	31.2 p.p.
In relationship	76%	56%	20 p.p.
Chinese sample	92.3%	25%	67.3 p.p.*
Males	96.43%	28.57%	67.86 p.p.*
Females	87.5%	20.83%	66.67 p.p.
Singles	96.67%	20%	76.67 p.p. *
In relationship	86.36%	31.82%	54.54 p.p.

* Significant at $p < .01$.

The lowest differentials are in the American sample. Chi-square tabulation reveals that the differential for the overall American sample is significant at $p < .01$. (chi square = 13.75). Chi-square tabulations also reveal:

- The differential for the overall Chinese sample is significant at $p < .01$ (chi square = 48.57).
- The differential for Chinese men is significant at $p < .01$. (chi square = 27.51).
- The differential for Chinese singles is significant at $p < .01$ (chi square = 36.27).

This does not imply that the Americans are indifferent to the well-being of others, or that they are more rational or consistent in their behavior than their Chinese counterparts. It simply suggests that Chinese culture, being more collectivist than American culture, may prompt different emotional reactions. American culture, being individualist, may drive people to be more self-centered and self-absorbed.

7. Conclusions

In our study, we tried to control for several variables that may influence respondents' choices. By selecting a homogenous sample of college-age students, we controlled for variations in age and cultural diversity. By employing hypothetical scenarios that remove genetic

relationships, we also controlled for the bias that might occur if subjects were to help their genetically connected relatives. The importance of such links has been demonstrated by, among others, Bleske-Rechek and colleagues (2010). We have tried to create a situation where the beneficiaries are unknown to the benefactors, and the anticipated return for the effort is nonexistent.

Our research confirms previous findings that people's choices are not fully consistent. The differences in the responses between the second and the third of our scenarios -- i.e., Bystander at the Switch and the Footbridge Dilemma – demonstrate that respondents are reluctant to act if required to be emotionally engaged in the process of decision-making with visible costs for the alternatives (see, e.g., Greene et al. 2001).

Given the limitation of the study due to sample size, we refrain from making any generalizations. We noted that females were slightly more willing to act than males, although the differences were relatively small. Our data do not allow us to identify any (statistically significant) difference between the choices made by single and non-single respondents.

It is evident that, when personal involvement and emotions are separated from a situation, people can make use of logic, reason, and rationale. Once moral convictions become involved (even when the logical outcomes are the same), people's choices become inconsistent.

Further research is needed with larger samples and different cultures. Our sample consisted of university students. We believe that samples with greater diversity in age and duration of relationship may shed light on decision-making. How many children one has and how old they are may also be variables worth considering. It may be useful to study the responses made by individuals pursuing different career paths. Bourget and Chalmers (2014) found that professional philosophers are much more reluctant to act not only in the Footbridge Dilemma but also in Bystander at the Switch: no more than 68.2% of participants in their study declared they would change the trolley's route to save the five lives. Examining the reactions of philosophy students who have been exposed to Kantian ideas and consequentialism might reveal the indoctrination effect of philosophical studies. Similarly, studying the responses of economics students, with training in utility maximization, may explain why people pursuing different career paths may respond differently to the same stimulus.

Scenarios such as justifying drone strikes and killing dozens of civilians to eliminate one terrorist leader or taking a stand to oppose abortion and reinstate capital punishment seem to suggest that the trolley industry is in vigorous health. Recent developments in cognitive sciences and practical philosophy assure us that even though the imaginative variations of the Trolley Problem may not bear much resemblance to reality, it helps us explore the nature of morality and continues to be a useful tool for coping with ethics and rationality.

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