The Effects of Attitude, Subjective Norm, Moral Norm, Anticipated Affect and Identity Appropriateness on Predicting People's Responses to Two Influential Moral Dilemmas

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Abstract

To investigate the factors that may influence people's responses to two influential moral dilemmas (the switch dilemma and the fat man dilemma) which were based on the classic Trolley Problem, 153 participants took part in an online questionnaire study. As expected, most participants chose to press the switch and not to push the fat man. In addition, among the five possible factors, attitude, moral norm and identity appropriateness could significantly predict individuals' moral decisions towards the two dilemmas. Moreover, the difference measure with action and inaction could explain more variance of the models than the single action measure. The study showed no supportive result for the effects of Dilemma Order and Decision Order.

Keywords**:** *trolley problem, Theory of Reasoned Action (TRA), attitude, subjective norm, moral norm, anticipated affect*

Introduction

Two influential moral dilemmas

Since a classic moral dilemma, the Trolley Problem, was first introduced by Philippa Foot in 1967, numerous variations of this original dilemma were invented to study humans' moral judgements and decisions (Thomson, 1976, 1985; Spranca, Minsk, & Baron, 1991; Unger, 1996; Singer, 2000; Greene, Sommerville, Nystrom, Darley, & Cohen, 2001; cited in Shallow, Iliev, & Medin, 2011). Among all the trolley dilemmas, two famous ones are respectively the original *switch* dilemma, and the *fat man* dilemma offered by Judith Jarvis Thomson in 1976. Also, this study is around these two moral dilemmas

According to the Trolley Problem (Foot, 1967; Thomson, 1976), a trolley is out of control and heading towards five people trapped on the railway track, and when the trolley reaches them, it will definitely kill all of them. In the *switch* dilemma, you can save the five people by pressing a switch to change the direction of the trolley to a side track where there is one person

standing, and once you press the switch, the one will definitely die. In the *fat man* dilemma, you can save the five people by pushing a fat man, who is large enough to stop the trolley, off the footbridge, and once you push the fat man, he will definitely die. In these two dilemmas, one needs to decide whether or not to press the switch, and whether or not to push the fat man. In other words, individuals need to decide whether they will sacrifice one person for the survival of five persons in these two situations.

Previous research

In the past studies, with regard to the *switch* dilemma, most people thought that pressing the switch was morally acceptable, and would choose to do it; while for the *fat man* dilemma, most people believed that pushing the fat man was morally unacceptable, and would reject to do it (Petrinovich, O'Neill, & Jorgensen, 1993; Greene et al., 2001; Cushman, Young, & Hauser, 2006; cited in Greene et al., 2009). BBC once did a survey on the *switch* dilemma with more than 1000 people and the result showed that 80% to 90% of the participants chose to press the switch (Rai, & Holyoak, 2009). In another study, the majority of participants, containing those who chose to press the switch in the *switch* dilemma, felt uneasy, hesitated and refused to push the fat man in the *fat man* dilemma (Lanteri, Chelini, & Rizzello, 2008). Some researchers believed that these patterns could be universal as they were so consistent (Hauser, 2006; Hauser, Cushman, Young, Jin, & Mikhail, 2007; Banerjee et al., 2011; cited in shallow et al., 2011).

With these findings, in the last few decades, most relevant studies focused on explaining that as for the same tragedy of sacrificing one individual to save five individuals, why people respond to the two dilemmas differently. Lots of the researchers attempted to find moral distinctions between these two dilemmas. Lanteri, Chelini and Rizzello (2008) claimed that people's responses to the two dilemmas were respectively triggered by moral reasoning (for the *switch* dilemma) and moral emotions (for the *fat man* dilemma). Also, some others believed that the asymmetry between the two dilemmas could be explained by the doctrine of double effect, which emphasizes that the harm (the one's death) caused as a foreseen side effect of the behavior (pressing the switch) may be permissible, whereas the harm (the fat man's death) caused as a necessary means (pushing the fat man) is impermissible (Aquinas, 13th century; cited in Lanteri et al., 2008).

The above studies are quite useful to help us to understand the implicit principles of

people's moral judgements and moral decisions. However, there is almost no study investigating the exact factors that may influence or even predict people's moral decisions towards the two dilemmas. As these trolley dilemmas are artificial and far away from real world issues, participants will have no relevant experience or existed position before answering the questions (Ahlenius, & Tännsjö, 2012; Hauser et al., 2007). This is conducive for us to probing the real factors that may affect human's decision making when encountering such moral issues.

Possible factors that may predict people's moral decisions

To explore the factors that may influence people's moral decisions, firstly the Theory of Reasoned Action (TRA) and the Theory of Planned Behavior (TPB) could be referred to because these two theories both are models for predicting people's behavioral intentions and/or behaviors. Although participants' responses to the trolley dilemmas will not involve specific behaviors, the moral decisions they make are similar to individuals' general behavioral intentions to some extent.

Mentioning the two theories, their main difference is that the TPB has the factor of perceived behavioral control, which stresses individuals' perceptions of their abilities to perform a behavior (Ajzen, 1988). In this study, as participants' decision makings are under their full volitional controls, there is no need to consider perceived behavioral control, thus, the TRA will be mainly referenced.

The core assumptions of the TRA are that people's behaviors can be determined by their intentions to perform the behaviors, and the intentions are formed by their attitudes toward the behaviors and their subjective norms (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975; cited in Thomas, Ellen, & Ajzen, 1992). In terms of attitude, it comprises one's beliefs about the outcomes if he/she performs the behavior, and one's evaluations of theses outcomes, and for subjective norm, it consists of one's perceptions that important individuals or groups for him/her think he/she should engage in the behavior or not, and one's perceptions that whether these referents themselves would perform the behavior or not, indicating individual's perceived social pressure to perform the behavior or not in general (Fishbein & Ajzen, 2010). In this case, people's attitude and subjective norm are introduced as the possible factors that may predict individuals' decisions towards the trolley dilemmas.

Considering the particularity of the Trolley problem, attitude and subjective norm may not cover all the important factors. Therefore, moral norm, anticipated affect and identity appropriateness are also imported.

Regarding to moral norm, it can be said to 'reflect internalized moral rules' (Eagly, & Chaiken, 1993, p. 177; cited in Manstead, 2000), it generally indicates the kind of people you ought to be and the kind of things you ought to do, and it can add the predictive ability of the TRA (Manstead, 2000). In this study, the scenarios are moral dilemmas, so moral norm could have a big effect on one's moral decisions.

As for the research on anticipated affect, it has shown that before making decisions, people may anticipate experiencing some positive or negative post-behavioral feelings, like pride, regret etc., and these feelings might influence their subsequent decision making (Janis, & Mann, 1977; Bell, 1982; Baron, 1992; cited in Manstead, 2000). There was an investigation of anticipated affect about safe sexual behaviors in the context of the TPB, and the result showed that anticipated affect may significantly add the prediction of the relevant behavioral expectations (Richard, van der Pligt, & de Vries, 1996), suggesting that it could add the predictive power of the TPB. Thus, it is regarded as a possible factor in this study. Since the scenarios participants face will be moral dilemmas which could cause their negative feelings, anticipated affect will be focused on regret and anxiety.

Meanwhile, for the factor of identity appropriateness, it can be related to the logic of appropriateness, which suggests that people's decisions are made by 'establishing identities and matching rules to recognized situations' (March, 1994, p. 58). Some researchers thought that identity appropriateness might be reflected within attitude (Eagly, & Chaiken, 1993), however, this argument is still in doubt. What was certain is that identity could play an important role in predicting people's behaviors (Sparks, 2000), so identity appropriateness is also treated as a possible factor. Under this circumstance, individuals who face the target situations will ask themselves that considering who I am and the kind of person I am, what is appropriate for me to do? This kind of questions will be presented in the questionnaires.

The above five variables are viewed as possible factors that may predict individuals' moral decisions toward the two dilemmas. Moreover, just as Fishbein (1980, cited in Raats, Shepherd, & Sparks, 1995) proposed, a behavior might be better predicted with the difference between

intentions to engage in alternative behaviors. In this case, participants' attitude, subjective norm etc. might be better reflected by their evaluations for both doing something (pressing the switch, pushing the fat man) and not doing something (not pressing the switch, not pushing the fat man) than just by their assessments for doing something. Thus, there will be measures of both 'taking action' and 'taking inaction' in this study. For instance, with action item, participants will evaluate '*My attitude towards pressing the switch is…*', while with inaction item, they will evaluate '*My attitude towards not pressing the switch is…*', and their difference (action minus inaction) will be tested to see if it could predict better than the single action measure.

The possible effects of Dilemma Order and Decision Order

In the most existed studies, Dilemma Order (the sequence of the appearance of two dilemmas) was fixed, and the *switch* dilemma was presented first, followed by the *fat man* dilemma. Considering the findings that participants responded to these two dilemmas differently, Lanteri et al. (2008) conducted a study to investigate whether Dilemma Order would influence people's moral decisions, and the results showed that fewer participants would choose to press the switch when the *switch* dilemma was presented second than when it was presented first, whereas people's responses to the *fat man* dilemma were unaffected. In this paper, the possible effect of Dilemma Order will be tested.

Simultaneously, although there has been no relevant research, Decision Order (the decision question presented before or after the items of five factors) may also have an impact on individuals' moral decisions because if decision is made last, participants will answer many questions towards the target dilemma before, and they may have more involvement in the dilemma before making final decision than in the situation that decision is made at the beginning. Thus, the possible influence of Decision Order will also be verified to see if people's involvements in the dilemmas will affect their moral decisions.

A statement of the research aims

There are several objects for this article. The main hypotheses are that firstly, participants' moral decisions towards the *switch* dilemma and the *fat man* dilemma are roughly consistent with the previous findings that most people chose to press the switch and not to push the fat

man; secondly, Dilemma Order and Decision Order may have significant effects on individuals' moral decisions; thirdly, the factors of attitude, subjective norm, moral norm, anticipated affect and identity appropriateness may significantly predict participants' decisions towards the two dilemmas; fourthly, the difference measure of action and inaction may better predict individuals' moral decisions than the single action measure in this study.

Method

Participants

One hundred and fifty-three participants (95 females, 58 males; M_{age} = 24.8 years, *SD* = 9.85), mostly students from the University of Sussex, took part in this study. Of these, 66.7% were from the UK, and 75.2% spoke English as their first language.

Materials

Each questionnaire included some initial questions (age, gender, nationality, mother-tongue and email address), and two moral dilemma scenarios, each of which was followed by measures of attitude, subjective norm, moral norm, anticipated affect, identity appropriateness and dilemma decision. Except for the two dilemma decision items, which used two-point and six-point scales respectively, the other items used seven-point scales.

In terms of the two moral dilemmas, one was a *switch* dilemma, which was based on Foot's (1967) original trolley dilemma, while the other was a *fat man* dilemma, which was based on Thomson's (1976) subsequent modified trolley dilemma.

Moral dilemmas. For the *switch* dilemma, the scenario showed that '*Imagine that you are a passenger on a train whose driver has just shouted that the train's brakes have failed, and who then died of the shock. On the track ahead are five people; the banks are so steep that they will not be able to get off the track in time. The track has a spur leading off to the right, and you can press a switch to turn the train onto it. Unfortunately there is one person on the right hand track. You can turn the train, definitely killing the one; or you can refrain from turning the train, letting the five definitely die.*'

Attitude, subjective norm, moral norm, anticipated affect, and identity appropriateness were each measured with 4 items, two relating to an action measure and two relating to an

inaction measure. For each variable, the score for the action (inaction) measure was the mean of the two items about taking action (inaction), and their difference measure is the score for the action measure minus the score for the inaction measure. All the items for attitude in relation to the *switch* dilemma are shown (below). Single illustrative items are presented for the other measures.

Attitude. Attitudes towards action ('pressing the switch') were '*My attitude towards pressing the switch is…*' (*extremely negative* to *extremely positive*) and '*My attitude towards pressing the switch is…*' *(extremely unfavorable* to *extremely favorable*) (r = .66). Attitudes towards inaction ('not pressing the switch') were '*My attitude towards not pressing the switch is…*' (*extremely negative* to *extremely positive*) and '*My attitude towards not pressing the switch is…*' *(extremely unfavorable* to *extremely favorable*) (r = .74).

Subjective norm. For example, '*Most people who are important to me probably think that I should press the switch*' (*strongly disagree* to *strongly agree*). For action measure, r = .75, and for inaction measure, r = .50.

Moral norm. For example, '*It is morally right for me to press the switch*' (*strongly disagree* to *strongly agree*). For action measure, r = .68, and for inaction measure, r = .61.

Anticipated affect. For example, '*If I pressed the switch, I would regret it*' (*strongly disagree* to *strongly agree*). For action measure, r = .53, and for inaction measure, r = .73.

Identity appropriateness. For example, '*Considering who you are and the kind of person that you are, how appropriate do you think it would be for you to press the switch?*' (*completely inappropriate* to *completely appropriate*). For action measure, r = .78, and for inaction measure, r = .81.

Dilemma decision. This part comprises two items. The first decision question was '*Imagine that you are in this situation. You must make the choice of either pressing the switch or not pressing it. Will you or will you not press the switch to change the direction of the train?*' (*I will press the switch* [1] or *I will not press the switch* [-1]). The second item was '*How confident are you that you would do this if you were in the situation described?*' (*not at all confident* [1] to *totally confident* [6]). Scores on these two items were multiplied together to form a measure of *subjective decision likelihood* of pressing the switch, such that higher scores indicate a greater confidence that they would press the switch.

Moral dilemmas. For the *fat man* dilemma, the scenario presented that '*Imagine that you are on a footbridge over the train tracks. You know trains, and can see that the one approaching the bridge is out of control. On the track on the other side of the bridge there are five people; the banks are so steep that they will not be able to get off the track in time. You also know that the only way to stop an out of control train is to drop a very heavy weight into its path. But the only available, sufficiently heavy weight is a fat man, also watching the train from the footbridge. You can push the fat man onto the track in the path of the train, definitely killing the fat man and saving the five people; or you can refrain from doing this, letting the five people definitely die.*'

The quantity and the structure of each type of subsequent question were as same as the *switch* dilemma.

Attitude. For example, '*My attitude towards pushing the fat man off the bridge is…*' (*extremely unfavorable* to *extremely favorable*). For action measure, r = .63, and for inaction measure, r = .54.

Subjective norm. For example, '*If I were to push the fat man off the bridge, most people who are important to me would probably*' (*disapprove strongly* to *approve strongly*). For action measure, r = .57, and for inaction measure, r = .43.

Moral norm. For example, '*I have a moral obligation to push the fat man off the bridge*' (*strongly disagree* to *strongly agree*). For action measure, r = .68, and for inaction measure, r = .64.

Anticipated affect. For example, '*I would feel anxious afterwards if I pushed the fat man off the bridge*' (*strongly disagree* to *strongly agree*). For action measure, r = .43, and for inaction measure, r = .67.

Identity appropriateness. For example, '*Considering who you are and the kind of person that you are, how fitting do you think it would be for you to press the switch?*' (*completely unfitting* to *completely fitting*). For action measure, r = .82, and for inaction measure, r = .73.

Dilemma decision. The first decision question was '*Imagine that you are in this situation. You must make the choice of either pushing the fat man off the bridge or not pushing him. Will you or will you not push the fat man off the bridge to stop the train?*' (*I will push the fat man off the bridge* [1] or *I will not push the fat man off the bridge* [-1]). The second item was '*How*

confident are you that you would do this if you were in the situation described?' (*not at all confident* [1] to *totally confident* [6]). Scores on these two items were multiplied together to form a measure of *subjective decision likelihood* of pushing the fat man, such that higher scores indicate a greater confidence that they would push the fat man.

Design and Procedure

Ethical approval for the study was granted by the Science and Technology Cross-Schools Research Ethics Committee (C-REC) of the university of Sussex.

The study has a 2 x 2 (Dilemma Order [the *switch* dilemma presented first, the *fat man* dilemma presented first] × Decision Order [decision made before the items of five variables, decision made after the items of five variables]) between group experimental design.

Since this was an online questionnaire study, participants were invited to participate by email, and after the experiment, they were debriefed by email as well. During the study, all the participants clicked the link and were randomly assigned to do one of the four questionnaire versions. Firstly, they answered the five initial questions. Then, they were told to read one of the two dilemmas, and to answer the related items with the imagination that they were in that situation. Afterwards, they were asked to read the other dilemma, and answered the relevant questions as before.

Results

Initial analyses: random allocation assessment

To test whether there were significant associations between Gender and Dilemma Order and between Gender and Decision Order, two Chi-square tests for independence (with Yates Continuity Correction) were performed. The results indicated no significant association between Gender and Dilemma Order, x^2 (1, n = 153) = .32, p = .57, phi = -.060; and between Gender and Decision Order, x^2 (1, n = 153) < .01, p = 1.00, phi = -.001.

A two-way between-groups analysis of variance was conducted to explore if there was an Age difference. Between the four groups, there was no main effect for Dilemma Order (F (1, 149) = .13, p = .72) and for Decision Order (F (1, 149) = 1.35, p = .25), and there was also no interaction effect.

Concerning the two dilemmas, Intercorrelations between key variables, including

subjective decision likelihood, and the action and difference (action minus inaction) measures of attitude, subjective norm, moral norm, anticipated affect and identity appropriateness, are each presented in Table 1 and Table 2. Meanwhile, the related Tolerance and VIF (Variance Inflation Factor) suggested no serious problem in applying the regression analyses

The impact of Dilemma Order, Decision Order and Gender on participants' dilemma decisions

In this study, 78.4% of the participants chose to press the switch, and 81.7% chose not to push the fat man. In more detail, 18.3% chose both to press the switch and to push the fat man; 21.5% chose neither to press the switch nor to push the fat man; 60.1% chose to press the switch but not to push the fat man; and no participant chose to push the fat man but not to press the switch.

Table 3 shows how many participants in each group chose to press the switch or to push the fat man. Besides that, a 2 x 2 x 2 (Dilemma Order × Decision Order × Gender) ANOVA was performed to test the influences of Dilemma Order, Decision Order and Gender on people's *subjective decision likelihood*.

Regarding to the effects on people's *subjective decision likelihood* of pressing the switch, the results suggested no main effect for Dilemma Order (F (1, 145) = .26, p = .61) and for Decision Order (F (1, 145) = 3.52, p = .06). However, there was a main effect for Gender (F (1, 145) = 4.44, p = .04), indicating that males were significantly more likely to choose to press the switch than females. Among the three variables, there was no interaction effect.

Also, There was no effect of Dilemma Order, F (1, 145) = .04, p = .84; of Decision Order, F (1, 145) = .02, p = .88; or of Gender, F (1, 145) = 2.67, p = .10, on participants' *subjective decision likelihood* of pushing the fat man. Meanwhile, there was no interaction effect.

As there was no significant Gender and Age difference among the four groups, and Dilemma Order and Decision Order did not affect participants' relevant decisions toward the dilemmas, all groups were combined into one to be analyzed for the subsequent regressions of participants' *subjective decision likelihood* scores.

The predictors of people's *subjective decision likelihood* on the two moral dilemmas

Multiple regression was used to analyze the factors of people's *subjective decision likelihood*. Considering people's attitude, subjective norm, moral norm, anticipated affect and

identity appropriateness as possible predictors, there were two models each for participants' *subjective decision likelihood* on (a) pressing the switch; (b) pushing the fat man, one with scores from items relating to taking action, and the other with scores from difference measure of taking action in relation to not taking action.

For the *switch* dilemma, Table 4 shows the model that is based on measures relating to taking that action. The model can account for 63.5% of the variance in *subjective decision likelihood* scores. The ANOVA test was statistically significant (F (5, 147) = 51.06, $p < .001$), and among the five variables, attitude (β = .18, $p = .01$), moral norm (β = .22, $p = .001$) and identity appropriateness (β = .43, $p < .001$) were significant predictors.

Table 5 indicates the model for the *switch* dilemma that is based on difference scores between action and inaction measures. The model can explain 69.0% of the variance in *subjective decision likelihood* scores, which is greater than the model only concerning the items relating to taking action. The ANOVA test was significant (F (5, 147) = 65.38, $p < .001$), and attitude (β = .31, $p < .001$), moral norm (β = .17, $p = .02$) and identity appropriateness (β = .28, $p = .002$) were significant predictors.

The above two models for the *switch* dilemma both indicates that the more positive people's attitudes were to press the switch, the more morally right people thought it to press the switch, and the more appropriate for identity people believed it to press the switch, the more they would choose to press the switch.

In terms of the model for the *fat man* dilemma that is based on the action measure, it can interpret 65.8% of the variance in *subjective decision likelihood* scores. The ANOVA test was significant (F (5, 147) = 56.52, $p < .001$). As Table 6 shows, attitude (β = .22, $p = .003$) and moral norm (β = .47, $p < .001$) were significant predictors, and the effect of identity appropriateness was marginally significant (β = .16, $p = .08$).

Mentioning the model for the *fat man* dilemma in Table 7, it is based on the difference measure of action and inaction, and the model can explain 69.3% of the variance in *subjective decision likelihood* scores, which is also greater than the model with the single action measure. The ANOVA test showed a significant result (F (5, 147) = 66.48, $p < .001$). In addition, the

significant predictors were attitude (β = .22, p = .01) and moral norm (β = .41, p < .001), and the effect of identity appropriateness was marginally significant (β = .17, p = .07).

These two models for the *fat man* dilemma both suggests that the more negative people's attitudes were to push the fat man, the more morally wrong people thought it to push the fat man, and the more inappropriate for identity people thought it to push the fat man, the more they would choose not to push the fat man.

Discussion

Regression analyses of individuals' moral decisions towards the two dilemmas

In view of the results from the regression analyses, some of the five variables could significantly influence the participants' moral decisions. For the *switch* dilemma, attitude, moral norm and identity appropriateness were the significant factors with either the action measure or the difference (action minus inaction) measure. Regarding to the *fat man* dilemma, with each of the two measures, attitude and moral norm were significant factors, and there was marginally significant effect of identity appropriateness. However, except the model for the *switch* dilemma with the action measure, in the other three models, the intercorrelations among most of the significant predictors were greater than .70, suggesting the possibility of multicollinearity. In fact, to what extent do attitude and moral norm (Manstead, 2000), and attitude and identity appropriateness (Sparks, 2000) correlate are still in debate and uncertain, thus, when the significant factors that may predict people's moral decisions are concluded, some reservations may also be necessary.

Furthermore, subjective norm, as an important factor in the TRA, was insignificant in affecting people's reactions to the dilemmas. As Miller (2005) stated, attitude and subjective norm may have different weights according to various situations. In this study, the participants did not need to take real actions, and they may feel less social pressure, so subjective norm could carry little weight. With regard to anticipated affect, it also showed little impact on impacting the participants' moral decisions. One of the reasons could be that the dilemmas are artificial and almost impossible to happen in reality, so it could be hard to imagine precise post-behavioral feelings.

With the difference measure, the model of the *switch* dilemma can explain 69.0% of the variance, which is 5.5% more than the model with the action measure, and the model of the *fat*

man dilemma can explain 69.3% of the variance, which is 3.5% more than the model with the action measure. Thus, the measure taking action and inaction into account may better predict people's responses to these two dilemmas than the single action measure to some extent. And the results also imply that even there are only two choices for a behavior (in this case, pressing the switch or not, pushing the fat man or not), attitude, moral norm and identity appropriateness might be better reflected by evaluating both doing and not doing something than just by assessing doing something.

The effects of Dilemma Order and Decision Order

Based on the results, the effect of Dilemma Order was not supported, and reversing the sequence of the appearance of two dilemmas did not cause significant changes in the participants' moral decisions. As mentioned above, Lanteri et al. (2008) thought that moral reasoning (for the *switch* dilemma) and moral emotions (for the *fat man* dilemma) affected people's reactions to different dilemmas, and once individuals dealt with the *fat man* dilemma at first, the specific emotional activation in this process would lead them to be more alert to considering moral violations, and then they might be more inclined not to press the switch in the following *switch* dilemma. In this study, the results may imply that individuals' responses to the target dilemma do not result from a single factor (moral reasoning or moral emotions), or the emotional activation in the *fat man* dilemma would not significantly impact people's moral decisions in the *switch* dilemma. No matter what the real reason is, it could be argued that for each dilemma, there might be some independent factors or specific processes that lead to humans' different responses.

In the meantime, there is also no evidence indicating the effect of Decision Order on changing people's reactions to the two dilemmas, which suggests that the different degrees of involvement in the target dilemma may not significantly influence individuals' moral decisions. Combined with the finding about the effect of Dilemma Order, individuals' responses to the two dilemmas seem to be comparatively stable.

Considering that Gender and Age difference among the four groups were insignificant, and there was no finding of the effect of Dilemma Order and Decision Order, all the four groups were combined to be one group so that there would be more participants in the target group, and the results of multiple regression could be more convictive.

Implications

Primarily, this article can be added to the literature of the Trolley Problem, and offer some quantitative data which is in shortage in this area. In addition, three factors that may significantly predict individuals' responses to the *switch* dilemma and the *fat man* dilemma, including attitude, moral norm and identity appropriateness, are proposed and verified, and this finding could also be useful when studying people's responses to other moral issues. Moreover, regardless of the two factors from the TRA, the augmented factors of moral norm and identity appropriateness seem to be capable of predicting people's moral decisions to some extent, and these two variables may provide some thoughts and clues for the development of the TRA and the TPB.

Limitations and future research

This paper used online questionnaires to study people's responses to two influential moral dilemmas. As there were action and inaction measure, the total number of the items was doubled than using a single measure, but for each measure, the items may not be sufficient.

For the future studies, the factor of culture can also be considered. Ahlenius and Tännsjö (2012) showed that Chinese and western people responded to the trolley dilemmas differently. Considering all the possible factors is useful for us to probe the nature of this problem. Simultaneously, there is no evidence showing the effect of Dilemma Order on changing participants' moral decisions towards the dilemmas, unlike Manstead's (2000) study. One possible reason is that the dilemmas used in this study were the versions with modified wording of the original trolley dilemmas. Therefore, more relevant studies should be done to clarify whether Dilemma Order can significantly influence people's moral decisions under some circumstances.

Conclusions

In the present study, the impacts of five variables, including attitude, subjective norm, moral norm, anticipated affect and identity appropriateness, on individuals' responses to two influential moral dilemmas were investigated. Meanwhile, whether Dilemma Order and Decision Order will significantly affect people's relevant moral decisions, and whether the difference measure (action measure minus inaction measure) has better predictive power than

the single action measure were tested.

Initially, consistent with the previous studies, most participants chose to press the switch and not to push the fat man, but the new finding is that male participants were more inclined to press the switch in the *switch* dilemma than female participants. In addition, for the *switch* dilemma, with either the action measure or the difference measure, attitude, moral norm and identity appropriateness are significant factors that may influence the participants' moral decisions towards the dilemmas; and for the *fat man* dilemma, with either the action measure or the difference measure, attitude and moral norm are significant predictors, and identity appropriateness is only marginally significant. What is more, the difference measure concerning both taking action and taking inaction seems to have more predictive power than the single action measure. Last, Dilemma Order and Decision Order did not show significant impact on affecting people's responses to the trolley dilemmas.

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Table 1

Descriptive statistics and intercorrelations of the switch dilemma (N = 153)

	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	*M*	*SD*
Attitude (action)	.86***	.49***	.45***	.44***	.52***	-.46***	-.60***	.63***	.64***	.61***	3.96	1.68
Attitude (difference)		.61***	.60***	.54***	.70***	-.44***	-.73***	.73***	.78***	.77***	0.75	2.52
Subjective norm (action)			.93***	.58***	.68***	-.20*	-.53***	.67***	.68***	.59***	4.85	1.26
Subjective norm (difference)				.55***	.65***	-.19*	-.53***	.65***	.68***	.61***	1.51	2.26
Moral norm (action)					.90***	-.18*	-.51***	.58***	.61***	.61***	4.48	1.53
Moral norm (difference)						-.29***	-.64***	.68***	.73***	.71***	1.08	2.51
Anticipated affect (action)							.65***	-.42***	-.46***	-.38***	5.26	1.34
Anticipated affect (difference)								-.69***	-.74***	-.69***	-0.25	1.96
Identity appropriateness (action)									.93***	.75***	4.44	1.34
Identity appropriateness (difference)										.77***	0.80	2.40
Subjective decision likelihood of pressing the switch											1.61	2.81

* p ≤ .05. ** p ≤ .01. *** p ≤ .001.

Table 2

Descriptive statistics and intercorrelations of the fat man dilemma (N = 153)

	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	*M*	*SD*
Attitude (action)	.89***	.53***	.57***	.62***	.65***	-.50***	-.59***	.70***	.71***	.65***	2.11	1.28
Attitude (difference)		.62***	.69***	.75***	.77***	-.48***	-.68***	.76***	.80***	.75***	-3.02	2.46
Subjective norm (action)			.93***	.65***	.63***	-.37***	-.57***	.57***	.59***	.60***	2.84	1.37
Subjective norm (difference)				.67***	.68***	-.43***	-.65***	.61***	.66***	.64***	-2.34	2.49
Moral norm (action)					.92***	-.44***	-.68***	.79***	.79***	.77***	2.56	1.57
Moral norm (difference)						-.48***	-.69***	.81***	.82***	.80***	-2.82	2.75
Anticipated affect (action)							.67***	-.51***	-.48***	-.38***	6.11	1.19
Anticipated affect (difference)								-.69***	-.69***	-.64***	2.48	2.39
Identity appropriateness (action)									.94***	.71***	2.48	1.45

Identity appropriateness (difference)	.76***	-2.75	2.75
Subjective decision likelihood of pushing the fat man		-2.91	2.96

* p ≤ .05. ** p ≤ .01. *** p ≤ .001.

Table 3

Participants' choices for the two dilemmas

Choice	The *switch* dilemma presented first		The *fat man* dilemma presented first	
	Dilemma decision presented first (*n* = 46)	Dilemma decision presented last (*n* = 30)	Dilemma decision presented first (*n* = 41)	Dilemma decision presented last (*n* = 36)
Choosing to press the switch	40 (87.0%)	22 (73.3%)	31 (75.6%)	27 (75.0%)
Choosing not to press the switch	6 (13.0%)	8 (26.7%)	10 (24.4%)	9 (25.0%)
Choosing to push the fat man	8 (17.4%)	5 (16.7%)	6 (14.6%)	9 (25%)
Choosing not to push the fat man	38 (82.6%)	25 (83.3%)	35 (85.4%)	27 (75%)

Table 4

Multiple regression of people's subjective decision likelihood of pressing the switch (the single action measure)

Variable	*B*	*SE B*	β	95% CI
Constant	-5.48	1.01		[-7.47, -3.49]
Attitude	0.30	0.11	.18**	[.07, .52]
Subjective norm	0.17	0.16	.08	[-.14, .49]
Moral norm	0.41	0.12	.22***	[.17, .64]
Anticipated affect	-0.14	0.12	-.07	[-.38, .10]
Identity appropriateness	0.90	0.17	.43***	[.56, 1.24]

Note. $N = 153$. CI = confidence interval. * $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$. †$p \leq .10$.

Table 5

Multiple regression of people's subjective decision likelihood of pressing the switch (the difference measure between action and inaction)

Variable	*B*	*SE B*	β	95% CI
Constant	0.70	0.16		[.39, 1.02]
Attitude	0.34	0.09	.31***	[.16, .52]
Subjective norm	0.09	0.08	.08	[-.07, .25]
Moral norm	0.19	0.08	.17*	[.03, .36]
Anticipated affect	-0.15	0.11	-.11	[-.36, .06]
Identity appropriateness	0.32	0.10	.28**	[.12, .53]

Note. $N = 153$. CI = confidence interval. * $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$. †$p \leq .10$.

Table 6

Multiple regression of people's subjective decision likelihood of pushing the fat man (the single action measure)

Variable	*B*	*SE B*	β	95% CI
Constant	-8.50	1.12		[-10.71, -6.30]
Attitude	0.50	0.16	.22**	[.18, .82]
Subjective norm	0.23	0.14	.11	[-.05, .51]
Moral norm	0.88	0.16	.47***	[.56, 1.20]
Anticipated affect	0.14	0.14	.06	[-.15, .42]
Identity appropriateness	0.32	0.18	.16†	[-.04, .68]

Note. $N = 153$. CI = confidence interval. * $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$. †$p \leq .10$.

Table 7

Multiple regression of people's subjective decision likelihood of pushing the fat man (the difference measure between action and inaction)

Variable	*B*	*SE B*	β	95% CI
Constant	-0.04	0.22		[-.47, .39]
Attitude	0.26	0.10	.22*	[.06, .47]
Subjective norm	0.09	0.08	.07	[-.08, .25]
Moral norm	0.44	0.10	.41***	[.26, .63]
Anticipated affect	-0.05	0.09	-.04	[-.22, .12]
Identity appropriateness	0.18	0.10	.17†	[.01, .38]

Note. $N = 153$. CI = confidence interval. * $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$. †$p \leq .10$.