Validation of the Korean version of the Moral Judgment Scale: A process dissociation approach to moral dilemmas

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ABSTRACT

Conway and Gawronski proposed a scale that independently measures utilitarian and deontological inclinations underlying moral judgments, based on an individual's endorsement of acceptable or unacceptable responses to 10 congruent and 10 incongruent moral dilemmas. This study aimed to develop and standardize the Korean version of this scale and examine the psychometric characteristics of various indexes extracted from it. The English version was translated and back-translated by two independent bilinguals. Inconsistencies between the backward translated version and the original version were resolved by consultation with an independent psychologist. Using an online survey, Korean adults aged 18 years or older were asked to read 20 dilemmas in the Korean version and indicate whether the action undertaken in each dilemma was acceptable, the probability that they would undertake the action themselves, and their level of tension and happiness. A total of 469 adults participated. Participants additionally answered questions that assessed utilitarianism and their level of antisocial personality disorder. Analysis showed that it was appropriate to use 20 dilemmas (10 incongruent and 10 congruent) in Korean adults but psychometric characteristics were different from those of the original English version. The correlation of probability that utilitarianism would drive responses (KU) and the probability that deontology would drive the responses (KD) was -.23 (p < .001). KU showed a significant correlation with utilitarianism (.18, p < .001) and a near-zero correlation with antisocial personality disorder. KD showed a correlation of -.27 (p < .001) with utilitarianism and a correlation of -.13 (p < .01) with antisocial personality disorder. A previous study that proposed that utilitarian and deontological inclinations are independent in moral judgment found a near-zero correlation between U and D, which was different from the result of the present study. Additionally, the limitations and implications of this study are discussed.

1. Introduction

1.1. Moral judgment

How to measure the level of human morality has long been a puzzle in psychology. Early on, Kohlberg (Kohlberg, 1969, 1976) believed that cognitive maturity is essential to moral reasoning and proposed his theory of moral development, which describes six stages that people progress through from childhood to adulthood. Haidt’s (2008) Moral Foundations Theory proposed that an individual’s values play an important role in moral judgment. Haidt proposed six moral foundations: care/harm, fairness/proportionality, loyalty/in-group, authority/respect, sanctity/purity, and liberty. Moreover, he believed that violations of values important to oneself can elicit specific emotions. For example, watching harm being done elicits the emotion of care, whereas seeing violations of fairness elicits the emotion of anger or guilt. Haidt presumed that these judgments and experiences are intuitive processes. Including affective elements when describing the moral decision-making process has enabled researchers to conduct various studies on people’s decision-making processes. In moral dilemmas, for which there is no right answer, people’s responses have been largely classified into two types: responses guided by the utilitarianism principle, wherein the choice that minimizes harm is chosen from multiple alternatives, and responses guided by the deontological principle, wherein the choice that violates moral standards is rejected regardless of the overall harm. In the classic runaway trolley dilemma, the choice to do nothing to the runaway trolley and not intervene in a person’s death even if it will kill five people is considered a deontological choice, whereas manually switching the track to sacrifice one life to save five others is considered a utilitarian choice.

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The Dual Process Model (Greene, 2007) attempted to provide a systematic explanation of how emotional and cognitive processes contribute to moral judgments. Following the dual process model, the aforementioned trolley dilemma may be explained as follows: directly harming or killing people (e.g., with one’s own hands) causes a greater aversive emotional reaction than remotely harming or killing them (e.g., by pressing a button). When the emotional reaction is sufficiently strong (Greene et al., 2001), or if there is insufficient time to think (Greene et al., 2008), the emotional reaction dominates the decision-making process. In addition, a previous study investigated the relationship between anxiety and moral judgment in a series of written dilemmas adapted from Greene’s trolley dilemma task (Perkins et al., 2013). These results suggested that in a condition of decreased anxiety induced by the anti-anxiety drug lorazepam, participants were more willing to harm others in interpersonal moral dilemmas (i.e., where harm was inflicted directly), regardless of whether that harm was for selfish reasons or utilitarian reasons. This result therefore suggests anxiety exerts a general inhibitory effect on directly harmful acts towards other people. In such a case, people’s moral judgment is driven by the deontological principle. In contrast, when people have sufficient time to think, resources, and motivation, cognitive processes are activated and people’s moral judgment is driven by the utilitarian principle. A number of previous studies have explored judgments made in moral dilemmas, in which one is influenced by deontological, utilitarian, or both principles, and explored predictive variables (Bartels, 2008; Greene et al., 2004; Pellizzoni et al., 2010). For example, it has been found that participants with greater working memory capacity were more likely to make utilitarian judgments (Moore et al., 2008), while participants with more intuitive thinking styles were more likely to make deontological judgments (Bartels, 2008).

These empirical studies have facilitated the development of methods for measuring whether an individual makes a deontological or utilitarian judgment in moral dilemmas. For example, Greene et al. (2004) attempted to measure utilitarian inclinations underling people’s moral judgments by constructing personal and impersonal moral dilemmas, which were assumed to elicit different strengths of emotional reaction. Recently, Christensen et al. (2014) selected and formulated 46 dilemmas available in the literature and extracted psychological factors for each dilemma (e.g., personal force, benefit recipient, intentionality).

The dual process model states that deontological and utilitarian judgments are independent and distinct processes that are negatively correlated, and, as a result, the two principles compete in difficult, high-conflict moral dilemmas. Researchers who support the dual process model presume that the deontological and utilitarian principles constitute opposite ends of a single continuum and have conducted empirical studies. Recently, Conway and Gawronski (Conway and Gawronski, 2013) proposed that the strengths of these two inclinations, which are activated when making moral judgments, may differ between individuals, and that it is impossible to assume that the two inclinations are located along one dimension.

1.2. Process dissociation in moral judgment

Conway and Gawronski (2013) attempted to develop a measurement approach that does not rely on the assumption that deontological inclinations and utilitarian inclinations are negatively correlated and that can therefore independently measure deontological inclinations and utilitarian inclinations within individuals. To this end, they adopted Jacoby’s Process Dissociation (PD) (Jacoby, 1991) procedure. Jacoby’s PD procedure was not originally developed in the moral psychology field. The key idea of this procedure is to create two conditions, one of which leads to divergent responses, while the other leads to convergent responses, for questions that are similar in content. Conway and Gawronski (2013) created an incongruent and a congruent condition for dilemmas describing similar situations (see Appendix A).

Incongruent dilemmas were designed to depict the outcomes of the action that the person chooses as more beneficial than harmful, so that deontological inclinations and utilitarian inclinations would be in conflict and work in opposition. Each incongruent dilemma had a congruent version. These congruent dilemmas present almost identical situations but the outcomes of the person’s action are more harmful than beneficial, and therefore the probability that deontological inclinations and utilitarian inclinations will compete was low. Overall, incongruent moral dilemmas are situations that can generate divergent responses, and congruent moral dilemmas are situations that will not.

PD in moral dilemmas was summarized using a processing tree in previous research (Conway and Gawronski, 2013, p. 220). This categorized the paths that lead to an acceptable or unacceptable response to an immoral action in each moral dilemma into three cases. In congruent dilemmas, (1) harm is judged as unacceptable when utilitarianism drives the response, (2) harm is still judged as unacceptable if utilitarianism does not drive the response but deontology drives the response, and (3) harm is judged as acceptable only when neither utilitarianism nor deontology drives the response. Similarly, in incongruent dilemmas, (1) harm is judged as unacceptable when utilitarianism does not drive the response, (2) harm is judged as unacceptable when deontology drives the response, (3) harm is judged as acceptable either when utilitarianism drives the response or when neither utilitarianism nor deontology drives the response. By combining the inclinations that drive the response in each condition, the probability that utilitarian or deontological judgment had an effect on individuals’ acceptable or unacceptable response to congruent and incongruent conditions can be calculated. From the results, the probability that utilitarianism drives the response (U) and the probability that deontology drives the response (D) are calculated from the following equations.

\[
U = p(\text{unacceptable} | \text{congruent}) - p(\text{unacceptable} | \text{incongruent})
\]

\[
D = p(\text{unacceptable} | \text{incongruent}) / (1 - U)
\]

By calculating U and D parameters independently, the unique properties of each moral inclination during moral judgments in dilemmas might be elicited.

1.3. Culture and moral judgment

Cultural differences can be manifest in moral judgments. Individuals facing a moral judgment usually compare their moral norms or values to the dilemmatic situation. Previous research shows that high arousal emotions are more frequently experienced in Eastern or collectivist cultures (Lim, 2016) and that harmful actions are regarded as less moral in Western or individualist cultures (Buchtel et al., 2015). These results suggest that preferred moral standards or norms may vary by culture. The bigger the difference between the norm and the situation, the higher the intensity of the emotion, which might result in strong deontological inclinations. In addition, cognitive appraisal of moral dilemmas can be understood by referring to the standards of the culture to which the individual belongs.

Cultural differences in moral judgments were investigated using the classic version of the trolley problem. Gold, Colman, and Pulford (2014) showed that Chinese people were less willing to sacrifice one person than the British. Another study (An and Trafnimow, 2014) suggests that Koreans require more negative affect to choose utilitarian judgments. The results of previous research imply that the decisions made by individuals and the inclinations operating their moral judgments can differ by culture. Therefore, to test the hypotheses, standardized scales in home languages which can measure utilitarian and deontological inclinations independently should be developed. Although the aforementioned studies are meaningful in identifying the cultural differences in moral judgments, the inclinations were not measured, and the 20 dilemmas scenario was standardized.
Congruent and incongruent 20 dilemmas were translated into Korean in an experimental study (Lee et al., 2018). However, it is not clear whether the scale was developed by translation and back-translation procedures. In addition, the study reported reaction times and deontological judgment proportions but did not report on the psychometric properties of each inclination. Therefore, it was assumed necessary to develop a Korean version of the Moral Judgment Scale, and to examine basic properties of the scenarios (acceptance of the immoral choice, behavioral intention, arousal, and valence), and to obtain descriptive statistics for the inclinations.

1.4. Overview of the current research

The aims of this study were as follows: First, the 20 moral dilemmas (10 incongruent and 10 congruent) developed by Conway and Gawronski (2013) were translated and back-translated into Korean to develop a final version in Korean and to standardize the Korean version of the Moral Judgment Scale. Second, the psychological experiences that Korean adults have when responding to the 20 dilemmas were reviewed to discover their psychometric features (acceptance, behavior intentionality, and valence). Third, the relationships between deontological and utilitarian inclinations were explored and the correlations of the inclinations with antisocial tendencies were examined to obtain convergent and divergent validity.

2. Methods

2.1. Participants and procedure

A total of 469 Korean adults aged 18 years or older participated in the online survey during October2019. The instructions were as follows: “Please assess the various situations that people may face and provide your opinion for each situation.” Dilemmas and questions were presented to those who agreed to take part after they had read the consent form and ticked the ‘agree to participate’ box. Participants responded to the 20 dilemmas of the Korean version of the Moral Judgment Scale (Appendix B) and then completed questions that assessed utilitarianism and antisocial tendencies. After providing their responses to the questions of the scale, participants indicated their gender, age, level of education, and place of residence. As compensation for participating in the study, participants were given points corresponding to eight dollars by the online survey organization. Prior to the online survey, a pilot study was conducted offline on 10 college students, which showed that about 20 min was required to complete the survey.

Of the participants who took part in the online survey, 465 provided usable data. Four participants were excluded as they did not respond to 10 or more of the total of 20 moral dilemmas. The final 465 participants were found to reside in 16 cities and provinces in South Korea. It was found that 39.6% (186) of the respondents were residents of Seoul, where about 20% of the country’s population live. Of the participants, 34.8% (163) were male, 64.0% (300) were female, and 1.3% (6) did not indicate their gender. The mean age was 31.37 years (SD = 14.20). The youngest participant was 18 years old, and the oldest was 67 years old. With respect to level of education, 62.9% (295) were college graduates, 34.8% (163) had a high school diploma or less, and 2.3% (11) did not provide a response.

2.2. Ethical considerations

This Study was approved by the Institutional Review Board of Honam University (approval number: 1041223-201907-HR-08). As data collection was performed through an online survey, a written consent form was displayed on the screen and participants agreed to participate by ticking the relevant assent box. Participants were assured of confidentiality and anonymity.

2.3. Measurement and scales

2.3.1. Korean version of the Moral Judgment Scale

The original version of the Moral Judgment Scale (Greene, 2007) consists of 10 dilemmas. Conway and Gawronski (2013) extended the dilemmas to include 10 original incongruent dilemmas and 10 modified congruent dilemmas. Incongruent dilemmas describe dilemmas wherein the benefit outweighs the harm caused by the action, so that deontological inclinations and utilitarian inclinations work in opposition. For each of the 10 incongruent dilemmas, a parallel congruent dilemma was created. In these dilemmas, the action causes more harm than benefit and the probability that utilitarian inclinations and deontological inclinations will compete is low.

In Conway and Gawronski’s experiment (2013) dilemmas were presented one at a time on a computer screen in random order. After reading each dilemma, participants were asked to indicate whether the action would be appropriate or inappropriate according to their opinion (Greene et al., 2001).

The content and questions of the original scale was translated into Korean by a bilingual who did not know the study’s purpose or hypothesis. The main differences between original scale and translated scale were found with respect to the translation of a specific noun, the fact that singular/multiple is unclear in Korean, and the fact that the point of time is unclear in Korean. It was thought that these differences were not qualitative but related to linguistic habits; therefore, the translated content was sent to another bilingual for translation from Korean to English. A psychologist, for whom a consultation was requested by the investigator, reviewed the back-translated version and the original version. Inconsistencies in the expression or words were corrected during this process.

The present study was an online survey. For the first 250 participants who completed the survey, incongruent dilemmas were presented first, followed by congruent dilemmas. For the 251st participant and thereafter, the dilemmas were presented in reverse order. For each dilemma, participants responded whether the described action of the person in the dilemma was appropriate or inappropriate for each condition. Additionally, they were asked to indicate on a 6-point scale the probability that they would undertake the described action themselves if they were the person in the dilemma (“1” = “never,” “6” = “certainly”), how tense (“1” = “very relaxed,” “6” = “very tense”) and how happy (“1” = “very unhappy,” “6” = “very happy”) they were while reading each dilemma. No significant differences in responses were found with respect to the order in which incongruent and congruent dilemmas were presented.

2.3.2. Utilitarianism

The Oxford Utilitarianism Scale, developed by Kahane et al. (2018) and adapted by Jang (under review) for use in Korea, was used. This scale consists of a total of 9 items, which are answered on a 5-point scale, with “1” = “Very Happy” and “3” = “Very Sad.” In the present study, Cronbach’s α = .75. The mean score of the 9 items was used for the analysis.

2.3.3. Antisocial personality disorder

The standardized Korean Antisocial Personality Disorder Scale, a measure modified by extracting only the antisocial personality disorder items from a scale developed by Hylar (1994) to diagnose 10 types of personality disorder, and standardized for the Korean population by Kim et al. (2000), was used to assess antisocial tendencies. This scale consists of 29 items answered using a yes/no response format. Fourteen items assess antisocial tendencies, while 15 items assess past conduct problems. Higher total scores indicate higher levels of antisocial personality. In the present study, the reliability coefficient computed using

The online survey company was ‘DolSurvey’ located in South Korea (http://www.doolit.co.kr/).
Incongruent conditions, which showed that con

3.1. Characteristics of moral dilemmas

To determine whether incongruent conditions lead to divergent responses and congruent conditions converge to unacceptable responses in the Korean version of the Moral Judgment Scale as intended in the original scale, the frequency and percentage of unacceptable responses were calculated. Additionally, behavior probability, tension, and happiness for each dilemma were presented to examine the characteristics of the 20 dilemmas.

Next, traditional analysis and PD analysis employed by Conway and Gawronski (2013) were performed. In the traditional analysis, the proportion by which the action was judged as inappropriate in incongruent moral dilemmas was calculated. This is called the traditional bipolar index (TBI), and its distribution, mean value, and SD were calculated. The probability that utilitarianism (KU) and deontology (KD) drive the action in the Korean version of the Moral Judgment Scale were calculated, and their distributions, mean values, and SDs were computed.

Lastly, the correlations of TBI with KU, KD, utilitarianism, and the level of antisocial personality disorder were explored, and non-parametric tests were performed to show gender- and level of education-related differences.

3. Results

3.1. Characteristics of moral dilemmas

Table 1 shows the frequency and percentage by which the participants judged the specific immoral action of the person in the dilemma as inappropriate for each of the 20 dilemmas, the mean and SD of the probability that the participant would undertake that action themselves in that particular situation, the mean and SD of level of tension and happiness the participants felt when reading each dilemma, are presented in Table 1.

It was found that the frequency ranged from 24.2% to 92.9% for the 10 incongruent conditions, which showed that conflict was aroused between utilitarian and deontological inclinations, and led to divergent responses depending on the individual. In contrast, all respondents had inappropriate responses in the congruent condition of the Time Machine, Car Accident, Hard Times, Crying Baby, Relationship, Abortion, and Torture dilemmas. This is consistent with the effect assumed for the congruent conditions when the original scale was developed. In other words, this shows that utilitarian and deontological inclinations were not in conflict and the participants’ responses were driven by deontology because the action itself was immoral and did not lead to a beneficial net outcome.

However, inappropriate responses for the Vaccine Policy, Animal Research, and Border Crossing dilemmas were 63.0%, 63.9%, and 84.0%, respectively. In particular, consistent with the results that around 60% of participants judged the action in the Vaccine Policy and Animal Research dilemmas as inappropriate, the mean value of the probability that the participant would undertake the action that the person in the dilemma is considering was 3.06 for Vaccine Policy and 3.35 for Animal Research, which were somewhat higher than 3.0. In the Vaccine Policy, Animal Research, and Border Crossing dilemmas, the level of tension was somewhat lower and the level of happiness was somewhat higher compared with the remaining seven dilemma conditions.

3.2. Correlational analysis

Correlations between TBI calculated from 10 incongruent dilemmas, probabilities of utilitarian judgement calculated from 20 dilemmas, probabilities of deontological judgement calculated from 20 dilemmas, utilitarianism, antisocial personality disorder, antisocial tendencies, and past conduct problems are shown in Table 2.

The results a very high correlation of TBI and KU (r = -0.91, p < .001) and a moderate high correlation of TBI and KD (r = -0.58, p < .001). In addition, KU and KD showed a correlation of -0.23 (p < .001). Utilitarian inclinations measured with a separate scale were negatively correlated with TBI (r = -0.25, p < .001) and KD (r = -0.27, p < .001) and positively correlated with KU (r = 0.18, p < .001). Therefore, it appears that measurement methods based on utilitarianism or deontological inclinations in moral dilemmas have convergent validity.

The present study also examined the correlations of moral judgement with antisocial tendency, past conduct disorder, and their sum, the level of antisocial disorder. Both TBI indexes, higher values of which indicates stronger deontological inclinations, showed a significant but weak negative correlation with antisocial tendencies (r = -0.11, p < .01) and the level of antisocial personality disorder (r = -0.12, p < .01). Consistent with this result, KD showed a negative correlation of similar strength with antisocial tendencies (-0.17, p < .01) and the level of antisocial personality disorder (r = -0.13, p < .01). KU, which indicates the probability of utilitarian judgement from 20 dilemmas, showed a near-zero correlation with all three antisocial personality-related values.

### Table 1. Characteristics of 20 moral dilemma.

| Dilemma              | Incon (N, %) | Con (N, %) | Behavior probability (M, SD) | Tension (M, SD) | Happiness (M, SD) |
|----------------------|--------------|------------|-----------------------------|-----------------|-------------------|
|                      | Incon. | Con. | Incon. | Con. | Incon. | Con. | Incon. | Con. | Incon. | Con. | Incon. | Con. |
| Time Machine         | 306 (65.9) | 464 (100.0) | 2.74 (1.33) | 2.87 (1.26) | 3.66 (1.19) | 3.77 (1.06) | 3.02 (0.86) | 2.73 (0.91) |
| Car Accident         | 365 (78.7) | 464 (100.0) | 3.20 (1.23) | 2.31 (1.03) | 4.28 (1.23) | 4.14 (1.29) | 2.10 (1.00) | 2.15 (0.92) |
| Hard Times           | 431 (92.9) | 463 (100.0) | 2.12 (1.27) | 1.89 (1.19) | 3.74 (1.23) | 3.59 (1.22) | 2.10 (1.00) | 2.22 (1.03) |
| Crying Baby          | 340 (73.3) | 463 (100.0) | 3.05 (1.36) | 2.74 (1.36) | 4.37 (1.27) | 4.07 (1.23) | 1.92 (0.96) | 2.13 (0.90) |
| Relationship         | 387 (83.4) | 460 (100.0) | 2.67 (1.45) | 2.00 (1.23) | 3.39 (1.15) | 3.56 (1.25) | 2.90 (0.93) | 2.33 (1.00) |
| Abortion             | 132 (28.4) | 461 (100.0) | 4.25 (1.31) | 3.58 (1.54) | 3.69 (1.16) | 3.65 (1.14) | 2.68 (0.94) | 2.54 (0.95) |
| Torture              | 180 (39.0) | 460 (100.0) | 3.84 (1.47) | 2.82 (1.37) | 3.94 (1.17) | 3.55 (1.10) | 2.56 (1.05) | 2.78 (0.96) |
| Vaccine Policy       | 112 (24.2) | 291 (63.0) | 4.29 (1.21) | 3.06 (1.40) | 3.72 (1.14) | 3.55 (1.10) | 2.93 (0.93) | 2.80 (0.94) |
| Animal Research      | 199 (43.0) | 295 (63.9) | 4.11 (1.36) | 3.35 (1.39) | 3.57 (1.09) | 3.44 (1.06) | 2.81 (0.99) | 2.82 (0.96) |
| Border Crossing      | 278 (60.0) | 388 (84.0) | 3.32 (1.25) | 2.46 (1.31) | 3.96 (1.13) | 3.51 (1.15) | 2.75 (0.90) | 2.75 (0.90) |

Incon. = Incongruent condition.

Con. = Congruent condition.
In contrast, past conduct disorder showed a near-zero correlation with TBI, KU, and KD. In addition, antisocial personality disorder showed a high correlation with antisocial tendencies (r = .86, p < .001) and past conduct problems (r = .83, p < .001), while antisocial tendency and past conduct problems showed a correlation of r = .44 (p < .001). On the other hand, utilitarianism and antisocial indexes showed a correlation close to zero (r < .08, n.s.).

Additionally, a multiple regression analysis was conducted predicting KU and KD by antisocial tendencies and past conduct problems, and the results were consistent with correlational analysis. Specifically, neither antisocial tendencies (β = .03, t = .55) nor past conduct problems (β = .07, t = 1.39) predicted KU. In contrast, not past conduct problems (β = .03, t = .56) but antisocial tendencies (β = -.18, t = -3.51, p < .001) significantly predicted KD.

### 3.3. Characteristics of the index from traditional and PD analyses

Table 3 summarizes the descriptive statistics results of the six indexes. First, the bipolar index value, which is based on the assumption that utilitarianism and deontology are treated as anchors at the ends of a single continuum, was calculated using two different methods. First, the traditional method used the 10 incongruent moral dilemmas from the 20 dilemmas for calculation. That is, the proportion of inappropriate responses among the 10 incongruent moral dilemmas was calculated (TBI). In addition, the PD analysis used by Conway and Gawronski (2013) was applied to the 10 dilemmas to calculate the probability that utilitarianism would drive the response (KU) and the probability that deontology would drive the response (KD).

The results showed that the distributions of the other six indexes were significantly non-normal (Zs > 2.20, ps < .05). However, the statistics were between 0 and 1 and, except for the KD, the skewness and kurtosis were also within the acceptable range. However, kurtosis was greater than 2 for the KD when all 20 dilemmas were used for the calculation, showing a negatively skewed distribution.

A Mann-Whitney test was used to examine the gender- and level of education-related differences for the five indexes that could be used for statistical analysis. The means for gender and educational level of the five indexes and Mann-Whitney Z values are shown in Table 4. The results show that females consistently had higher deontological inclinations than males. That is, in all five indexes, females were found to have significantly higher deontological inclinations. In addition, the college graduate group had higher deontological inclinations than the group with high school diploma or lower. More specifically, there were significant differences in TBI and KD values by level of education.

Additionally, the correlation of TBI, KU, and KD with age was calculated. Age was significantly and negatively associated with TBI (r = -.09, p < .05) and KD (r = -.14, p < .002). The correlation of age and KU was not significant (r = .03, p = .479).

### 4. Discussion and conclusion

#### 4.1. Korean version of the Moral Judgment Scale

The first purpose of this study was to validate the Korean version of the Moral Judgment Scale using a process dissociation approach using twenty moral dilemmas. To this end, the English version of the 20 moral dilemmas used by Conway and Gawronski (2013) was translated into Korean. The translation procedure included translation and back-translation by bilinguals, and inconsistencies were reviewed to develop the final version. Because the process of understanding and judging moral dilemmas may vary depending on the culture, it was necessary to examine whether it is appropriate to use all 20 dilemmas of the original scale or whether some dilemmas should be added or excluded. For this purpose, the psychometric characteristics based on the responses given by Korean adults to the 10 incongruent dilemmas and their congruent versions were reviewed. Of the 10 dilemmas predicted to be congruent, the last three dilemmas, namely the Vaccine Policy (8th), Animal Research (9th), and Border Crossing (10th) dilemmas were judged inappropriate by 63.0%, 63.9%, and 84.0%, respectively, of Koreans. Therefore, it appears that, for Koreans, conflict was aroused between utilitarian and deontological inclinations regarding topics like Vaccine Policy, Animal Research, and Border Crossing.

It may seem that people did not pay close attention when responding to these three dilemmas because these dilemmas were answered last. However, this is unlikely because the proportion of people who judged the given action inappropriate increased again to 80% in the 10th dilemma, compared to the 8th and 9th dilemmas, and an additional analysis showed no differences resulting from the response order. One
could also raise the possibility that the deontological principle was strongly activated in disease-related dilemmas because of COVID-19. However, the data collection of this study was completed in the fall of 2019, before there was any report of Wuhan pneumonia or the coronavirus, making such a possibility very unlikely. It is possible that this result reflects the fact that vaccine developments or animal experiments for health and disease treatment may strongly activate utilitarianism in Koreans. In fact, Table 1 shows that the probability that the participants would undertake the action that the person in the dilemma is contemplating doing was somewhat higher in these two dilemmas compared with the other dilemmas. Furthermore, the participants experienced less tension and higher happiness when making moral judgments. Moreover, KD showed a negatively skewed distribution with kurtosis greater than 2.

4.2. Utilitarianism and deontology among Koreans

The second purpose of the present study was to examine the correlation between KU and KD and their correlations with utilitarianism and antisocial personality disorder in Korean adults. To this end, all 20 dilemmas were used to calculate KU and KD and their correlations were determined, which showed that KU and KD had a correlation of .23 (p < .001). This result was different from the correlation (.09) found in a previous study (Conway and Gawronski, 2013), which proposed that the two inclinations are independent.

Moreover, correlations of KU and KD to the TBI were found to be somewhat different from those found in the previous study. TBI is designed in a way that higher TBI values indicate stronger deontological inclinations, whereas lower values indicate stronger utilitarian inclinations in moral judgment. TBI showed a correlation of .58 with KD, which was a lower absolute value than .75 found in the previous study. These results suggest a stronger inclination to utilitarianism is associated with a weaker inclination to deontology when making moral dilemma judgments in Korean adults. However, it seems that making utilitarian judgements in moral dilemmas is clearly different from preferring utilitarianism in general. KU showed somewhat small correlations with utilitarianism, which were .18.

This study measured utilitarian tendency and explored its relationships with TBI, KU, and KD. The findings were helpful in understanding the relationship between KU and KD inclinations in moral judgment among Koreans. As utilitarianism showed positive correlations with KU and TBI and positive correlations with KD, the desirable validity of the Korean version of the Moral Judgment Scale was supported. In addition, the findings implied that during moral judgment among Koreans, KU and KD did not operate independently, which was consistent with the negative and significant relationship between KU and KD in this study.

The present study also has implications for correlations between utilitarian judgements and antisocial tendencies. Bartels and Pizarro (2011) used the traditional method of calculating bipolar scores and found that the tendency to make a utilitarian judgment was positively correlated with antisocial tendencies. The present study found that the TBI were negatively correlated with antisocial personality disorder and antisocial tendencies, which is consistent with the previous study. These results indicate that the low probability of the tendency to prefer utilitarian judgment is directly related to antisocial personality in moral dilemmas. In other words, utilitarian judgements are found to have a small but significant correlation with antisocial tendencies.

Additional analyses showed that females and those with higher education had lower utilitarian inclination than males and those with a lower educational background. In addition, older the participants, lower was the deontological inclination. There are several studies including gender and moral judgment, and a previous meta-analysis (Friedsorf et al., 2015) examined the relationship between gender and utilitarian and deontological judgments. The results showed that females had lower utilitarian and higher deontological inclinations than males, which is consistent with the findings of the present study. Previous studies have interpreted this gender difference as arising from the fact that females have stronger emotional reactions in moral dilemmas. The present study examined differences in emotional reaction by gender in 20 dilemmas and found that females reported more tension in the incongruent condition of the Torture dilemma, Animal Research dilemma, and the congruent condition of the Animal Research dilemma and less happiness in the incongruent condition of the Animal Research dilemma and the congruent condition of the Abortion dilemma. These results reject the hypothesis that utilitarian inclinations in females result from emotional reactions. The relationship between emotion and deontological decisions does not appear to be simple as feelings of positivity at the time of judgment (Valdesolo and Desteno, 2006) and mirth (Strohminger et al., 2011) reduced deontological judgments in previous studies.

Very few previous studies have found relationships between level of education, age, and inclinations in moral judgment. The mechanisms that operate in the process of lowering of utilitarian inclination with higher levels of education and lowering of deontological inclination with increase in age, need to be explored through future studies.

4.3. Limitations and future direction

The limitations of the present study and suggestions for future research are as follows. First, pros and cons of online survey should be discussed. This method might be helpful in collecting honest responses in the moral context wherein social desirability works. However, concerns with respect to representativeness and reliability can arise. This study used the convenience sampling method which caused limitations in representativeness of the sample. Responses were obtained from 469 adults aged 18 years or older from 16 cities and provinces. The sample size was about four times greater than the number of questions and the sample is limited because of oversampling of people living in Seoul and females, and lack of stratified sampling. The online method was also vulnerable to reliability issues such as insincerity or inattentiveness. As 465 out of 469 participants were assumed to express sincere and attentive responses, the level of reliability was presumed to not cause

| Table 4. Means and Mann-Whitney Z values of TBI, KU, and KD by gender and education. |
|-----------------|-----------------|-----------------|-----------------|
| Index          | gender          | Education       | Z               |
|                | male | female | <13 years | >12 years | Z   |
| TBI            | .55  | .61    | -3.19**   | .61        | .55 | -2.50* |
| KU             | .36  | .30    | -2.60**   | .31        | .34 | -1.41 |
| KD             | .84  | .87    | -2.60**   | .88        | .82 | -3.30**|

TBI = Traditional Bipolar Index from 10 Incongruent dilemmas; KU = probability of utilitarian judgment from 20 dilemmas of Korean version of Moral Judgment Scale; KD = probability of Deontology judgment from 20 dilemmas of Korean version of Moral Judgment Scale. Z = Z value of Mann-Whitney test.

*p < .05; **p < .01.
distortion in the findings. However, in the future, systematic analysis of factors that affect moral judgments in Koreans will be needed with offline survey and stratified sampling. Second, to control for order effects, counterbalancing was performed with half of the participants given congruent dilemmas after incongruent dilemmas and the remaining participants given the two conditions in reverse order. However, the order in which each dilemma was presented was not randomly structured, and it was not possible to directly check participants’ response integrity. Third, different indexes calculated based on participants’ responses to the dilemmas did not form a normal distribution. In addition, it is not yet clear whether the lack of a normal distribution is a characteristic found in this study or a characteristic of the indexes. Previous studies that have used these indexes did not provide information regarding this. Therefore, there is a need to examine this matter with a greater sample size, and if lack of normality is repeatedly observed, it will be necessary to modify the equations used for deriving these indexes to make various analyses possible. Fourth, possibilities derived from the correlational analyses of the present study were not directly tested and make various analyses possible. Fifth, although some of the words and expressions used in the dilemmas should be confirmed with a study designed to directly test these hypotheses. Fifth, although some of the words and expressions used in the dilemmas were modified to fit Korean culture, the topics of the dilemmas were not drawn from Korean culture. Therefore, this scale is limited in fully measuring the process of moral judgment in Koreans. Thus, there is a need to develop dilemmas that are appropriate for Koreans.

Declarations

Author contribution statement

E. Jang: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

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Data availability statement

Data will be made available on request.

Declaration of interests statement

The authors declare no conflict of interest.

Additional information

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