

# Altruistic Economic Behaviors and Implicit Worldviews<sup>†</sup>

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## Abstract

The main purpose of this paper is to study how the individual differences in implicit worldviews regarding categories versus relationships affect altruistic behavior towards parents, children, and non-family members, using the data obtained through surveys conducted in Korea, Japan, and the US. Our analyses revealed international differences that are consistent with Nisbett's theory, which postulates that, compared with Westerners, Easterners tend to use relationships more than categories. We found statistically significant effects of implicit worldviews on some altruistic behaviors. In addition, our findings suggest that confidence in spiritual beliefs in explicit worldviews has significant effects on some altruistic behaviors.

Keywords: implicit and explicit worldviews, categories, relationships, altruism

JEL Classification: D03, D64

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## 1. Introduction

Altruism and intergenerational transfers have been widely studied in economics (see, for example, Fehr & Schmidt, 2006). Despite the reluctance to use a cultural factor as the determinant for the economic outcomes because of its ambiguity and the difficulty associated with its measurement, authors of several studies that have recently been conducted in the field of economics have attempted to analyze the possible impacts of individual beliefs and preferences on a variety of economic outcomes (for a survey, see Guiso et al., 2006). In a recent study, in which data on China, India, Japan, and United States was analyzed, Horioka (2014) found substantial international variations in altruism. To explain the variation that is not explained by income differences, culture emerged as a natural candidate. Some researchers have recently started to study worldviews in order to explain international differences in intergenerational altruistic attitudes (see, for example, Kubota et al., 2013 for a comparative study of Japan and the United States, and Akkemik et al., 2013 for a study of Turkish people living in Turkey and in Germany).<sup>7</sup> These authors have found that certain elements in explicit worldviews (or belief systems), such as confidence in worldview beliefs, have statistically significant effects on intergenerational altruistic attitudes, and can explain substantial proportions of international differences in them.

The work reported here thus aimed to increase our understanding of how implicit worldviews affect an individual's altruistic economic behavior towards parents, children, and non-family members. Following the approach Hiebert (2008) proposed for studying cultures in anthropology, in our work, we assume that a worldview exists behind each culture and consist of explicit and implicit levels. According to Hiebert, different types of logic operate at the implicit level of the worldview, the most important ones being algorithmic logic and relational logic. This classification is in line with Nisbett's (2003) theory of reasoning that compares Westerners and East Asians, indicating that, relatively speaking, compared to East Asians, Westerners tend to use categories more, while relying on the relationships less. Nisbett's hypothesis—based on intellectual traditions in ancient Greece and ancient China, as well as experimental evidence—is that Westerners would have a greater tendency to categorize objects than would Easterners. However, it should not be inferred that every Westerner categorizes, while every Easterner uses relationships. In other words, the arguments made above are made based on the difference is in distributions, which implies that a greater number of Westerners and Easterners would use categories and relationships, respectively. Nonetheless, it is possible

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<sup>7</sup> These authors focused on a type of intergenerational altruistic behavior studied by Bhatt and Ogaki (2012), whose work is part of the literature of the economics of cultural transmission and socialization (see Bisin and Verdier 2011 for a survey).

that an individual Westerner would use relationships, just as an individual Easterner would categorize.

In our work, we used data obtained through surveys conducted in Korea, Japan, and the US, which contain various measures of implicit and explicit worldviews, as well as individual preferences. We found that implicit worldviews have statistically significant effects on some altruistic attitudes. In addition, our analyses revealed that confidence in spiritual beliefs in explicit worldviews has significant effects on some altruistic behaviors. Our work differs from the previous studies in this field mainly due to the usage of data that represent implicit worldviews about categories and relationships. The estimation results reported here thus contribute to shedding light on the effect of an individual foundational framework that is formulated at the implicit level on altruistic economic behaviors.

The remainder of the paper is organized as follows. The main variables used in our analysis of worldview and confidence are described in Section 2, while Section 3 describes the data used in our study and the economic framework that underpins it. The estimation results are summarized and discussed in Section 4. The results of the robustness check are explained in Section 5 and Section 6 concludes the paper.

## **2. Worldviews**

Hiebert (2008) defines “worldview” in anthropological terms as “the foundational cognitive, affective, and evaluative assumptions and frameworks a group of people makes about the nature of reality which they use to order their lives” (pp. 25-26). A worldview is behind each culture, and Hiebert (2008) considers explicit and implicit levels of a worldview. Culture can be expressed with several levels, which consist of the surface, explicit and implicit elements.

We adapt Hiebert’s concepts of explicit and implicit levels of a worldview for our purpose of the analysis of effects of culture on economic behaviors as in Figure 1. As shown in Figure 1, observed patterns of economic behaviors are at the top level of culture. Rituals that are studied by anthropologists are also at the top level.<sup>8</sup> The next level is the explicit worldview, which consist of systems of belief. Hiebert (2008) describes that belief systems encode the cultural knowledge. Finally, the bottom level of culture is the implicit worldview, which consists of categorical and relation logics, and epistemology. These are unobservable foundations, on which the explicit culture are structured and established. We hypothesize that these explicit and implicit elements of culture act as significant determinants for the individual altruistic economic behavior.

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<sup>8</sup> Hiebert (2008) explains that these rituals help people to define, understand and establish the social norms, which are essential to preserve their culture and society.

### **Implicit Worldviews: Relation Logic**

We measured the difference in the implicit worldviews by asking the survey respondents the following question, “which figure does not belong with the other three figures?” (see Figure 2). In the three countries included in this survey, most participants chose the third one because of its different size relative to the others (Table 1). We consider this as evidence of the use of algorithmic logic or categories when making a selection. On the other hand, some respondents selected other figures as being different from others, and they typically interpret the image as representing a family, consisting of the father, the mother, and the child. This is interpreted as evidence of the usage of relational logic or relationships based on the example of a psychologist A.R. Luria (1976)<sup>9</sup>, which is explained by Hiebert (2008, p 43).

The immediate selection of one figure, irrespective of the respondents’ perception of why they chose it, can be thought as being affected by their implicit worldview that determines how people perceive the world. Among the individuals that rely on relationships, some differences can be noted, as those that view the first or the fourth figure as distinct from the remaining three can be interpreted to have the worldview valuing family relations. It is assumed that the respondents that made such a selection tend to view three figures in a row as a family unit consisting of either a father, a child, and a mother, or a father, a mother, and a child. Thus, the first or the fourth figure would not belong to these two family units. However, the interpretation of these three figures as representing one core family unit (e.g., the order of the family members) can be different between cultures or regions. More specifically, the selection of the second figure can be interpreted in several ways. One possible interpretation is that respondents that made this selection see the third and the fourth figures as a unit representing one parent and a child, and consider the first figure as the other parent who is distanced from his/her own core family. In this interpretation, the second one is not a member of the core family of the parents and a child (first, third, and fourth figures). However, it is also possible that the second figure is the child’s grandmother, i.e., the husband’s or the wife’s mother. As Table 1 shows, in all analyzed countries, most participants chose the third figure as not belonging to the group. As mentioned above, in this work, we focus on the differences in distributions of the choices between countries and can reveal that a greater number of respondents from the US chose the third figure compared to their counterparts that took the survey in Japan and Korea. In Korea, furthermore, there is an even greater variation in answers. This is consistent with Nisbett’s hypothesis that, on average, Westerners tend to use categories more than Easterners do.

### **Explicit Worldviews**

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<sup>9</sup> Two examples of A. R. Luria (1976) are explained in Hiebert (2008). For details, please refer to Appendix 1.

A culture has both explicit and implicit levels of a worldview. We now turn to study how the explicit level of the worldview affects economic behaviors. For this purpose, we follow Kubota et al. (2013) in assuming multiple worldviews at the explicit level for modern people who are exposed to many cultures through books, televisions, movies, interactions of people from other cultures, etc. We assume that people attach subjective probabilities to different worldviews, and as a result attach subject probabilities to different beliefs.

In our empirical analysis, we analyzed the effect of subjective probabilities attached to belief related to Luriaspiritual and non-spiritual matters, as these are believed to affect one's behavioral patterns (Figure 1). Spiritually directed confidence variables are based on the following questions: (i) Whether God / Gods exist; (ii) God is watching and sees all bad deeds; (iii) Life after death exists; and (iv) Heaven exists. Similarly, non-spiritually based worldview is constructed from the answer to the question "human beings evolved from other living things."<sup>10</sup> We constructed two variables that represent the direction of the degree of confidence toward (non-)spiritual matters. For *spiritually* ("non-spiritually") *directed confidence* we assigned one point to each spiritual question to which the respondent answered with "completely agree" ("completely disagree"), as well as to the non-spiritual question, if the answer was "completely disagree" ("completely agree"), and zero otherwise. Once these scores were determined, the total was calculated (Please see the 6th row of Table 1, under "Confidence in worldview beliefs"). This data revealed some interesting country differences in the confidence in worldview beliefs.<sup>11</sup> More specifically, Americans have strong confidence only in spiritual matters, whereas Koreans have stronger confidence in both spiritual and non-spiritual matters in comparison with the Japanese.

For the purpose of modeling how worldviews affect economic behavior, each person was considered to attach different subjective probabilities to the truthfulness of each of the worldviews. Thus, a high subjective probability attached to a worldview indicates a high level of confidence to the belief in non-spiritually and/or spiritually directed worldview. It should be noted that, in our approach, cultural differences in different countries do not indicate that everyone in one country has the same worldview, but rather that the distributions of the subjective probabilities are different across the analyzed countries. For example, a striking cultural difference between the United States and Japan found by Kubota et al. (2013) was that, on average, Americans are much more confident in their worldview beliefs than are Japanese.

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<sup>10</sup> The score range for (non-)spiritual questions in the Korean survey is 0 to 100. For better comparison, each question of (non-)spiritual nature is recoded on a scale ranging from 1 to 5. The estimation in this paper is conducted with the recoded variables.

<sup>11</sup> The degree of confidence is measured as a binary indicator that equals 1 if the answer to a (non-)spiritual question is either "completely agree" or "completely disagree", and zero otherwise. For the estimation, spiritually and non-spiritually directed confidence variables are used to measure the degree and direction of one's confidence in spiritual matters.

However, this should be interpreted as indicating that, among Japanese, some people can still be more confident than an average American, and some US citizens could have less confidence than Japanese do.

### **3. Data and Econometric Method**

The data used for the analyses conducted in this study are based on the questionnaire survey entitled "Preference and Life Satisfaction Survey", which has been conducted as a part of Osaka University 21st Century Center of Excellence Program. This survey was first conducted in Japan in February 2004 using a random sample of 6,000 individuals, selected by a placement method and has since been conducted annually. The same questionnaire survey was conducted annually in the US (in 2012, it included 3653 individuals). However, in Korea, it was conducted only in 2012, with a random sample consisting of 1009 individuals. In this study, we use the 2012 data, as this was the only time point when the survey was conducted in the three countries, allowing the same variables to be used in the analysis.

We created the dependent variable using the answers to the question, "how much of your own family income per month would you be willing to give to your (i) parents, (ii) child, and (iii) others to help out if they had only one-third (for others, one-fifth) as much family income per person to live on as you do?" Three ordinal variables were created from the aforementioned five answers (1 for 0%; 2 for up to 2%; 3 for more than 2%).<sup>12</sup> The analyses revealed similar trends in the degree of donations to parents, child, and others across the three studied countries (Table 2). Approximately 80-90% of the respondents indicated that they would be willing to provide financial support to their parents and the child in all three countries. Charitable donation aimed at helping others is more generous in the US, where around one half of the respondents answered that they would be willing to give more than 2% of their household income to help others in need. Figure 4 depicts the variations in the degree of donations to parents, child, and others by country, where similar trends can be observed across the three countries. It is noteworthy that, 20-40% of the respondents answered that they would not donate to help strangers in financial difficulty.

## **4. Estimation Results**

### **4.1. Intergenerational Altruism/Charity and Confidence by Country**

Tables 3-1 through 3-3 present the estimation results about altruistic behaviors using ordered probit regressions. Table 3-1 shows the results pertaining to the Korean respondents, which suggest that logic/relation-based worldview is associated with individual decision to give

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<sup>12</sup> The reason why we categorized the degree of donations to parents, child, and others into three tiers (0%, up to 2%, and more than 2%) is that we found a non-linear trend at the threshold level of 2%.

one's own household income to the family and others. In addition, those who think that the first figure looks isolated from the other three figures are less likely to give their income to others in financial difficulty. This finding can be interpreted as indicating that such individuals place great value on the relationship with their own family, which makes them assign lower importance to helping others. However, this result does not necessarily imply that they statistically significantly would give a greater proportion of their income to their family members. In contrast, those who selected the second figure as not belonging to the group are less likely to care about their own family and are less likely to contribute to the family income, if needed. As explained in Section 2.1, those who chose the second figure may consider the first one as the parent who is distanced from the rest of the core family—the third and the fourth figures—possibly representing a unit of one parent and a child. If this assumption holds true, the significant negative signs can reflect less willingness to provide financial support to the family members when the bond of the core family is not strong.

The same trends associated with logic/relation-based worldviews are observed with and without controlling for relation-related confidence and behavioral traits, in addition to demographic variables. Regarding spiritually directed confidence, individuals that have strong confidence in what they believe in seem to be willing to make a donation for a good cause, whereas those with non-spiritually directed confidence are less likely to donate in order to help others. In addition, in Korea, Christians who are deeply dedicated are willing to give their income for others, and those with low discount rate, who are deemed more patient, are most likely to donate to help both their parents and others.

In case of Japan, as shown in Table 3-2, only fourth choice has statistically significant effect on donation behavior of the respondents, as those who thought that the fourth figure did not belong with the remaining three were more likely to give their income to their children. We interpret this result as indicating a strong bond between a husband and a wife, which are considered as the first and second figures. This, in turn, leads to more pronounced sense of altruism toward children when the respondent uses the relational logic rather than the algorithmic logic. In addition, individuals exhibiting spiritually directed confidence are more likely to donate in order to help others, compared to those demonstrating non-spiritual confidence. In addition, Christians and Buddhists that are deeply religious tend to give a part of their income for a cause aimed at helping others. The distinct difference observed in Japan is that having a child has a strong effect on the altruistic behavior of the respondents. More specifically, those that have a child are less likely to help their parents and others, as they would rather share their household income with their own children.

Lastly, our analysis pertaining to the US sample revealed no significant effect of relational logic worldviews, probably due to very small variations in the choices (Table 3-3). The degree

of devotion to their religion also seems to have no significant effect among the US respondents, with and without controlling for some other additional variables. However, the (non-)spiritually directed confidence has statistically significant (negative) positive effects on the individuals' decision to donate in order to help others. This is in line with the results obtained for the Japanese sample. In addition, Christians and/or Buddhists that are deeply devoted to their religion tend to give a part of their income for others in Korea and Japan only.

In all three countries, people exhibiting non-spiritually directed confidence are less likely to donate for others. On the other hand, having spiritually directed confidence has statistically significant positive effects on the individuals' decision to donate for others in Japan and the US only. In Korea, the positive effects are only significantly associated with donations to one's family, but not with the charitable donation to others. However if the questions regarding spiritually directed confidence are separately controlled (please see four questions used to measure an individual confidence in spiritual related worldview in Section 2 and results are presented in Table 4-1), the same effects are also observed in Korea. Therefore, it can be said that spiritually (non-spiritually) directed confidence variables are positively (negatively) associated with charitable donations to others in all three studied countries. In addition, Christians and/or Buddhists that are deeply devoted to their religion tend to give a part of their income for others in Korea and Japan only.

#### **4.2. Intergenerational Altruism/Charity and Confidence with Yes/No Dummies**

Tables 4-1 through 4-3 present the estimation results of the ordered probit regressions, with "yes" or "no" dummies corresponding to the (non-)spiritual questions. The aim of this analysis was to investigate in a greater detail which worldviews have stronger association with the altruistic behavior. Answers to the (non-)spiritual questions are rated on a 5-point scale ranging from 1 (completely disagree) to 5 (completely agree). Thus, the "yes" dummy takes the value of one if the respondents choose the response 4 or 5, and zero otherwise. In contrast, the "no" dummy takes the value of one if the respondents choose the response 1 or 2, and zero otherwise. The base value for "yes" and "no" dummies corresponds to the answer 3 ("neither completely agree nor completely disagree"), which implies that the respondent does not have strong views regarding any of the spiritual / non-spiritual questions.

First, Table 4-1 shows the results pertaining to the Korean sample. In Korea, spiritually directed worldviews are overall positively related to the willingness to donate to others, whereas non-spiritually directed worldviews are negatively associated with charitable giving. Specifically, if the respondents believe in the existence of God(s) and Heaven, they are more likely to donate in order to help others. Similarly, those who do not believe in life after death and Heaven, and that God is watching them are less likely to donate for others. This indicates



that an individual's confidence to his/her own belief in spiritually directed worldview is positively associated with the donation to others.

Next, the results pertaining to the Japanese respondents are shown in Table 4-2. The findings reveal that, in Japan, spiritually directed worldviews seem to have statistically significant effects on the individuals' decision to give a part of the household income not only to others, as found in the case of Korea, but to their parents as well. For the Japanese, having confidence in spiritually directed worldviews positively affects their willingness to help their parents financially. An interesting contrast, however, is found in the responses to the non-spiritually directed question about "Evolutionism". Both "yes" and "no" dummies have a positive effect on the willingness of the Japanese respondents to donate to their parents, which suggests that, compared to those who do not have a strong opinion on the non-spiritually directed question, those who have confidence in the non-spiritually directed question are more willing to provide financial support for their parents. Lastly, in the case of the US respondents, those who disagree with the spiritually directed worldviews are less likely to give money to others, whereas those who believe in non-spiritually directed worldview are willing to provide a financial support to their children. In the US, having less confidence in spiritually directed worldviews and similarly, having more confidence in non-spiritually directed worldview have statistically significant effects on individual altruistic behaviors.

#### **4.3. Determinants of the Implicit Worldview**

Our finding that implicit worldviews affect individual altruistic economic behaviors prompted the need to identify the determinants for possession of relation-based and categories-based worldviews. The results presented in the last three columns of Table 2-(2) present the characteristics of individuals that are more likely to have the categories-based worldview, proxied by the choice of the third figure. The dependent variable is constructed as a binary indicator, which equals one if the third figure was chosen as the answer. The results show that, across the three studied countries, the probability that those who have a child, those in their 40s and 50s, and the Buddhists with deep religious convictions, have the categories-based worldview is low. These findings indicate that those with a child and middle-aged individuals are more likely to care for someone other than themselves, whereas Buddhism regards relationships very highly. With respect to the relationship between education and the logic-based worldview, the findings pertaining to the Korean and the US sample have opposite direction. More specifically, highly educated people tend to have the categories-based and relations-based worldview, in Korea and the United States, respectively.

One interpretation for these opposing findings is that highly educated Easterners may tend to learn more about Westerners and thus use categories to group people, while highly

educated Westerners tend to learn more about Easterners and thus adopt relation-based worldviews. One might question as to whether it is necessary to divide the relations-based worldviews into three different types (i.e., based on the selection of 1st, 2nd, or 4th figure in the image), if all of those three choices are associated with relationship-based worldview. Although further study is needed to investigate the mechanism behind the perception differences in the above choices with respect to the relational logic, the estimation results reported in this paper suggest that these three choices separately act as significant determinants of an individual's altruistic economic behavior.

#### **4.4. The Effects of Explicit and Implicit Worldviews**

As presented Tables 3 and 4, we found that both implicit and explicit worldviews affect an individual economic behavior, even after we controlled for demographic and socioeconomic related variables. We hypothesized that worldviews determine an individual altruistic decision. There is a possibility that changes in the explicit levels of a culture or beliefs could transform the implicit worldviews, but the worldview transformation does not occur shortly. As Hiebert (2008) pointed out, it could take generations to transform the worldviews despite a big change in explicit levels such as belief systems. Moreover, Hiebert (2008) describes that worldviews are more likely to play a role in maintaining the tradition rather than in initiating new ways of viewing the worlds.

Our estimation results, which indicate that relational logic has a statistically significant effect on an individual altruistic behavior only in Korea and Japan, can be interpreted as indicating the difference between East Asia and West. Nisbett (2003) focuses on the social origins of mind to explain the differences in habits of thoughts and behaviors between East Asia and the West. He has conducted a great deal of experimental studies and found the differences between the East and the West. He describes that Aristotle and Confucius has had great impact on the intellectual, social and political histories of people in the East and the West respectively, and those traditions have continued despite receiving effects from counterparts. One of the big differences he explains is patterns of perception and basic assumptions about the composition of the world. Easterners tend to detect relationships among events, whereas Westerners attend more to objects. Nisbett's theory and experimental results could explain why relational logic is significantly associated with Altruistic behavior in East Asia in our paper.

#### **5. Robustness Check**

Our main hypothesis of four figures as indicating that three figures consist of the core family and the other one is distanced from the core family unit is based on the interpretation of a neuropsychologist A.R. Luria (1976), which is introduced by Hiebert (2008, p 43). A.R. Luria

(1976) illustrates that the first three figures are father, mother, a child, and the last figure must be an uncle, which can be eliminated from the others. Similarly, the last three figures can be predicted to be the core family. Moreover, we hypothesize that some people may choose the second figure as being isolated from the others because the second figure is in between the core family that consists of the first, third and fourth figures. In sum, we predict that those who selected any figures other than the third one might have a relation logic as opposed to those who selected the third one is interpreted to have an algorithm logic. Who are likely to choose the third figure is estimated and discussed in Section 4.3. Our main analyses regarding the effects of implicit worldviews, which are summarized in Section 4.1 and 4.2, are conducted with third figure as a base group. In other words, the result indicating that those who chose the first figure are less likely to make charitable contributions for non-family members, compared with those who chose the third figure.

To check the robustness of the estimation results, in this section, we attempt to clarify if selecting a figure, in particular the second and third figures, is affected by other unobserved factors. Firstly, people may have a tendency of avoiding answering confidently or simply selecting the third choice without even reading a question during the survey process. To grasp the characteristics of people who tend to choose the third choice, we used the following question coded on a 5-point scale ranging from “completely disagree” to “completely agree”: “The earth is not round, but it is flat”. We can easily assume that people are well aware of the round shape of the earth. It means that those who chose an answer implying that the earth is flat are highly likely to have a tendency of selecting the choice in the middle without reading the question carefully. Some people answer that they are not completely disagree with the question. It means that they answered that they would somewhat or completely believe that the earth is flat. It can be interpreted that these respondents tend to select the third choice. In Japan, 37% of respondents (or 1718 out of 4552) and 20.4% of respondents (or 236 out of 3548) show this tendency. We dropped these respondents and conducted the same estimations (Table 6-1). The main results do not change. It suggests that although there may be some respondents who chose the third figure just because of their constant tendency of choosing the third choice without much thought, it would not affect our main results.

Secondly, we hypothesize that those who see the second figure as being isolated from the others may have an isolation issue in his/her own core family. We interpret that the isolation issue from the core family could be one of the reasons why selection of the second figure is negatively associated with the probability of helping financially his/her own family in Korea. However, the selection of the second figure may simply be the measurement error. The respondents who chose the second figure may have some unobserved characteristics, which are not necessarily related to the implicit worldview. When we check their response rate for other

questions, we find that they are likely to give no answer to other survey questions compared with those who chose the other figures. It means that they may have some characteristics (e.g., degree of impatience) that do not spend enough time in reading the questions and answering properly. Similar to the first robustness check, we excluded these respondents and conducted the same estimations (Table 6-2). The main results in association with the effects of implicit worldview do not change. Those who selected the first figure in Korea and those who selected the fourth figure in Japan are statistically significantly associated with altruistic behavior toward a family member of others, even when the respondents with the choice of the second figure are eliminated from the samples.

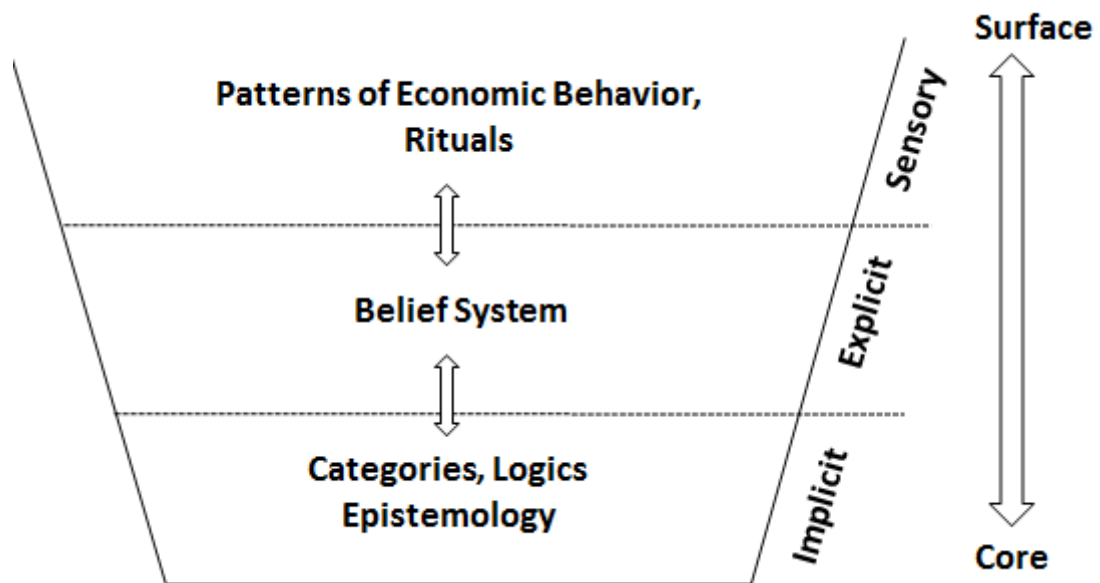
## **6. Conclusion**

In this study, we found that the worldviews concerning relational logic and degree of confidence in one's worldview beliefs affect individual altruistic behaviors towards parents, children, and non-family members, although the relevance and statistical significance differ by country. In Korea, the categories/ relationships-based worldviews that value the family relation were negatively correlated with the charitable donations to non-family members, whereas interpreting the image showing four figures as indicating that one figure represents a family member that is distanced from the core family unit negatively affects the willingness to provide financial support to one's family members. Non-spiritually directed confidence is negatively related with the charitable donation in all countries, whereas spiritually directed confidence is positively related with the charitable donation in Japan and the US, and the financial support for family members in Korea. Overall, our estimation results suggest that the implicit worldviews, belief systems, and confidence an individual possesses act as a set of rules that determine his/her altruistic behavior, even after controlling for socioeconomic variables.

## References

- Akkemik, K. A., Bulut, M., Dittrich, M., Göksal, K., Leipold, K., & Ogaki, M. (2013). *Worldviews and Intergenerational Altruism – A Comparison of Turkey and Germany*. Paper presented at the European Regional Science Association 2013 Congress.
- Bhatt, V., & Ogaki, M. (2012). Tough love and intergenerational altruism. *International Economic Review*, 53, 791-814.
- Bisin, A. and Verdier, T. (2011) “The Economics of Cultural Transmission and Socialization,” in J. Benhabib, A. Bisin, and M. O. Jackson, eds., *Handbook of Social Economics*, volume 1A, chapter 9, pp.339-416.
- Fehr, E., & Schmidt, K. M. (1999). *A theory of fairness, competition and cooperation*. Boston, MA: MIT Press.
- Guiso, L., Paola S., & Luigi, Z. (2006). Does culture affect economic outcomes? *Journal of Economic Perspectives*, 20, 23-48.
- Hall, E. T. (1983). *Hidden differences: how to communicate with the Germans*. *Studies in International Communication*. Hamburg, Germany: Stern.
- Hiebert, P. G. (2008). *Transforming worldviews: An anthropological understanding of how people change*. Michigan, U.S.A.: Baker Academic.
- Horioka, C. Y. (2014). Are Americans and Indians more altruistic than the Japanese and Chinese? Evidence from a new international survey of bequest plans. *Review of Economics of the Household*, vol. 12, no. 3 (September 2014), forthcoming.
- Iannaccone, L. R. (1998). Introduction to the economics of religion. *Journal of Economic Literature*, 36, 1465-1495.
- Kubota, K., Kamesaka, A., Ogaki, M., & Ohtake, F. (2013). *Cultures, Worldviews, and Intergenerational Altruism*. Paper presented at the European Regional Science Association 2013 Congress.
- Nisbett, R. E. (2003). *The Geography of Thought*. New York, NY: Free Press.
- Luria, A. R. (1976). *Cognitive Development, Its Cultural and Social Foundations*. Trans. M. Lopez-Morillas & I. Solotarof. Cambridge, MA: Harvard University Press.

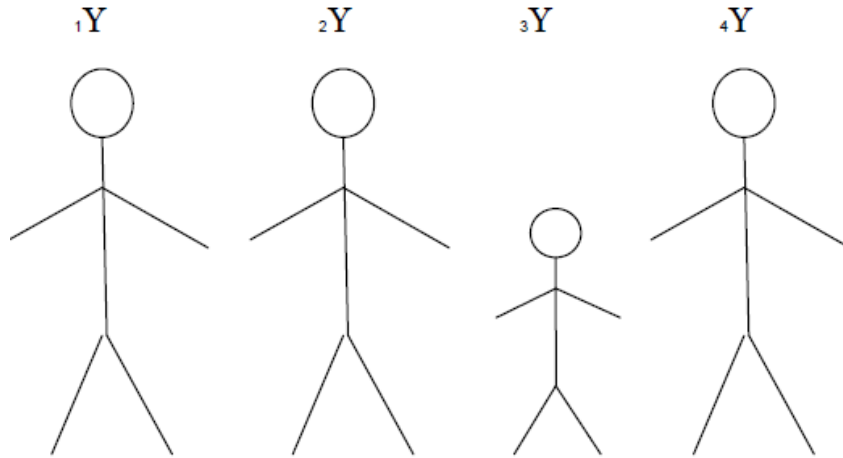
**Figure 1. Levels of Culture.**



Note: This figure indicates that a worldview is behind each culture, and Hiebert (2008) considers explicit and implicit levels of a worldview and posits that different types of logic act at the implicit level of the worldview. It has been revised and applied to the hypothesis of this paper. (see the original figure; Hiebert, 2008, p. 33).

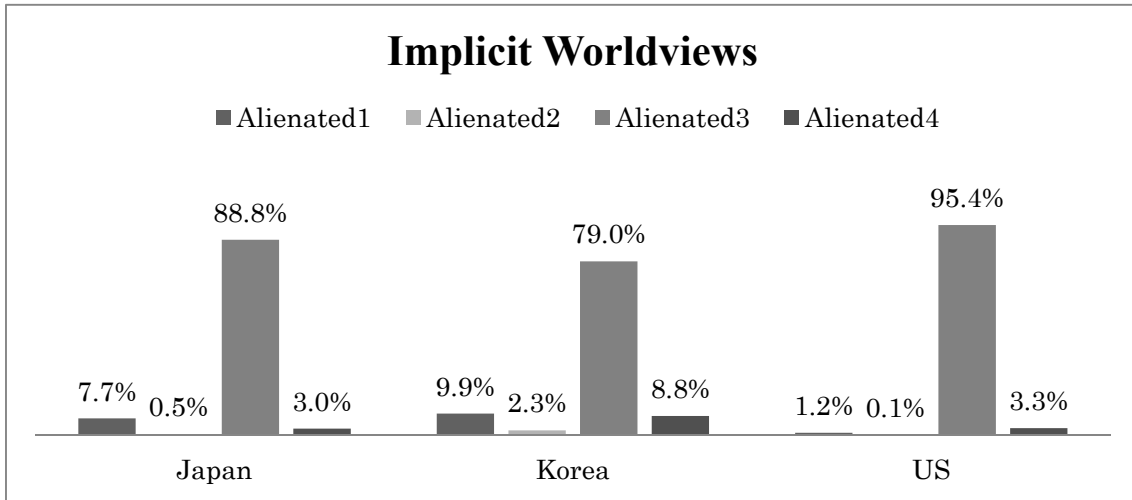
**Figure 2. Survey question used to measure implicit worldviews.**

Which figure does not belong with the other three figures? (X ONE Box)



Note: This study interprets that those who chose the third figure because of its different size relative to the others use algorithmic logic or categories, whereas those that make other choices, in our view, base their decisions on relational logic or relationships.

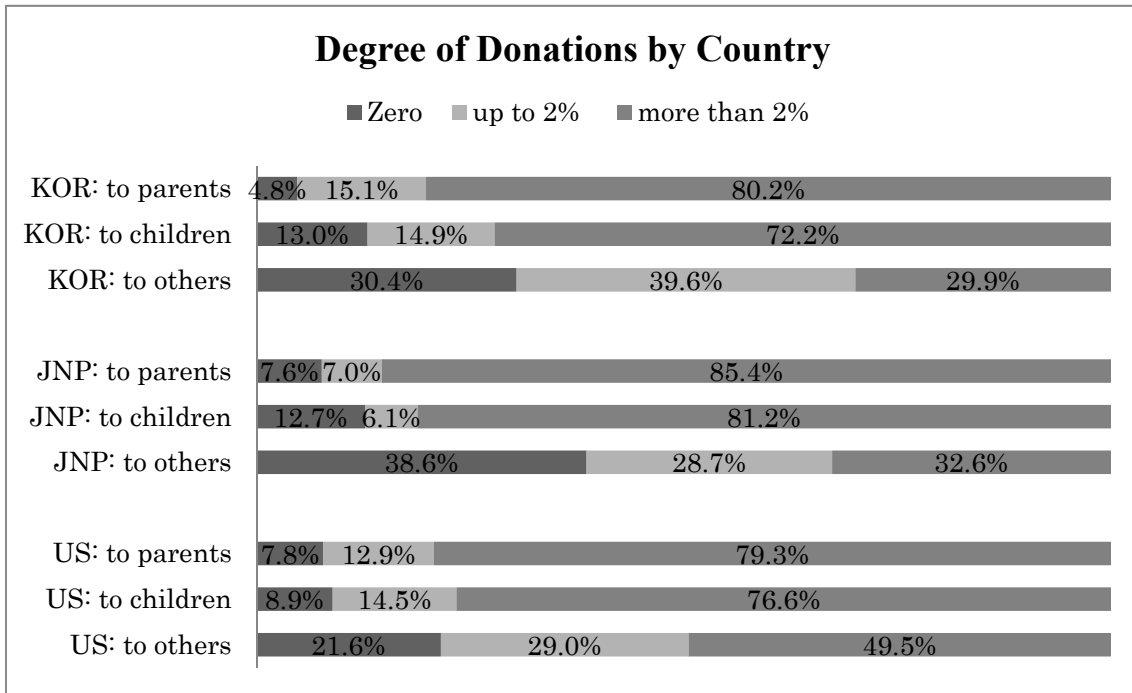
**Figure 3. Responses to the question of implicit worldviews.**



Note: This distribution is based on the choices of Figure 2 by country. As can be seen, while the majority of respondents in the three studied countries chose the third figure, this choice was more prevalent in the United States than in Japan and Korea.



**Figure 4. Financial support and charitable donations by country.**



**Note:** This figure depicts the variations in the degree of donations to parents, child, and others by country. As can be seen, similar trends are observed in all three countries, as approximately 80-90% of the respondents are willing to provide financial support to their family members, whereas 20-40% are willing to donate to others.

Table 1. *Explicit Worldviews: (Non)-spiritually Directed Confidence*

	Korea	Japan	US
<u><i>Spiritual Directed</i></u>			
(God or Gods exist)	0.225	0.196	0.511
(God is watching and sees all bad deeds)	0.225	0.083	0.458
(Life after death exists)	0.226	0.074	0.592
(Heaven exists)	0.243	0.104	0.628
(Human beings evolved from other living things)	0.341	0.046	0.342
<u><i>Non-spiritual Directed</i></u>			
(God or Gods exist)	0.272	0.030	0.081
(God is watching and sees all bad deeds)	0.252	0.118	0.083
(Life after death exists)	0.284	0.154	0.058
(Heaven exists)	0.242	0.120	0.057
(Human beings evolved from other living things)	0.111	0.177	0.166
<b>Confidence</b>			
(equals 1 if the answer to a (non) spiritual question is either 1 or 5, zero otherwise)	2.440	1.112	2.930
<b>Spiritual Directed</b>			
(equals 1 if the answer to a spiritual question is 5 and the answer to a non-spiritual question is 1, zero otherwise)	1.268	0.490	2.467
<b>Non-spiritual Directed</b>			
(equals 1 if the answer to a spiritual question is 1 and the answer to a non-spiritual question is 5, zero otherwise)	1.171	0.622	0.463

Note: Spiritually directed confidence variables are based on four questions from “God / Gods exist” to “Heaven exists”. Non-spiritually based worldview is constructed from the answer to the question “human beings evolved from other living things.” For *spiritually directed confidence*, we assign one point if the answer to a spiritual question is “completely agree”, or the answer to a non-spiritual question is “completely disagree”, and zero otherwise. Once the scoring is complete, the points are added up. In the same way, *non-spiritually directed confidence* equals one if the answer to a non-spiritual question is “completely agree”, and the answer to a spiritual question is “completely disagree”, and zero otherwise. Confidence equals one if answers to both spiritual and non-spiritual questions are either “completely agree” or “completely disagree”.

Table 2. *Descriptive Statistics*

	Korea (N=987)				Japan (N=2616)				US (N=1672)			
<b><u>Dependent Variable</u></b>	Relative Frequency (Total=100%)				Relative Frequency (Total=100%)				Relative Frequency (Total=100%)			
<b>Degree of Donation</b>	Mean				Mean				Mean			
Zero (=1), Up to 2% (=2) More than 2% (=3)	1 to 3	Zero	up to 2%	more than 2%	1 to 3	Zero	up to 2%	more than 2%	1 to 3	Zero	up to 2%	more than 2%
To parents	2.569	30.4%	39.6%	29.9%	2.604	38.6%	28.7%	32.6%	2.554	21.6%	29.0%	49.5%
To children	2.425	13.0%	14.9%	72.2%	2.554	12.7%	6.1%	81.2%	2.539	8.9%	14.5%	76.6%
To others	1.827	4.8%	15.1%	80.2%	1.757	7.6%	7.0%	85.4%	2.078	7.8%	12.9%	79.3%
<b><u>Main independent Variables</u></b>												
<b>Relational/Categorical Worldviews</b>	Korea (Relative Frequency; total=100%)				Japan				US			
<i>Which figure does not belong with the other three figures?</i>	First	Second	Third	Fourth	First	Second	Third	Fourth	First	Second	Third	Fourth
	10.1%	2.3%	78.7%	8.8%	8.1%	0.4%	88.7%	2.8%	1.0%	0.1%	95.5%	3.4%
	<u>Spiritual</u>		<u>Non-Spiritual</u>		<u>Spiritual</u>		<u>Non-Spiritual</u>		<u>Spiritual</u>		<u>Non-Spiritual</u>	
<b>Confidence in worldview beliefs</b>	<u>Directed</u>		<u>Directed</u>		<u>Directed</u>		<u>Directed</u>		<u>Directed</u>		<u>Directed</u>	
(Non-) Spiritually directed confidence	1.2685		1.1712		0.4897		0.6223		2.4671		0.4629	
	Korea				Japan				US			
	Mean	St.Dev.	Min	Max	Mean	St.Dev.	Min	Max	Mean	St.Dev.	Min	Max
<b><u>Religion-related confidence, Behavioral Traits</u></b>												
Buddhist_devoted	0.010	0.100	0	1	0.006	0.078	0	1	0.001	0.024	0	1
Christian_devoted	0.110	0.314	0	1	0.004	0.065	0	1	0.147	0.354	0	1
Impatience	0.022	0.020	-0.012	0.045	0.046	0.368	-0.430	0.626	0.075	0.108	-0.074	0.439
<b><u>Demographic Variables</u></b>												
Age	45.013	14.410	20	70	51.981	12.662	23	79	51.674	15.916	14	94
Female(=1)	0.508	0.500	0	1	0.520	0.500	0	1	0.539	0.499	0	1
Years of education	13.013	2.699	9	21	11.367	1.301	9	14	14.275	2.434	9	23
Having child(ren) (=1)	0.557	0.497	0	1	0.812	0.391	0	1	0.715	0.451	0	1
Income per capita (log)	6.944	0.709	3.248	8.854	5.099	0.667	2.097	7.171	3.339	0.795	0.916	5.303

Table 3-1. *Determinants of Individual Altruistic Economic Behaviors in Korea*

Model: Ordered Probit (3 ordinal variables) Korea			
Dependent Variable : Donate % of household income to	Without socioeconomic variables		
	Parents	Child	Others
<u>Relational Worldviews</u>			
Alienated (1)	-0.0854 (0.130)	0.1106 (0.127)	-0.3072** (0.125)
Alienated (2)	-0.5249** (0.242)	-0.5245** (0.237)	-0.4001 (0.253)
Alienated (4)	0.0689 (0.142)	-0.0987 (0.133)	-0.0961 (0.132)
<u>Spirituality-related confidence, Behavioral Traits</u>			
Buddhist_devoted	0.3607 (0.418)	0.1350 (0.385)	0.0744 (0.367)
Christian_devoted	0.0673 (0.145)	0.0791 (0.139)	0.5224*** (0.133)
Spiritually-Directed Confidence	0.0475* (0.027)	0.0515** (0.026)	0.0320 (0.025)
Nonspiritually-Directed Confidence	0.0174 (0.028)	0.0322 (0.026)	-0.0982*** (0.026)
Impatience	-3.7125* (1.989)	-2.3786 (1.905)	-4.5647** (1.870)
<u>Demographic Variables</u>			
Aged 30-39	-0.1571 (0.143)	-0.0133 (0.132)	-0.0902 (0.126)
Aged 40-49	-0.1239 (0.176)	0.0245 (0.165)	-0.0922 (0.158)
Aged 50-59	-0.3255** (0.157)	-0.0432 (0.147)	0.0098 (0.142)
Aged 60-69	-0.3508** (0.166)	-0.1927 (0.156)	-0.1264 (0.153)
Aged 70 and more	-0.2907 (0.222)	0.0689 (0.216)	0.2493 (0.207)
lnincome_percapita	0.0437 (0.060)	0.0419 (0.057)	0.1064* (0.056)
Female(=1)	-0.0859 (0.084)	-0.0016 (0.080)	-0.0313 (0.078)
Years of education	0.0292 (0.019)	0.0057 (0.018)	0.0787*** (0.018)
Having child(ren) (=1)	-0.1456 (0.100)	-0.0641 (0.096)	0.1066 (0.093)
cut1	-1.3919*** (0.474)	-0.8261* (0.451)	1.0917** (0.442)
cut2	0.0253 (0.473)	0.1801 (0.450)	2.8208*** (0.448)
Observations	987	987	987

Note: Dependent variable consists of three ordinal variables indicating how much the respondent is willing to donate in order to financially support the parents, children, and non-family members (1 corresponds to 0%; 2 is designated for up to 2%; and 3 for more than 2%). The model is ordered probit. standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 3-2. *Determinants for Individual Altruistic Economic Behaviors in Japan*

Model: Ordered Probit (3 ordinal variables) Japan			
Dependent Variable : Donate % of household income to	Without socioeconomic variables		
	Parents	Child	Others
<u><i>Relational Worldviews</i></u>			
Alienated (1)	0.0421 (0.091)	-0.0754 (0.088)	-0.0722 (0.082)
Alienated (2)	0.2837 (0.439)	-0.1949 (0.381)	0.1090 (0.361)
Alienated (4)	0.1713 (0.154)	0.3501** (0.162)	0.0435 (0.133)
<u><i>Spirituality-related confidence, Behavioral Traits</i></u>			
Buddhist_devoted	-0.0730 (0.313)	0.2214 (0.336)	0.5814** (0.285)
Christian_devoted	0.0418 (0.406)	-0.1558 (0.381)	0.6536* (0.355)
Spiritually-Directed Confidence	0.0189 (0.026)	-0.0208 (0.025)	0.0571** (0.023)
Nonspiritually-Directed Confidence	-0.0196 (0.023)	-0.0333 (0.023)	-0.0808*** (0.021)
Impatience	-0.0201 (0.068)	-0.0364 (0.068)	0.0787 (0.062)
<u><i>Demographic Variables</i></u>			
Aged 30-39	0.2318 (0.143)	-0.1230 (0.143)	-0.3129** (0.125)
Aged 40-49	0.1273 (0.138)	-0.3057** (0.138)	-0.4325*** (0.121)
Aged 50-59	0.2882** (0.141)	-0.1515 (0.141)	-0.3028** (0.123)
Aged 60-69	0.4735*** (0.144)	-0.2116 (0.143)	-0.2056 (0.125)
Aged 70 and more	0.4219*** (0.161)	-0.1421 (0.160)	0.0136 (0.140)
lnincome_percapita	0.1094*** (0.038)	0.0047 (0.038)	-0.0056 (0.035)
Female(=1)	-0.1812*** (0.051)	-0.1849*** (0.051)	0.0168 (0.046)
Years of education	0.1193*** (0.021)	0.0561*** (0.021)	0.0549*** (0.018)
Having child(ren) (=1)	-0.4152*** (0.077)	0.1400** (0.070)	-0.1685*** (0.064)
cut1	0.2244 (0.313)	-0.7057** (0.311)	-0.0944 (0.278)
cut2	1.3006*** (0.313)	-0.0180 (0.310)	1.2315*** (0.279)
Observations	2,616	2,620	2,617

Note: Dependent variable consists of three ordinal variables indicating how much the respondent is willing to donate in order to financially support the parents, children, and non-family members (1 corresponds to 0%; 2 is designated for up to 2%; and 3 for more than 2%). The model is ordered probit. standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 3-3. *Determinants for Individual Altruistic Economic Behaviors in the US*

Model: Ordered Probit (3 ordinal variables) US			
Dependent Variable : Donate % of household income to	Without socioeconomic variables		
	Parents	Child	Others
<u>Relational Worldviews</u>			
Alienated (1)	0.4435 (0.331)	0.2638 (0.299)	0.0576 (0.264)
Alienated (2)	4.3933 (226.811)	4.4637 (225.283)	-5.5905 (166.707)
Alienated (4)	0.0915 (0.168)	0.0035 (0.163)	-0.2033 (0.154)
<u>Spirituality-related confidence, Behavioral Traits</u>			
Buddhist_devoted	4.6228 (226.811)	4.4791 (225.283)	5.3871 (170.731)
Christian_devoted	0.0050 (0.092)	-0.0406 (0.091)	0.0293 (0.086)
Spritually-Directed Confidence	0.0186 (0.018)	-0.0183 (0.018)	0.0553*** (0.016)
Nonspritually-Directed Confidence	0.0211 (0.031)	-0.0236 (0.030)	-0.0865*** (0.029)
Impatience	-0.3175 (0.272)	0.0768 (0.274)	-0.3965 (0.259)
<u>Demographic Variables</u>			
Aged 30-39	-0.2292* (0.125)	-0.1864 (0.128)	-0.2726** (0.117)
Aged 40-49	-0.1005 (0.119)	-0.2321* (0.120)	-0.3084*** (0.110)
Aged 50-59	-0.0509 (0.117)	-0.2076* (0.119)	-0.3384*** (0.108)
Aged 60-69	0.0305 (0.124)	-0.2817** (0.124)	-0.1616 (0.114)
Aged 70 and more	0.0119 (0.134)	-0.3452*** (0.133)	-0.1206 (0.123)
lnincome_percapita	0.0480 (0.040)	0.0365 (0.040)	-0.0085 (0.037)
Female(=1)	-0.0652 (0.061)	-0.0343 (0.061)	-0.0794 (0.057)
Years of education	0.0272** (0.013)	0.0068 (0.013)	0.0244** (0.012)
Having child(ren) (=1)	-0.1150 (0.075)	-0.0006 (0.074)	0.0292 (0.069)
cut1	-1.0843*** (0.236)	-1.5082*** (0.235)	-0.6870*** (0.217)
cut2	0.1007 (0.234)	-0.3617 (0.232)	0.7115*** (0.217)
Observations	1,672	1,668	1,653

Note: Dependent variable consists of three ordinal variables indicating how much the respondent is willing to donate in order to financially support the parents, children, and non-family members (1 corresponds to 0%; 2 is designated for up to 2%; and 3 for more than 2%). The model is ordered probit. standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 4-1. *Determinants for Individual Altruistic Economic Behaviors with Yes/No Dummies in Korea*

Model: Ordered Probit (3 ordinal variables) Korea (1~5)						Model: Ordered Probit (3 ordinal variables) Korea (1~5)						Model: Ordered Probit (3 ordinal variables) Korea (1~5)					
Donate % of household income to parents						Donate % of household income to children						Donate % of household income to others					
Alienated (1)	-0.0949 (0.131)	-0.0804 (0.130)	-0.0823 (0.130)	-0.0845 (0.130)	-0.0838 (0.130)	Alienated (1)	0.1243 (0.127)	0.1163 (0.127)	0.1137 (0.127)	0.1145 (0.127)	0.1102 (0.127)	Alienated (1)	-0.3287*** (0.125)	-0.3284*** (0.125)	-0.3314*** (0.125)	-0.3326*** (0.125)	-0.3315*** (0.125)
Alienated (2)	-0.5348** (0.243)	-0.5306** (0.242)	-0.5329** (0.242)	-0.5310** (0.243)	-0.5316** (0.242)	Alienated (2)	-0.5307** (0.238)	-0.5316** (0.237)	-0.5313** (0.237)	-0.5345** (0.237)	-0.5346** (0.237)	Alienated (2)	-0.3945 (0.253)	-0.3850 (0.253)	-0.3847 (0.253)	-0.3969 (0.254)	-0.3963 (0.252)
Alienated (4)	0.0519 (0.142)	0.0504 (0.142)	0.0464 (0.142)	0.0495 (0.142)	0.0461 (0.142)	Alienated (4)	-0.0929 (0.133)	-0.0936 (0.133)	-0.1039 (0.133)	-0.1088 (0.133)	-0.1071 (0.133)	Alienated (4)	-0.0746 (0.132)	-0.0594 (0.132)	-0.0854 (0.132)	-0.0756 (0.132)	-0.0931 (0.132)
Buddhist_reli5	0.3245 (0.419)	0.3293 (0.416)	0.3457 (0.417)	0.3344 (0.417)	0.3298 (0.415)	Buddhist_reli5	0.1177 (0.385)	0.0918 (0.384)	0.1077 (0.384)	0.1241 (0.385)	0.1185 (0.384)	Buddhist_reli5	0.1181 (0.368)	0.0531 (0.366)	0.1008 (0.366)	-0.0012 (0.369)	0.1470 (0.367)
Christian_reli5	0.0133 (0.141)	0.0681 (0.140)	0.0958 (0.141)	0.0830 (0.141)	0.0729 (0.134)	Christian_reli5	0.0394 (0.136)	0.0677 (0.135)	0.0812 (0.136)	0.1105 (0.135)	0.1138 (0.129)	Christian_reli5	0.5207*** (0.130)	0.5048*** (0.130)	0.5340*** (0.130)	0.5111*** (0.130)	0.7037*** (0.124)
Impatience	-4.0285** (2.000)	-4.1637** (1.996)	-4.1136** (2.000)	-4.1960** (1.997)	-4.1605** (1.996)	Impatience	-2.3898 (1.912)	-2.5714 (1.910)	-2.5403 (1.913)	-2.5425 (1.909)	-2.5325 (1.909)	Impatience	-4.5491** (1.875)	-4.8699*** (1.877)	-4.7787** (1.877)	-4.6827** (1.874)	-4.8911*** (1.869)
<b>Confidence</b>	0.0393* (0.023)	0.0580** (0.023)	0.0465** (0.023)	0.0464** (0.023)	0.0532** (0.022)	<b>Confidence</b>	0.0531** (0.022)	0.0536** (0.022)	0.0463** (0.022)	0.0483** (0.022)	0.0394* (0.021)	<b>Confidence</b>	-0.0217 (0.021)	0.0039 (0.022)	-0.0104 (0.022)	-0.0182 (0.021)	-0.0184 (0.021)
<i>God or Gods exist</i>	0.2579** (0.117)					<i>God or Gods exist</i>	-0.0218 (0.112)					<i>God or Gods exist</i>	0.2251** (0.110)				
No dummy	0.1240 (0.114)					No dummy	-0.1725 (0.110)					No dummy	-0.1499 (0.108)				
<i>God is watching all bad deeds</i>	-0.0056 (0.115)					<i>God is watching all bad deeds</i>	-0.0439 (0.111)					<i>God is watching all bad deeds</i>	0.0646 (0.109)				
No dummy	-0.0188 (0.118)					No dummy	-0.1465 (0.112)					No dummy	-0.3833*** (0.112)				
<i>Life after death</i>			0.0511			<i>Life after death</i>			-0.0018			<i>Life after death</i>			0.1219		
Yes dummy			(0.119)			Yes dummy			(0.115)			Yes dummy			(0.114)		
No dummy			0.1022 (0.117)			No dummy			-0.0696 (0.112)			No dummy			-0.2271** (0.111)		
<i>Heaven exists</i>				0.0862		<i>Heaven exists</i>				-0.0767		<i>Heaven exists</i>				0.2180**	
Yes dummy				(0.115)		Yes dummy				(0.111)		Yes dummy				(0.110)	
No dummy				0.1085 (0.117)		No dummy				-0.0811 (0.112)		No dummy				-0.1868* (0.111)	
<i>Evolutionism</i>					0.0255	<i>Evolutionism</i>					0.0345	<i>Evolutionism</i>					0.0803
Yes dummy					(0.109)	Yes dummy					(0.104)	Yes dummy					(0.103)
No dummy					0.0372 (0.107)	No dummy					0.0201 (0.102)	No dummy					-0.0390 (0.101)
Constant	-1.2033** (0.480)	-1.3110*** (0.477)	-1.2357*** (0.477)	-1.2420*** (0.476)	-1.2843*** (0.474)	Constant	-0.8996** (0.457)	-0.8650* (0.454)	-0.8151* (0.454)	-0.8083* (0.453)	-0.7575* (0.450)	Constant	1.1201** (0.448)	0.9554** (0.446)	1.0603** (0.445)	1.0775** (0.445)	1.2232*** (0.441)
Constant	0.2218 (0.478)	0.1084 (0.475)	0.1843 (0.476)	0.1788 (0.475)	0.1353 (0.472)	Constant	0.1090 (0.456)	0.1419 (0.453)	0.1909 (0.453)	0.1974 (0.452)	0.2481 (0.449)	Constant	2.8519*** (0.454)	2.6990*** (0.452)	2.7909*** (0.451)	2.8137*** (0.451)	2.9401*** (0.447)
Observations	987	987	987	987	987	Observations	987	987	987	987	987	Observations	987	987	987	987	987

Note: Dependent variable consists of three ordinal variables indicating how much the respondent is willing to donate in order to financially support the parents, children, and non-family members (1 corresponds to 0%; 2 is designated for up to 2%; and 3 for more than 2%). The model is ordered probit. The responses to each (non-)spiritual question are rated on a 5-point scale ranging from 1 (completely disagree) to 5 (completely agree). The “yes” dummy takes the value of one if the respondents choose 4 or 5, and zero otherwise. Similarly, the “no” dummy takes the value of one if the respondents choose 1 or 2, and zero otherwise. The base value for “yes” and “no” dummies is set at the answer 3, corresponding to “neither completely agree nor completely disagree”. All the remaining demographic variables—age dummies, income, gender, education, and having a child (=1)—are controlled for.

Table 4-2. *Determinants for Individual Altruistic Economic Behaviors with Yes/No Dummies in Japan*

Model: Ordered Probit (3 ordinal variables) Japan (1~5)						Model: Ordered Probit (3 ordinal variables) Japan (1~5)						Model: Ordered Probit (3 ordinal variables) Japan (1~5)					
	Donate % of household income to parents						Donate % of household income to children						Donate % of household income to others				
Alienated (1)	0.0421 (0.091)	0.0325 (0.091)	0.0424 (0.091)	0.0373 (0.091)	0.0432 (0.091)	Alienated (1)	-0.0767 (0.088)	-0.0798 (0.088)	-0.0736 (0.088)	-0.0729 (0.088)	-0.0747 (0.088)	Alienated (1)	-0.0658 (0.082)	-0.0807 (0.082)	-0.0737 (0.082)	-0.0645 (0.082)	-0.0666 (0.082)
Alienated (2)	0.3290 (0.440)	0.3116 (0.442)	0.2897 (0.439)	0.2934 (0.440)	0.2888 (0.442)	Alienated (2)	-0.1678 (0.383)	-0.1733 (0.383)	-0.1884 (0.382)	-0.1929 (0.381)	-0.1966 (0.381)	Alienated (2)	0.1704 (0.362)	0.1084 (0.363)	0.1051 (0.361)	0.1246 (0.361)	0.0981 (0.361)
Alienated (4)	0.1769 (0.154)	0.1694 (0.154)	0.1791 (0.154)	0.1708 (0.154)	0.1856 (0.154)	Alienated (4)	0.3550** (0.162)	0.3491** (0.162)	0.3529** (0.162)	0.3525** (0.162)	0.3594** (0.162)	Alienated (4)	0.0447 (0.133)	0.0468 (0.133)	0.0622 (0.133)	0.0544 (0.133)	0.0490 (0.133)
Buddhist_reli5	-0.0828 (0.310)	-0.0583 (0.310)	-0.0586 (0.311)	-0.0684 (0.311)	-0.0338 (0.310)	Buddhist_reli5	0.2127 (0.335)	0.2336 (0.334)	0.2356 (0.335)	0.2232 (0.335)	0.2527 (0.336)	Buddhist_reli5	0.6559** (0.281)	0.6822** (0.282)	0.6713** (0.283)	0.6680** (0.283)	0.7233** (0.281)
Christian_reli5	0.0889 (0.402)	0.1020 (0.403)	0.0983 (0.403)	0.0530 (0.403)	0.0573 (0.407)	Christian_reli5	-0.1345 (0.377)	-0.1323 (0.377)	-0.1283 (0.377)	-0.1732 (0.379)	-0.1096 (0.382)	Christian_reli5	0.8076** (0.352)	0.8702** (0.351)	0.8446** (0.351)	0.7447** (0.353)	0.8059** (0.356)
Impatience	-0.0164 (0.068)	-0.0236 (0.068)	-0.0204 (0.068)	-0.0253 (0.068)	-0.0106 (0.068)	Impatience	-0.0325 (0.068)	-0.0377 (0.068)	-0.0359 (0.068)	-0.0363 (0.068)	-0.0307 (0.068)	Impatience	0.0734 (0.062)	0.0746 (0.062)	0.0762 (0.062)	0.0747 (0.062)	0.0770 (0.062)
<b>Confidence</b>	-0.0148 (0.018)	-0.0101 (0.019)	-0.0066 (0.019)	-0.0097 (0.019)	-0.0149 (0.018)	<b>Confidence</b>	-0.0363** (0.018)	-0.0384** (0.019)	-0.0330* (0.019)	-0.0206 (0.018)	-0.0323* (0.017)	<b>Confidence</b>	-0.0188 (0.016)	-0.0197 (0.017)	-0.0116 (0.017)	-0.0041 (0.017)	-0.0232 (0.016)
<i>God or Gods exist</i>	0.1944*** (0.057)					<i>God or Gods exist</i>	0.1117** (0.056)					<i>God or Gods exist</i>	0.2028*** (0.051)				
No dummy	0.1317 (0.092)					No dummy	0.1116 (0.092)					No dummy	-0.1599* (0.083)				
<i>God is watching all bad deeds</i>		0.1438** (0.062)				<i>God is watching all bad deeds</i>		0.0918 (0.062)				<i>God is watching all bad deeds</i>		0.1875*** (0.055)			
No dummy		0.0186 (0.068)				No dummy		0.0715 (0.068)				No dummy		-0.0736 (0.061)			
<i>Life after death</i>			0.1121* (0.063)			<i>Life after death</i>			0.0437 (0.063)			<i>Life after death</i>			0.1343** (0.057)		
Yes dummy						Yes dummy						Yes dummy					
No dummy			0.0003 (0.068)			No dummy			0.0339 (0.067)			No dummy			-0.1172* (0.061)		
<i>Heaven exists</i>				0.1411** (0.059)		<i>Heaven exists</i>				-0.0040 (0.059)		<i>Heaven exists</i>				0.0990* (0.053)	
Yes dummy						Yes dummy						Yes dummy					
No dummy				0.0352 (0.070)		No dummy				-0.0740 (0.070)		No dummy				-0.1834*** (0.063)	
<i>Evolutionism</i>					0.1487*** (0.055)	<i>Evolutionism</i>					0.0837 (0.055)	<i>Evolutionism</i>					0.0153 (0.050)
Yes dummy						Yes dummy						Yes dummy					
No dummy					0.1964** (0.092)	No dummy					0.0442 (0.091)	No dummy					0.1275 (0.081)
Constant	0.2894 (0.313)	0.2545 (0.313)	0.2513 (0.313)	0.2663 (0.313)	0.2270 (0.313)	Constant	-0.6651** (0.311)	-0.6954** (0.311)	-0.7012** (0.311)	-0.7066** (0.311)	-0.7118** (0.311)	Constant	-0.0595 (0.279)	-0.0549 (0.279)	-0.0690 (0.279)	-0.0845 (0.279)	-0.1228 (0.278)
Constant	1.3691*** (0.314)	1.3325*** (0.314)	1.3288*** (0.314)	1.3441*** (0.314)	1.3051*** (0.313)	Constant	0.0233 (0.311)	-0.0073 (0.311)	-0.0133 (0.311)	-0.0187 (0.311)	-0.0237 (0.310)	Constant	1.2695*** (0.280)	1.2709*** (0.280)	1.2554*** (0.279)	1.2414*** (0.280)	1.1975*** (0.279)
Observations	2,616	2,616	2,616	2,616	2,616	Observations	2,620	2,620	2,620	2,620	2,620	Observations	2,617	2,617	2,617	2,617	2,617
Standard errors in parentheses						Standard errors in parentheses						Standard errors in parentheses					
*** p<0.01, ** p<0.05, * p<0.1						*** p<0.01, ** p<0.05, * p<0.1						*** p<0.01, ** p<0.05, * p<0.1					

Note: Dependent variable consists of three ordinal variables indicating how much the respondent is willing to donate in order to financially support the parents, children, and non-family members (1 corresponds to 0%; 2 is designated for up to 2%; and 3 for more than 2%). The model is ordered probit. The responses to each (non-)spiritual question are rated on a 5-point scale ranging from 1 (completely disagree) to 5 (completely agree). The “yes” dummy takes the value of one if the respondents choose 4 or 5, and zero otherwise. Similarly, the “no” dummy takes the value of one if the respondents choose 1 or 2, and zero otherwise. The base value for “yes” and “no” dummies is set at the answer 3, corresponding to “neither completely agree nor completely disagree”. All the remaining demographic variables—age dummies, income, gender, education, and having a child (=1)—are controlled for.



Table 4-3. *Determinants for Individual Altruistic Economic Behaviors with Yes/No Dummies in the US*

Model: Ordered Probit (3 ordinal variables) US (1~5)						Model: Ordered Probit (3 ordinal variables) US (1~5)						Model: Ordered Probit (3 ordinal variables) US (1~5)					
	Donate % of household income to parents						Donate % of household income to children						Donate % of household income to others				
Alienated (1)	0.4525 (0.331)	0.4432 (0.330)	0.4436 (0.330)	0.4555 (0.331)	0.4464 (0.329)	Alienated (1)	0.2660 (0.299)	0.2699 (0.299)	0.2637 (0.299)	0.2812 (0.299)	0.2841 (0.299)	Alienated (1)	0.0331 (0.263)	0.0517 (0.263)	0.0566 (0.263)	0.0401 (0.264)	0.0571 (0.263)
Alienated (2)	4.2036 (175.018)	4.3827 (226.811)	4.3926 (226.811)	4.2746 (175.018)	4.3378 (226.811)	Alienated (2)	4.2966 (173.310)	4.3168 (173.310)	4.4579 (225.283)	4.3589 (173.310)	4.3733 (225.520)	Alienated (2)	-5.4816 (166.707)	-5.6021 (191.504)	-5.5072 (147.214)	-6.0393 (527.343)	-5.9466 (527.343)
Alienated (4)	0.0928 (0.167)	0.0909 (0.168)	0.0903 (0.168)	0.0908 (0.168)	0.1035 (0.168)	Alienated (4)	0.0039 (0.163)	0.0011 (0.163)	0.0035 (0.163)	0.0064 (0.163)	0.0200 (0.163)	Alienated (4)	-0.1880 (0.154)	-0.1705 (0.153)	-0.1850 (0.154)	-0.1972 (0.154)	-0.1805 (0.153)
Buddhist_reli5	4.4480 (175.018)	4.6317 (226.811)	4.5913 (226.811)	4.5241 (175.018)	4.6210 (226.811)	Buddhist_reli5	4.3228 (173.310)	4.4247 (173.310)	4.4861 (225.283)	4.3865 (173.310)	4.5257 (225.520)	Buddhist_reli5	5.3889 (170.731)	5.3818 (196.100)	5.3488 (150.764)	5.7527 (522.446)	5.8345 (522.446)
Christian_reli5	0.0054 (0.091)	-0.0001 (0.091)	-0.0055 (0.091)	-0.0112 (0.091)	0.0302 (0.092)	Christian_reli5	-0.0435 (0.089)	-0.0397 (0.089)	-0.0433 (0.089)	-0.0468 (0.089)	0.0027 (0.090)	Christian_reli5	0.0600 (0.085)	0.0821 (0.085)	0.0757 (0.085)	0.0879 (0.085)	0.0989 (0.086)
Impatience	-0.3244 (0.272)	-0.3098 (0.273)	-0.3097 (0.272)	-0.3101 (0.272)	-0.3053 (0.272)	Impatience	0.0741 (0.275)	0.0813 (0.275)	0.0798 (0.274)	0.0786 (0.274)	0.0891 (0.275)	Impatience	-0.3940 (0.259)	-0.3635 (0.259)	-0.3900 (0.259)	-0.4108 (0.258)	-0.4319* (0.258)
<b>Confidence</b>	0.0286 (0.020)	0.0166 (0.020)	0.0236 (0.020)	0.0253 (0.019)	0.0231 (0.019)	<b>Confidence</b>	-0.0140 (0.020)	-0.0353* (0.020)	-0.0206 (0.020)	-0.0106 (0.019)	-0.0213 (0.019)	<b>Confidence</b>	0.0164 (0.018)	0.0315* (0.019)	0.0205 (0.018)	0.0235 (0.018)	0.0247 (0.017)
<i>God or Gods exist</i>	-0.0955 (0.095)					<i>God or Gods exist</i>	-0.0573 (0.095)					<i>God or Gods exist</i>	0.1155 (0.088)				
No dummy	-0.0908 (0.108)					No dummy	-0.1095 (0.107)					No dummy	-0.3082*** (0.099)				
<i>God is watching all bad deeds</i>		0.0215 (0.087)				<i>God is watching all bad deeds</i>		0.1352 (0.087)				<i>God is watching all bad deeds</i>		0.0362 (0.081)			
No dummy		-0.0099 (0.106)				No dummy		0.0994 (0.105)				No dummy		-0.2558*** (0.098)			
<i>Life after death</i>			-0.0469 (0.099)			<i>Life after death</i>			0.0163 (0.099)			<i>Life after death</i>			0.1355 (0.091)		
Yes dummy						Yes dummy						Yes dummy					
No dummy				-0.1170 (0.123)		No dummy			-0.0369 (0.123)			No dummy			-0.2490** (0.113)		
<i>Heaven exists</i>				-0.0712 (0.104)		<i>Heaven exists</i>				-0.0992 (0.104)		<i>Heaven exists</i>				0.1309 (0.095)	
Yes dummy						Yes dummy						Yes dummy					
No dummy				-0.2011 (0.130)		No dummy				-0.1689 (0.130)		No dummy				-0.2015* (0.120)	
<i>Evolutionism</i>					0.0894 (0.085)	<i>Evolutionism</i>					0.2270*** (0.084)	<i>Evolutionism</i>					0.0000 (0.078)
Yes dummy						Yes dummy						Yes dummy					
No dummy					-0.0216 (0.087)	No dummy					0.0665 (0.086)	No dummy					0.0831 (0.081)
Constant	-1.1615*** (0.248)	-1.0791*** (0.237)	-1.1092*** (0.241)	-1.1290*** (0.244)	-1.1156*** (0.237)	Constant	-1.5570*** (0.246)	-1.4720*** (0.236)	-1.5022*** (0.241)	-1.5718*** (0.243)	-1.5483*** (0.236)	Constant	-0.6849*** (0.227)	-0.7841*** (0.218)	-0.6957*** (0.223)	-0.6931*** (0.224)	-0.7358*** (0.218)
Constant	0.0242 (0.246)	0.1063 (0.235)	0.0765 (0.240)	0.0580 (0.242)	0.0710 (0.235)	Constant	-0.4096* (0.243)	-0.3246 (0.233)	-0.3554 (0.238)	-0.4241* (0.240)	-0.3980* (0.233)	Constant	0.7137*** (0.227)	0.6079*** (0.218)	0.6988*** (0.223)	0.6991*** (0.224)	0.6500*** (0.218)
Observations	1,672	1,672	1,672	1,672	1,672	Observations	1,668	1,668	1,668	1,668	1,668	Observations	1,653	1,653	1,653	1,653	1,653

Note: Dependent variable consists of three ordinal variables indicating how much the respondent is willing to donate in order to financially support the parents, children, and non-family members (1 corresponds to 0%; 2 is designated for up to 2%; and 3 for more than 2%). The model is ordered probit. The responses to each (non-)spiritual question are rated on a 5-point scale ranging from 1 (completely disagree) to 5 (completely agree). The “yes” dummy takes the value of one if the respondents choose 4 or 5, and zero otherwise. Similarly, the “no” dummy takes the value of one if the respondents choose 1 or 2, and zero otherwise. The base value for “yes” and “no” dummies is set at the answer 3, corresponding to “neither completely agree nor completely disagree”. All the remaining demographic variables—age dummies, income, gender, education, and having a child (=1)—are controlled for.

Table 5. *Categories vs. Relational Logic: Who chose the third figure*

Model: Probit Regression			
Dependent : Alienated 3 (=1)			
	Korea	Japan	US
Buddhist_reli5	-0.7771* (0.402)	-0.0102 (0.408)	
Christian_reli5	-0.0589 (0.167)	-0.2789 (0.459)	0.1749 (0.171)
Aged 30-39	-0.2261 (0.160)	-0.1012 (0.207)	0.4541 (0.453)
Aged 40-49	-0.3576* (0.196)	-0.2120 (0.200)	-0.6725** (0.307)
Aged 50-59	-0.1061 (0.180)	-0.1577 (0.203)	-0.5996* (0.308)
Aged 60-69	0.0109 (0.195)	-0.0851 (0.207)	-0.3253 (0.324)
Aged 70 and more	0.2818 (0.281)	0.0735 (0.231)	-0.2659 (0.336)
lnincome_percapita	-0.1032 (0.074)	-0.0173 (0.051)	-0.0338 (0.078)
Female(=1)	-0.1067 (0.097)	0.0043 (0.067)	-0.1262 (0.117)
Years of education	0.0674*** (0.023)	0.0356 (0.027)	-0.0566** (0.023)
Having child(ren) (=1)	0.1088 (0.116)	-0.2148** (0.099)	-0.4223** (0.166)
Impatience	4.0743* (2.326)	0.0940 (0.088)	-0.0657 (0.515)
<b>Spiritual Directed Confidence</b>	-0.0035 (0.031)	-0.0109 (0.033)	-0.0443 (0.033)
<b>Non-Spiritual Directed Confidence</b>	-0.0285 (0.029)	0.0197 (0.031)	0.0424 (0.066)
Constant	0.7317 (0.577)	1.1822*** (0.418)	3.5507*** (0.512)
Observations	987	2,656	1,717

Note: The dependent variable is constructed as a binary indicator, which equals one if the third figure was chosen as the answer, which we interpret as an indicator that the respondents are using algorithmic logic or categories. The results presented in the table indicate determinants for the categories-based worldview as opposed to the relation/logic-based worldview.

Table 6-1. *Robustness Check*

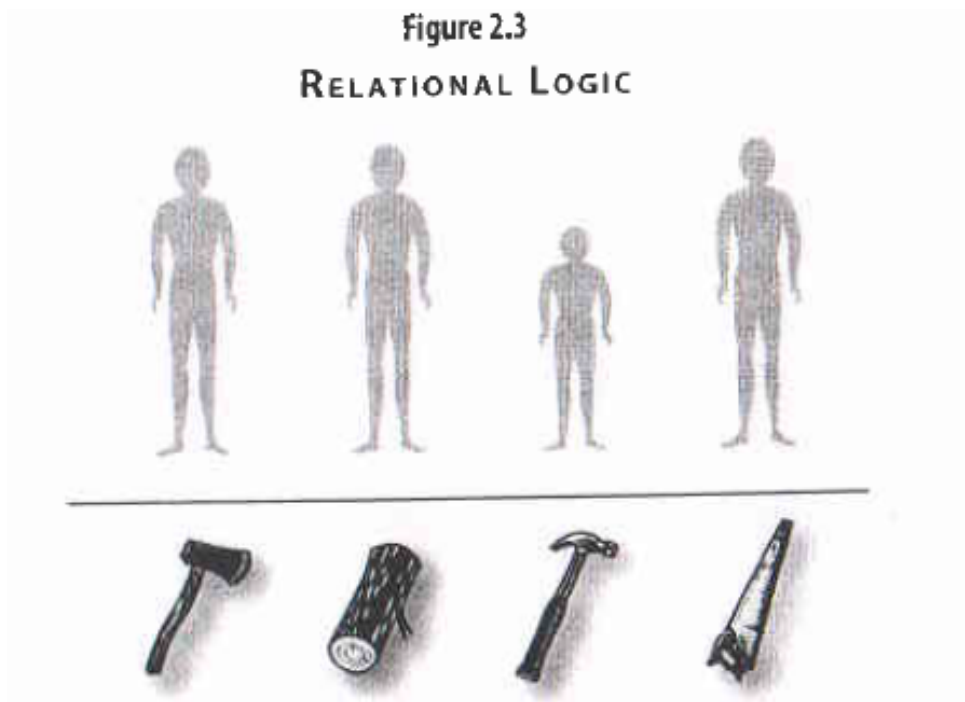
Model: Ordered Probit (3 ordinal variables) Japan (1~3)				US (1~3)		
Dependent Variable						
: Donate % of househo	Parents	Child	Others	Parents	Child	Others
<i>Relational Worldviews</i>						
Alienated (1)	0.1063 (0.148)	0.0028 (0.127)	0.0270 (0.104)	-0.4777 (0.354)	0.5126 (0.403)	0.1149 (0.274)
Alienated (2)	3.3009 (81.405)	3.8940 (81.312)	1.0037 (0.660)	-1.2214 (1.677)	3.8693 (176.660)	-5.5236 (166.751)
Alienated (4)	0.6645* (0.352)	0.7132** (0.338)	0.2936 (0.189)	-0.0897 (0.210)	-0.0706 (0.191)	-0.2186 (0.166)
<i>Spirituality-related confidence, Behavioral Traits</i>						
Buddhist_devoted	0.0492 (0.458)	0.1057 (0.452)	0.5246 (0.354)			
Christian_devoted	0.0425 (0.564)	-0.4908 (0.449)	0.8027* (0.461)	0.1555 (0.114)	-0.0707 (0.110)	0.0360 (0.098)
SpritualDirected Confidence	-0.0196 (0.038)	-0.0025 (0.035)	0.0852*** (0.028)	-0.0088 (0.023)	-0.0485** (0.023)	0.0394** (0.019)
Non-SpritualDirected Confidence	0.0102 (0.034)	-0.0233 (0.029)	-0.0833*** (0.023)	0.0133 (0.036)	-0.0596 (0.036)	-0.0550* (0.031)
Impatience	-0.2522** (0.110)	0.0012 (0.099)	0.1182 (0.079)	-0.0776 (0.357)	-0.0963 (0.348)	-0.5900** (0.296)
<i>Demographic Variables</i>						
Aged 30-39	0.1978 (0.258)	-0.0488 (0.216)	-0.1947 (0.167)	0.0373 (0.164)	-0.4720** (0.186)	-0.3805*** (0.140)
Aged 40-49	0.1566 (0.250)	-0.2438 (0.207)	-0.2377 (0.160)	0.1491 (0.152)	-0.5173*** (0.176)	-0.2731** (0.133)
Aged 50-59	0.2548 (0.252)	-0.1746 (0.209)	-0.1578 (0.162)	0.2730* (0.148)	-0.4933*** (0.173)	-0.3007** (0.129)
Aged 60-69	0.6464** (0.261)	-0.1504 (0.211)	0.0441 (0.165)	0.4299*** (0.154)	-0.5993*** (0.178)	-0.1553 (0.136)
Aged 70 and more	0.3976 (0.278)	0.0421 (0.239)	0.2778 (0.183)	0.2149 (0.171)	-0.6956*** (0.190)	-0.1281 (0.149)
lnincome_percapita	0.1318** (0.063)	-0.0566 (0.056)	-0.0257 (0.045)	-0.0180 (0.054)	0.0074 (0.051)	-0.0363 (0.043)
Female(=1)	-0.1280 (0.080)	-0.1284* (0.072)	-0.0169 (0.058)	0.0060 (0.076)	0.0327 (0.076)	-0.0062 (0.064)
Years of education	0.1265*** (0.033)	0.0893*** (0.029)	0.0608*** (0.023)	-0.0063 (0.016)	-0.0040 (0.016)	0.0176 (0.013)
Having child(ren) (=1)	-0.5402*** (0.133)	0.1975** (0.096)	-0.1968** (0.079)	-0.3069*** (0.095)	0.0415 (0.091)	-0.0853 (0.078)
cut1	0.3954 (0.507)	-0.4366 (0.442)	0.1003 (0.352)	-3.1301*** (0.363)	-2.1114*** (0.305)	-0.9488*** (0.250)
cut2	0.7795 (0.507)	-0.2166 (0.442)	0.8380** (0.353)	0.2386 (0.293)	-1.4575*** (0.303)	-0.1295 (0.249)
Observations	1,717	1,723	1,724	1,198	1,370	1,353

Note: Dependent variable consists of three ordinal variables indicating how much the respondent is willing to donate in order to financially support the parents, children, and non-family members (1 corresponds to 0%; 2 is designated for up to 2%; and 3 for more than 2%). The model is ordered probit. To grasp the characteristics of people who have the tendency to avoid answering confidently, we dropped the sample who selected the third choice to the questions of, “The earth is not round, but it is flat”.

Table 6-2. Robustness Check

Model: Ordered Probit (3 ordinal variables)		Korea			Japan			US		
Dependent Variable		Without Alien (2)			Without Alien (2)			Without Alien (2)		
: Donate % of household income		Parents	Child	Others	Parents	Child	Others	Parents	Child	Others
<i>Relational Worldviews</i>										
Alienated (1)		-0.0807 (0.130)	0.1129 (0.127)	-0.3268*** (0.125)	0.0421 (0.091)	-0.0761 (0.088)	-0.0735 (0.082)	0.4443 (0.331)	0.2641 (0.299)	0.0576 (0.264)
Alienated (4)		0.0504 (0.142)	-0.1071 (0.133)	-0.0943 (0.132)	0.1715 (0.154)	0.3507** (0.162)	0.0438 (0.133)	0.0915 (0.168)	0.0035 (0.163)	-0.2034 (0.154)
<i>Spirituality-related confidence. Behavioral Traits</i>										
Buddhist_devoted		0.3178 (0.416)	0.1028 (0.385)	0.0690 (0.367)	-0.0794 (0.313)	0.2195 (0.336)	0.5815** (0.285)	4.2570 (101.521)	4.0497 (88.373)	5.3330 (151.449)
Christian_devoted		0.0389 (0.148)	0.0693 (0.142)	0.4716*** (0.136)	0.0302 (0.406)	-0.1612 (0.382)	0.6501* (0.355)	0.0050 (0.092)	-0.0406 (0.091)	0.0293 (0.086)
Spiritually-Directed Confidence		0.0624** (0.027)	0.0458* (0.026)	0.0282 (0.025)	0.0226 (0.026)	-0.0190 (0.025)	0.0583** (0.023)	0.0186 (0.018)	-0.0183 (0.018)	0.0553*** (0.016)
Nonspiritually-Directed Confidence		0.0566** (0.026)	0.0373 (0.025)	-0.0717*** (0.024)	-0.0190 (0.023)	-0.0339 (0.023)	-0.0794*** (0.021)	0.0211 (0.031)	-0.0236 (0.030)	-0.0865*** (0.029)
Impatience		-4.1490** (2.028)	-2.9566 (1.937)	-5.0276*** (1.897)	-0.0216 (0.068)	-0.0375 (0.068)	0.0715 (0.062)	-0.3175 (0.272)	0.0768 (0.274)	-0.3966 (0.259)
<i>Demographic Variables</i>										
Aged 30-39		-0.1253 (0.145)	0.0117 (0.133)	-0.1046 (0.127)	0.2448* (0.144)	-0.1131 (0.143)	-0.3179** (0.125)	-0.2292* (0.125)	-0.1865 (0.128)	-0.2726** (0.117)
Aged 40-49		-0.1194 (0.177)	0.0237 (0.166)	-0.1159 (0.159)	0.1282 (0.138)	-0.3054** (0.138)	-0.4346*** (0.121)	-0.1005 (0.119)	-0.2322* (0.120)	-0.3084*** (0.110)
Aged 50-59		-0.3233** (0.159)	-0.0395 (0.148)	-0.0021 (0.143)	0.2939** (0.141)	-0.1532 (0.141)	-0.3127** (0.123)	-0.0509 (0.117)	-0.2077* (0.119)	-0.3384*** (0.108)
Aged 60-69		-0.3456** (0.168)	-0.1980 (0.158)	-0.1741 (0.155)	0.4750*** (0.145)	-0.2149 (0.143)	-0.2112* (0.125)	0.0305 (0.124)	-0.2818** (0.124)	-0.1616 (0.114)
Aged 70 and more		-0.2352 (0.226)	0.1082 (0.219)	0.2729 (0.209)	0.4254*** (0.161)	-0.1424 (0.160)	0.0059 (0.140)	0.0119 (0.134)	-0.3453*** (0.133)	-0.1206 (0.123)
Inincome_percapita		0.0339 (0.061)	0.0280 (0.058)	0.1056* (0.056)	0.1107*** (0.038)	0.0055 (0.038)	-0.0020 (0.035)	0.0480 (0.040)	0.0365 (0.040)	-0.0085 (0.037)
Female(=1)		-0.0539 (0.085)	0.0215 (0.081)	-0.0243 (0.079)	-0.1793*** (0.051)	-0.1837** (0.051)	0.0195 (0.046)	-0.0652 (0.061)	-0.0343 (0.061)	-0.0794 (0.057)
Years of education		0.0305 (0.019)	0.0064 (0.018)	0.0769*** (0.018)	0.1169*** (0.021)	0.0545*** (0.021)	0.0523*** (0.018)	0.0272** (0.013)	0.0068 (0.013)	0.0244** (0.012)
Having child(ren) (=1)		-0.1613 (0.101)	-0.0766 (0.097)	0.1081 (0.094)	-0.4222*** (0.077)	0.1382** (0.070)	-0.1611** (0.064)	-0.1150 (0.075)	-0.0006 (0.074)	0.0292 (0.069)
cut1	Constant	-1.3650*** (0.480)	-0.8862* (0.456)	1.0301** (0.446)	0.2028 (0.313)	-0.7207** (0.311)	-0.1036 (0.279)	-1.0842*** (0.236)	-1.5084*** (0.235)	-0.6870*** (0.217)
cut2	Constant	0.0626 (0.478)	0.1152 (0.455)	2.7643*** (0.452)	1.2814*** (0.313)	-0.0328 (0.310)	1.2225*** (0.279)	0.1008 (0.234)	-0.3619 (0.232)	0.7116*** (0.217)
Observation	Observations	964	964	964	2,606	2,610	2,607	1,671	1,667	1,652

Note: Dependent variable consists of three ordinal variables indicating how much the respondent is willing to donate in order to financially support the parents, children, and non-family members (1 corresponds to 0%; 2 is designated for up to 2%; and 3 for more than 2%). The model is ordered probit. Considering the possibility that selecting the second figure is measurement error, we dropped the sample who selected the second figure in the question of “which figure does not belong with the other three figures? (see Figure 2 for details)”.



Source: Hiebert (2008, p 43).

Note: These are examples of A. R. Luria (1976) explained by Hiebert (2008) to investigate the relational logic, which we use as an indicator of implicit worldview. Four figures above are similar to Figure 2 in our paper and the other four figures below are a hatchet, a log, a hammer, and a saw. Similarly, those with categorical logic would choose a log because it is not a tool, whereas those with relational logic would choose the hammer because it is useless without nails to build something using the log.