Testing the Effect of Risk on Intertemporal Choice in the Chinese Cultural Context

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Online publication date: 24 May 2011
CROSS-CULTURAL NOTES

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ABSTRACT. Previous studies using Western samples have found that introducing uncertainty to an intertemporal choice decreases the degree of discounting future rewards. The authors of this article examined the effect of risk on intertemporal choice using Chinese participants and found that respondents preferred the smaller but sooner (SS) outcome to the larger but later (LL) one in the presence of risk, which indicates that risk increases rather than decreases the degree of discounting future rewards. Thus, variations in response patterns between different cultural groups suggest that culture may play an important role in intertemporal choice and researchers should delve into this topic from an emic rather than an etic perspective.

Keywords: cross-cultural difference, decision making, intertemporal choice, risk

INTERTEMPORAL CHOICE REFERS TO A CHOICE between alternatives that differ in size and time to delivery. Many decisions that individuals and organizations make in the real world depend on a trade-off between immediate pleasure...
and later benefits. For instance, given the choice whether to receive $2,000 immediately or to wait to receive $2,100 in one year on an earlier investment, a dilemma for the investor would arise due to this trade-off. Thus, the investigation involving intertemporal choice has strong practical implications. Experimental literature on intertemporal choice is relatively well developed (Frederick, Loewenstein, & Donoghue, 2002). But Green and Myerson (2004) argue that a general theoretical model of time discounting must deal with situations involving risk. Indeed, situations are uncertain in most real-world decisions.

Using undergraduate students from a University in Amsterdam as a sample, Keren and Roelofsma (1995) found that introducing uncertainty to an intertemporal choice decreases the degree of discounting future rewards. In other words, participants prefer a larger but later (LL) outcome to a smaller but sooner (SS) one in the presence of risk (see Table 1 for details on the choices and results for risk and no risk). Similarly, other researchers (Ahlbrecht & Weber, 1997; Stevenson, 1992) also found that certain outcomes were discounted more than risky ones in instances of intertemporal decision making.

However, these conclusions were drawn from Western samples (e.g., North American and European). In Western countries, and the United States in particular, it would seem that most people do not attach much importance to saving and that some individuals even use credit card debt to maintain consumption. In contrast, many Chinese are accustomed to saving at least some portion of money

<table>
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<th>TABLE 1. The Four Questions on Intertemporal Choices and the Proportion (Actual Numbers in Parentheses) of Participants Who Chose Each Outcome ($N = 311$)</th>
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<tbody>
<tr>
<td><strong>Uncertainty</strong></td>
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<td><strong>Delay</strong></td>
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Note. The results of Keren and Roelofsma (1995) are also shown in italicized numbers for each outcome.
from their salary. Obviously, in order to have a full understanding of intertemporal choices in the real world, it would seem important to study this topic in its many variations in cultures around the world.

Unfortunately, little is known about whether people in different cultures differ in the perception of risk in intertemporal choice. Research evidence has revealed a cross-cultural difference in risk preference as well as time discounting. For example, Weber and Hsee (1998) found that Chinese are more willing to take risks than Americans in financial decisions. Hofstede (2001) demonstrated that Chinese, compared to Americans, have a stronger long-term orientation and value the future over the present. The goal of the present study is to examine the effect of risk on intertemporal choice in a Chinese cultural context. We, therefore, conjectured that Chinese might demonstrate opposite response patterns in intertemporal choice involving risk—that is to say we predicted risk would increase rather than decrease the degree of discounting future rewards in a Chinese sample.

**Method**

**Participants**

The initial participant pool consisted of 320 (139 male, 181 female) undergraduate student volunteers recruited from a university in Shan Dong, China; all provided oral consent. Data from 9 (7 male, 2 female) of the 320 participants were eliminated as these 9 participants did not pass the manipulation check.

**Design**

As per Keren and Roelofsma (1995), each participant in our study was randomly presented with one of the four questions. The intertemporal choices in our study were exactly same as those employed by Keren and Roelofsma except that in our case the money symbol “¥” was used instead of “Fl” (see Table 1). In the remote future condition, the options were identical to those in the immediate future condition, except that a delay of 26 weeks was added. In the uncertain condition, the options were also identical to those in the certain condition, except that they were associated with a probability of 0.5. Thus, this was a 2 (immediate future condition vs. remote future condition) × 2 (certain condition vs. uncertain condition) between-subjects experimental design. The exact participant numbers in each experimental condition are listed in parentheses in Table 1.

**Materials and Procedure**

Questions mixed among six unrelated questions (i.e., a student attitude survey toward physical education) were randomly presented to the participants in
questionnaire form. Participants were asked to choose the alternative they preferred between two options. In the certain condition, the gender breakdowns were 42% male for the immediate future and 45% male for the remote future; in the uncertain condition, the gender breakdowns were 43% male for the immediate future and 40% male for the remote future. Our data show that there were no gender differences in the results.

Manipulation Check

To eliminate incorrect results caused by inattention, each participant was presented with a choice: (A) to receive ¥110 with a probability of 0.5 four weeks from now; or (B) to receive ¥100 with a probability of 0.5 six weeks from now. If a participant preferred alternative B to A, his or her response was regarded as a violation of dominance since alternative B is dominated by alternative A. Thus, the data from these participants (n = 9) were dropped.

Results

The results can be seen in Table 1. A 2 (certainty) × 2 (delay) logistic regression analysis on choice responses reveals that the main effect of uncertainty was significant ($\chi^2(1, N = 311) = 13.68, p < .001$), and the main effects of uncertainty were both significant when the logistic regression analysis was limited either to the choices in the immediate future condition ($\chi^2(1, N = 161) = 6.519, p = .011$) or to those in the remote future condition ($\chi^2(1, N = 150) = 6.642, p = .010$). This suggests that the proportion of participants who chose the SS outcome increased in both the immediate and the remote future conditions when the same uncertainty was added to the outcomes.

The main effect of delay was also significant ($\chi^2(1, N = 311) = 12.46, p < .001$)—that is to say the proportion of participants who chose the SS outcome decreased in both certain and uncertain conditions when the same time delay was added to the outcomes. The interaction between delay and uncertainty was not significant ($\chi^2(1, N = 311) = .02, p = .901$).

Discussion

Our experiment was a replication of Keren and Roelofsma (1995). In both experiments, the addition of an external time delay decreased the degree of discounting future in the certain condition.

However, our results were inconsistent with Keren and Roelofsma in the uncertain condition. Keren and Roelofsma reported that this time delay effect vanished when participants received future rewards with a probability of 0.5, whereas
our results indicate the presence of a time delay effect not only in the certain condition but also in the uncertain one.

Most significantly, these two experiments reveal opposite response patterns when uncertainty is added to the intertemporal choice. Specifically, Keren and Roelofsma indicated that risk decreased the proportion of participants who chose the SS outcome. However, our results suggest this proportion increases, rather than decreases when introducing risk.

This significant difference in the effect of risk on intertemporal choice between western and eastern groups suggests that culture may play an important role in intertemporal choice. Living in a society with a strong Confucian tradition, Chinese usually attach more positive significance to saving behavior. In the famous classic Aesop fable, the grasshopper, who luxuriated during the warm summer, is often regarded as a “bad guy” by many Chinese children, whereas the ant, who stored food for the upcoming winter, is categorized as a “good guy.” In reality, the savings rate is relatively high in China but lower in Western countries, like the United States, according to a World Bank survey (http://finance.mapofworld.com/savings). Therefore, in intertemporal decision making, a single culture (e.g., Western culture) may not fully capture the complicated patterns of differences between groups, and future research should delve into the intertemporal choice from an emic rather than an etic perspective.

NOTE

1. In this article the term “discounting” refers to time discounting, i.e., lowering the value of a temporally extended prospect.

AUTHOR NOTES

Yan Sun is an Assistant Professor at the Institute of Psychology, Chinese Academy of Sciences. His current research interests focus on the risky and intertemporal choice. Shu Li is a Professor at the Center for Social and Economic Behavior, Institute of Psychology, Chinese Academy of Sciences. His research interests are in the area of behavioral decision making.

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*Received August 24, 2009
Accepted May 28, 2010*