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Influence of elaboration
on the framing of decision

by

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Two experimental studies were conducted to examine the influence of elaboration on framing of a medical decision problem. Subjects were 344 male and female undergraduate students randomly assigned to one cell of a 2 x 2 design (high and low elaboration conditions; positive and negative decision frame versions). In the low elaboration condition, a framing effect (Tversky & Kahneman, 1981) was observed: Most of the subjects chose the riskless option in which decision options were phrased positively in terms of gains, whereas most chose the risky option wherein options were phrased negatively in terms of losses. However, in the high elaboration condition, the framing effect was not observed.

In many situations, people are confronted with decision problems, such a buying decision problem, personnel decision problem, or medical decision problem in social situations. In normative decision theory, a decision problem is represented by the options among which one must choose, the possible outcomes of the options, and the contingencies of conditional probabilities that relate outcomes to options (Tversky and Kahneman,1981).

The recent descriptive decision research stresses the importance of internal representation of decision problem rather than objective decision problem by normative decision theory. The internal representation of decision problem is called "decision frame" (Kahneman & Tversky, 1982; Tversky and Kahneman, 1981,1986). Tversky and Kahneman (1981) proposed the concept of decision frame to " refer to the decision maker's conception of the acts, outcomes, and contingencies associated with a particular choice" (Tversky & Kahneman, 1981, p.453.).

Tversky and Kahneman (1981) reported a large effect of the decision frame on choice. When decision options were phrased positively in terms of gains, most people chose the sure thing. But when options were phrased negatively in terms of losses, most people chose the risky option. This phenomenon has been called the "framing effect." The essential feature of the framing effect as described by Tversky and Kahneman (1981) is a reversal in the majority choices. They argued that this preference reversal occurs because the alternative framings cause subjects to view the outcomes as gains in the positive frame and as losses in the negative frame.

Tversky and Kahneman (1981) used the following two versions of a same decision problem.

Imagine that the U.S. is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimate of the consequences of the programs are as follows:

Version 1 (Positive frame version).

- (a) If program A is adopted, 200 people will be saved.
- (b) If program B is adopted, there is 1/3 probability that 600 people will be saved, and 2/3 probability that no people will be saved.

Version 2 (Negative frame version).

- (c) If program C is adopted, 400 people will die.
- (d) If program D is adopted, there is 1/3 probability that nobody will die, and 2/3 probability that 600 people will die.

Tversky and Kahneman (1981) reported that out of a group of 152 subjects, 72 % chose the riskless option, program C, in the version 1 which highlights lives saved. On the Contrary, out of 155 subjects who were presented with the version 2 which highlights lives lost, 78 % chose risky option, program D. Since the two versions are formally identical, this result indicates inconsistent behavior, violating notions of rational choice which are postulated in the normative decision theory.

Tversky and Kahneman (1981,1986) suggested that the two versions induce subjects to adopt different decision frames. Although they reported that the framing effect was robust phenomenon, a contradictory finding which did not replicate the

framing effect was obtained (Fagley & Miller, 1987; Takemura, 1992, 1993). This contradiction of the findings indicated a possibility that problem characteristics or task requirements were important in whether or not the framing effect was observed.

In fact, Takemura found a significant effect of decision time (Takemura, 1992) and decision justification (Takemura, 1993) on framing of decision. In his study, the framing effect was not observed in the condition where decision makers thought about decision problems for a relatively short time or they were not requested to justify their decisions, although the framing effect was observed in the condition where decision makers thought about decision problems for a relatively long time or they were requested to justify their decisions.

These findings suggested that mental elaboration had influences on whether the framing effect was observed or not. Although the concept of elaboration was used in memory research (Craik & Lockhart, 1972) and persuasion research (Petty & Cacioppo ,1986) and was not used in decision research, this concept can be applicable to the decision process. The more a decision maker elaborates upon a piece of information of the decision problem (or the more deeply it is processed), the more likely the framing effect would be inhibited. Thus, the results of Takemura's studies (1992, 1993) implied that the framing effect was not observed in high elaboration condition, whereas the framing effect was observed in low elaboration condition.

However, there is a methodological restriction in those studies. In the experimental design of his studies, a factor of decision frame (two levels: positive and negative frames) was

within-subjects design. Using within-subject factor as the factor of decision frame may inhibit the framing effect since making decisions for the identical problems (Version 1 and 2) would enhance "transparency of decision problem" (Tversky & Kahneman, 1986). Tversky and Kahneman (1986) suggested that decision makers would obey rational decision rules in transparent problems, whereas they would frequently violate rational rules in nontransparent ones. If their suggestion is correct and the within-subjects design enhances the transparency, the findings of Takemura's studies should be restricted.

To clarify this problem and generalize the findings, we used between-subjects design for the factor of decision frame and the factor of elaboration. Moreover, to extend the findings, we used a medical decision problem which was so called "Asian disease problem" instead of gambling decision problem used in Takemura's studies (1992, 1993). Thus, we conducted two experiments in order to examine an influence of elaboration on the framing of decision. For the manipulation of elaboration, we used two different procedure to maintain convergent validity: decision justification for study 1 and decision time for study 2. It was expected that using these different procedures for the manipulation of elaboration enabled to maintain the convergent validity (e.g., Campbell & Fiske, 1959).

Accordingly, it was hypothesized as follows.

Hypothesis 1. In the low elaboration condition, the framing effect would be observed: When decision options would be phrased positively in terms of gains, most subjects would choose the riskless option. But when options would be phrased negatively in terms of losses, most of subjects would choose risky option.

Hypothesis 2. In the high elaboration condition, the framing effect would not be observed.

Study 1

METHOD

Subjects and design One hundred and eighty male and female undergraduate students at Doshisha University and at Koka Women's College participated in the experiment. The experimental design was a 2 (high or low elaboration) x 2 (positive or negative frame) factorial. All factors were manipulated between subjects. The subjects were randomly assigned to one of four conditions.

Materials A medical decision problem was used to measure subjects' choices between risk-averse and risky options. This was identical with the problems by Tversky and Kahneman (1981) except for the subjects being Japanese.

Procedure Subjects were asked to complete a questionnaire. In the high elaboration condition, the subjects were asked to think about the justification of decision, and were told that after completing each decision they had to write down the content of justification in open-ended manner. All subjects in the condition wrote the justification of decision. On the other hand, in the low elaboration condition, the subjects were asked only to choose between two options.

RESULTS AND DISCUSSION

Table 1 presents the number of subjects choosing the riskless and the risky options for each version of the problem in each condition. As shown there, a pattern of choice in the low elaboration condition differed from a pattern of choice in the high elaboration condition.

Insert Table 1 about here.

In the low elaboration condition, 80.0 % of subjects preferred the riskless option for the positive frame version , while 68.9 % of them preferred the risky option for the negative frame version . The statistical tests revealed that a significantly high percentage of subjects chosed the sure option for the positive frame version ($\chi^2=16.20$, $df=1$, $p<.001$) whereas a significantly high percentage of subjects chosed the risky option for the negative frame version ($\chi^2=6.42$, $df=1$, $p<.05$). These findings were consistent with the framing effect (Tversky & Kahneman,1981) and supported Hypothesis 1.

In the high elaboration condition, 53.3 % of subjects preferred the risky option for the positive frame version , while 37.8 % of them preferred the risky option for the negative frame version . The statistical tests revealed that there was no significant difference between percentages of risky and riskless choices for the positive and negative frame versions ($\chi^2= .20$, $df=1$, n.s. , $\chi^2= 2.69$, $df=1$, n.s., respectively). These findings were not consistent with the framing effect (Tversky & Kahneman,1981) and supported Hypothesis 2.

Study 2

METHOD

Subjects and design One hundred and sixty-four male and female undergraduate students at Doshisha University participated in the experiment. The experimental design was a 2 (high or low elaboration) x 2 (positive or negative frame) factorial. In this experiment, time taken for decision (decision time) was used for manipulation of elaboration. The subjects were randomly assigned to one of four conditions.

Materials The same decision problem of study 1 was used to measure subjects' choices between risk-averse and risky options.

Procedure Subjects were asked to complete a questionnaire. In the high elaboration condition, the subjects were asked to think about the decision problem for three minutes. On the other hand, in the low elaboration condition, the subjects were asked to think about the decision problem for only 10 seconds. In the both conditions, the subjects were instructed to think about the problem until the decision time would be finished.

RESULTS AND DISCUSSION

Table 2 presents the number of subjects choosing the riskless and the risky options for each version of the problem in each condition. As shown in Table 2, a pattern of choice in the low elaboration condition differed from a pattern of choice in the high elaboration condition. This pattern was basically the same as the pattern of study 1.

Insert Table 2 about here.

In the low elaboration condition, 70.7 % of subjects preferred the riskless option for the positive frame version , while 68.3 % of them preferred the risky option for the negative frame version. The statistical tests revealed that a significantly high percentage of subjects chosed the sure option for the positive frame version ($\chi^2=7.05$, $df=1$, $p<.01$) whereas a significantly high percentage of subjects chosed the risky option for the negative frame version ($\chi^2=5.49$, $df=1$, $p<.05$). These findings were consistent with the framing effect (Tversky & Kahneman,1981) and supported Hypothesis 1.

In the high elaboration condition, 41.5 % of subjects preferred the risky option for the positive frame version , while 43.9 % of them preferred the risky option for the negative frame version . The statistical tests revealed that there was no significant difference between percentages of risky and riskless choices for the positive and negative frame versions ($\chi^2= 1.20$, $df=1$, n.s. , $\chi^2= 0.61$, $df=1$, n.s., respectively). These findings were not consistent with the framing effect (Tversky & Kahneman,1981) and supported Hypothesis 2.

General Discussion

The purpose of the present study was to examine the effect of elaboration on framing of decision. In the low elaboration condition, the framing effect (Tversky & Kahneman, 1981,1986) was observed. On the contrary, in the high elaboration condition, the framing effect was not observed. These results supported Hypothesis 1 and Hypothesis 2 of the present study. It was concluded that the framing effect was limited to situations where a decision maker did not elaborate a piece of information of a problem during the decision process.

Kahneman and Tversky (1982) argue that people are often unaware of framing effect and, once they are made aware, they are still unable to see decision problems in an objective way. They also reported that the framing effect was a robust phenomenon. On the contrary, in the present study, a contradictory finding which did not replicate the framing effect was obtained in the high elaboration condition. It can be concluded that the framing effect was not robust phenomenon because elaboration weakened the framing effect.

However, this finding of the present study does not always deny the explanation of framing effect by Tversky and Kahneman (1981,1986) who explained why the framing effect should occur in term of prospect theory proposed by Kahneman and Tversky (1979). In prospect theory, the decision making process is divided into two phases: an editing phase responsible for developing a decision frame and an evaluation phase during the framed course of action are evaluated as a basis for choice. According to the prospect theory, a decision frame is formed by a number of information processing operations during the editing phase.

These operations can be varied by contexts or presentation format of a decision problem. Thus, different presentation of a decision problem makes different decision frame. Once a decision frame is organized, a reference point is fixed, and choice can be determined by an evaluation. In the evaluation, subjective value function and decision weight function are assumed to be nonlinear. As a result, different frames lead to different choice. Therefore, if the prospect theory is correct, it can be concluded that the procedure of elaboration made different type of decision frame in the editing phase and diminished the framing effect at the final choice.

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T a b l e 1

Frequency of subjects choosing the riskless and risky options for
each condition in Study 1

| Condiiton | <u>Low elaboration</u> | | <u>High elaboration</u> | |
|-----------------|------------------------|-------------------|-------------------------|-------------------|
| | Positive frame | Negative frame | Positive frame | Negative frame |
| Riskless option | 36 | 14 | 21 | 28 |
| Risky option | 9 | 31 | 24 | 17 |

T a b l e 2

Frequency of subjects choosing the riskless and risky options for
each condition in Study 2

| Condiiton | <u>Low elaboration</u> | | <u>High elaboration</u> | |
|-----------------|------------------------|-------------------|-------------------------|-------------------|
| | Positive frame | Negative frame | Positive frame | Negative frame |
| Riskless option | 29 | 13 | 24 | 23 |
| Risky option | 12 | 28 | 17 | 18 |

Footnote 1.

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