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Research Report

Preliminary study on the component of perceived benefit in risk-taking[1), 2)]

Shingo MORIIZUMI* and Shinnosuke USUI**

The present study aimed to explore the important factors related to perceived benefit in daily risk-taking behaviors. A web-based questionnaire survey was conducted for five hundred respondents with a wide range of ages. The list of risk-taking behaviors in daily life was developed by consulting previous studies. The perceived benefit of such behaviors was evaluated using several indicators (e.g. whether the benefit can be obtained with certainty). Results of factor analysis indicated that perceived benefit in risk-taking behavior was mainly evaluated by the intuitive thinking process. Multiple regression analysis also revealed the important effect of such intuitive thinking process on intention of risk-taking. Our research suggested the important components of perceived benefit in risk-taking behaviors. The findings should have also been discussed from the viewpoints of several theories such as the dual process theory used in industrial and social psychology.

key words: Risk-taking, Perceived benefit, Risk perception

Introduction

It has been suggested that, intentional unsafe behaviors such as risk-taking and violation are particularly likely to lead to traffic accidents (e.g., Parker, Reason, Manstead, & Stradling, 1995; Moriizumi, Usui, & Nakai, 2012). With regard to intentional risk-taking, various factors have been investigated including the effect of gender difference that males are more likely to take risks than females (Byrnes, Miller, & Schafer 1999), and the complex effect of difference in age as a function of task demands (Mata, Josef, Samanez-Larkin, & Hertwig, 2011). Specifically, many studies demonstrated that, of all forms of risk-taking, the effects of perceived risk and perceived benefit (recognition of returns from risk-taking) are of prime importance (e.g., Mckenna & Horswill, 2006; Soane, Dewberry, & Narendran, 2010; Dhami & Mandel, 2012).

In the background of these cognitions, there seems to be the dual process theory, which is the basic human thought process (e.g., Finucane, Alhakami, Slovic, & Johnson, 2000; Slovic, 2007; Nakayachi, 2012). In this theory, two types of thought processes leading to decision making and judgment are assumed: "experiential system" (system 1) and "analytic system" (system 2). The former is a high-speed and low-load thought mode based on affect. The latter is a high-load and low-speed thought mode that follows logical and sophisticated processes. In daily judgment, empirical systems generally take precedence over analytical systems (e.g., Nakayachi, 2012; Small, Leowenstein, & Slovic, 2007), and analytical system plays a role for monitoring empirical system.

Perceived risk has been evaluated in general terms based on "the subjective levels of risk" (e.g., Finucane et al., 2000; Weber, Blais, & Betz, 2002), and more classically, much research has been done on the risk components as represented by the study of Slovic (1987) on dread risk and unknown risk and a study on indices that numerically evaluated the probability and severity of damage (National Research Council, 1989). Meanwhile, regarding perceived benefit, unlike perceive risk, most studies have focused on general evaluation on "the subjective degree of benefit for risky activity" without mentioning its components (e.g., Parsons, Siegel, & Cousins, 1997; Finucane et al., 2000; Weber et al., 2002). Several studies about

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2) When submitting the present paper, the first author was at Graduate School of Human Sciences, Osaka University
* Faculty of Psychology, Tezukayama University, 3-1-3 Gakuenminami, Nara, 631-8585, Japan
e-mail: hs5126ms@tezukayama-u.ac.jp
** Graduate School of Human Sciences, Osaka University, 1-2 Yamadaoka, Suita, Osaka 565-0871, Japan

benefits associated with behaviors not restricted to risk-taking behaviors revealed that perceived benefit can be captured by the effect of timing for gaining benefits, typically illustrated by delay discounting (Mazur, 1987), and by probability and degree just like perceived risk (Dhami & Mandel, 2012). If we narrow down the focus to specific behaviors, perceived benefit is sometimes understood as offering a concrete benefit, as smoking "looks cool" (Morrell, Song, & Halpern-Felsher, 2010), drink-driving "is cheaper than alternative ways of returning home" (Dhami & Mandel, 2012), and not wearing a seatbelt provides "comfort" (Dhami & García-Retamero, 2012).

Thus, perceived benefit associated with risk-taking tends to be evaluated in general terms or according to specific behavior, and the components of perceived benefit common to broad forms of risk-taking have not been clarified. Considering the inverse correlation between perceived benefit and perceived risk (e.g., Sokolowska, & Sleboda, 2015; Finucane et al., 2000; Alhakami & Slovic, 1994), the components of perceived benefit could be explored not only from psychological factors associated with said benefits but also from the perspective of the components of perceived risk. Therefore, this study focuses on various risk-taking behaviors in daily situations with the aim of revealing the components that constitute perceived benefit associated with risk-taking, while at the same time exploring how they influence behavior. This study was conducted after obtaining approval from the Ethical Committee of Behavioral Sciences at the Graduate School of Human Sciences, Osaka University (Approval No. 29-106).

Method

Participants

Of all monitors registered in Rakuten Insight, Inc., 500 subjects (250 males, 250 females) were selected for a web survey. The mean age was 39.76 years (*SD* = 10.82). They were composed of 125 participants from each age group, the 20's, 30's, 40's, and 50's. Of the total participants, 48.6% were office workers (n = 243). Of all 47 prefectures in Japan, responses were received from 43 prefectures (93.5%). Tokyo had the greatest number of responders (13.8%).

Risk taking in daily life

Behaviors presented in the Risk-taking Behavior Scale for Undergraduates (RIBS-U) as developed by Oshio (2001) were used. The RIBS-U is a 12-item questionnaire scale in which everyday risk-taking behaviors of undergraduate students were classified into two factors: personal risk-taking (e.g., drink-driving, smoking cigarettes, committing a speeding violation via auto or bike) and social risk-taking (e.g., running a red-light, dashing for a train, absenteeism). The reliability and validity of the RIBS-U as a behavioral scale have been reported (Oshio, 2001). This study assesses the benefit of each risk-taking behavior considered in the following section. To this end, of all 12 forms of risk-taking behavior, two forms-"Arrive late for a class or meeting" and "Break a promise" -that seem to be difficult to evaluate about their benefits (both of these forms of behavior were classified as "social risk-taking" in Oshio (2001)) were excluded, and the remaining 10 forms were assessed.

Evaluations of the perceived benefit in taking risks

In the present study, with reference to 15 items ((un) controllable, (not) dread, (not) global catastrophic, consequences (not) fatal, (not) equitable, catastrophic (individual), high (low) risk to future generations, (not) easily reduced, risk decreasing (increasing), involuntary (voluntary), (not) observable, unknown (unknown) to those exposed, effect delayed (immediately), new (old) risk, and risks unknown (known) to science) selected as primary components in a study on the components of perceived risk (subjective perception of risks) by Slovic (1987), four items that authors deemed useful for the present study of benefit ("intuitive goodness", "controllability," "voluntariness," and "continuousness (to future)") were defined. Unlike the study of Slovic (1987), the present study focused on the benefits of the risk-taking behaviors, which made it difficult to use the same items as Slovic (1987). Therefore, the present study considered whether participants were easy to evaluate the benefits in selecting items. Moreover, in reference to Dhami & Mandel (2012) which considers the relationship between risk behavior and perceived benefit, two items-"importance" and "certainty"-were created. Additionally, based on a study of delay discounting, an item on "timing (for gaining

Table 1 Items and these evaluations about the perceived benefit in taking risks

Items of perceived benefit		Assessment scale
Degree of feeling "intuitive goodness"	(intuitive goodness)	Not good to Good
Degree of feeling "importance"	(importance)	Not important to Important
When the benefit can be gained	(timing)	Obtained immediately to Obtained later
Degree of influence to one's future	(continuousness)	No influence to the future to Influence remains in the future
Degree of improvement through one's effort	(controllability)	Cannot improve through my effort to Can improve through my effort
The degree of voluntary action	(voluntariness)	Forced to do to Do voluntarily
Whether benefit can be obtained with certainty	(certainty)	Rarely obtained with certainty to Obtained

Table 2 Mean and standard deviation scores of each perceived benefit

Items		*Mean (SD)*
Intuitive goodness	(α=.91)	2.07 (1.05)
Importance	(α=.94)	2.27 (1.38)
Timing	(α=.94)	4.61 (1.13)
Persistence	(α=.94)	4.35 (1.63)
Controllability	(α=.97)	3.54 (1.69)
Voluntariness	(α=.94)	3.44 (1.48)
Certainry	(α=.95)	2.49 (1.33)

benefit)" was created. For each item, participants were asked to answer on a 7-point scale. The higher the score, the higher the benefit is perceived to be. In the study of Dhami & Mandel (2012), "certainty" was evaluated by means of the scale, "0% (no chance at all) - 100% (absolutely certain)". In some risk taking such as skydiving, the behavior itself may be the end (Zinn, 2019). However, many of them seems to be avoided if there is no return for the risk-taking. Thus, in the present study, "rarely" was used as the lowest score label instead of "no chance at all". Table 1 shows the questionnaire items concerning perceived benefit used in the present study and its assessing methods. For example, as for "intuitive goodness", we asked how much the benefits gained by the behaviors listed in the 10 items feel "intuitively good" for you. Thus, participants were asked to answer a total of 70 items-seven items each for ten forms of behavior mentioned above. In addition, as an intention toward each form of behavior, they were requested to answer a 7-point scale question (1 = I do not want to engage in it at all to 7 = I definitely want to engage in it) of "To what extent, do you want to perform the behavior?". Whereas the original study of Oshio (2001) takes frequency (I do not engage in it at all to I often engage in it) as an assessment item, the present study measures the intention, due to research ethical issues of the research firm.

Results

Components of the perceived benefit in risk taking

With regard to 7 items concerning perceived benefit, averaged indices were developed without considering the kinds of risk-taking (α-coefficient is described in Table 2). Taking these seven items as observation variables, factor analyses were performed based on the maximum likelihood method with promax rotation. Factors with the eigenvalue of 1 or greater were extracted and a three-factor structure was obtained. However, since the third factor was composed of just one item, a factor analysis was performed once again and two factors were extracted in consideration of the scree plot and interpretability. As a result, factor loadings for "timing" were low for both the first and second factors (-.145, -.068 respectively), this item was removed and another factor analysis was performed. The final results of factor analyses are shown in Table 3. F1 consisted of "intuitive goodness," "importance," and "certainty," with all having the factor loading of .60 or greater. F2 was comprised of "voluntariness," "controllability," and "continuousness." From these results, F1 was interpreted as perceived benefit of an experiential system (system 1) in the dual-process theory (e.g., Esptein, 1994; Slovic, 2007) and F2 was interpreted as perceived benefit of an analytic system (system 2), and F 1 and F2 were named as "perceived intuitive benefit"

Table 3 Results of factor analysis

	perceived intuitive benefit (α=.77)	perceived analytic benefit (α=.38)
Intuitive goodness	**.862**	-.206
Importance	**.701**	.000
Certainty	**.678**	.162
Voluntariness	.132	**.533**
Controllability	.114	**.416**
Continuousness	-.198	**.333**
	(I)	(II)
(I) perceived intuitive benefit	-	.484
(II) perceived analytic benefit		-

CFI=.975, RMSEA=.085

Table 4 Mean and standard deviation scores of the intention and perceived benefit of each risk-taking

	Mean (SD)	
	Personal risk-taking	Social risk-taking
Intention	2.04 (1.14)	2.57 (1.20)
Perceived intuitive benefit	2.12 (1.08)	2.52 (1.13)
Perceived analytic benefit	3.82 (1.12)	3.72 (1.08)

Table 5 Results of regression analysis

	Personal risk-taking	Social risk-taking
Sex	.10 ***	-.02
Age	-.07 *	-.07 *
Perceived intuitive benefit	.72 ***	.70 ***
Perceived analytic benefit	-.01	.03
Adj. R^2	.56 ***	.50 ***

Note) ***p<.001, *p<.05

and “perceived analytic benefit” respectively.

Regression analysis

For each risk-taking behavior, perceived benefit items were averaged for each factor. Additionally, risk-taking behaviors were divided into “personal risk-taking” and “social risk-taking” according to Oshio (2001). Table 4 shows the mean and standard deviation scores of the intention and the perceived benefit of each factor according to the two classifications. The alpha coefficient of the intention of personal risk-taking was .84, while social risk-taking was .82. The forced-entry multiple regression analysis was then performed with the intention toward each behavior regarded as a dependent variable, and sex, age, each factor regarded as independent variables (Table 5). Sex was dummy-coded 0 for females and 1 for males. As a result, in both personal risk-taking (β = .72) and social risk-taking (β = .70), perceived intuitive benefit significantly explains the intention (ps < .001). Perceived analytic benefit was insignificant for both behaviors (β = .01, *n.s.*, β =応 用 .03, *n.s.* respectively). The VIF values of each independent variable indicating multicollinearity were all 1.13 or less.

Discussion

The components of perceived benefit in daily life risk taking

The present study attempts to explore and identify the components of perceived benefit common to broad forms of risk-taking behavior. As a result, in the present study, two factors were drawn as the primary components of perceived benefit. The first factor consisted of “intuitive goodness,” “importance,” and “certainty,” whereas the second factor was comprised of “voluntariness,” “controllability,” and “continuousness.” From these results, F1 was interpreted as perceived benefit of an experiential system (system 1) in the dual-process theory (e.g., Esptein, 1994; Slovic, 2007) and F2 was interpreted as perceived benefit of an analytic system (system 2). This interpretation is also supported by the fact that our observation that F1 better explained the intention is in line

with the dominance in decision-making of the system 1 in the dual process theory (Nakayachi, 2012). However, the alpha coefficient of the F2 was not sufficient. So, the interpretation of the factor can't be discussed anymore.

With respect to the association between risk-taking behavior and derived factors, in both personal risk-taking behavior and social risk-taking behavior, perceived intuitive benefit significantly affected the intention. As mentioned above, in view of dominance of affect in decision-making, it is legitimate to think that intuitive benefit is the sole influencer of the intention. However, it would not be possible to conclude from the present results that analytic aspects do not affect risk-taking behavior at all. Oshio (2001) defined personal risk-taking behavior as "behavior that can have adverse effects (e.g., disease, death, etc.) on the actor himself" and social risk-taking behavior as "behavior that can indirectly have adverse effects (e.g., loss of social status, etc.) on the actor himself through his relationships with others and with society" (p.259). As far as these definitions are concerned, it would be implausible to think that analytic thinking does not intervene in the occurrence of these behaviors. Furthermore, the reduced reliability coefficient for perceived analytic benefit (α = .38) may be associated with the results of the present study.

Regarding "timing" (when benefit can be gained), it was not included as a component of the present analysis. Considering previous studies on delay discounting (e.g., Mazur, 1987), the question of "when the benefit can be gained (immediately?)" would be an important element. This absence of timing may be due to the fact that risk-taking behaviors presented in this study do not include kinds of behavior whose benefit can be gained later. To put it another way, daily risk-taking behaviors provide benefit immediately after its execution, which makes it difficult for "timing" to be a component.

Limitations

The first limitation of the present study has to do with the risk-taking behavior scale used for measurement. Although there was not much difference in overall trends of the results of our multi-regression analysis with previous studies on risk-taking, due to the smaller number of risk-taking behaviors and benefit items dealt with in the present study, it is hard to deny that the present study is nothing more than a preliminary study. Accordingly, re-evaluation on risk-taking behavior based on a separate scale (e.g., Schwartz, Yamagishi, Hirahara, Onishi, Barnes, Rosman, Garcia, Lee, & Butler, 2013; Moriizumi & Usui, 2011) would be necessary.

Second, the reliability of perceived analytic benefit derived from the factor analysis was low (α = .38). If perceived analytic benefit is an item related to the system 2, items would be diverse compared to the first factor "perceived intuitive benefit." For example, situation-specific and behavior-specific benefits may be included as items. Reflecting on the aim of this study, that is, to explore components common to various risk-taking behaviors, it may be difficult henceforth to improve reliability by increasing items that would constitute perceived analytic benefit. Reliability should be checked from a different index, such as test-retest reliability in the future. Moreover, although the item "intuitive goodness" was used in this research, the results of the factor analysis may be influenced by this word "intuitive" itself. Therefore, whether the results of this study are valid should be evaluated by other methodologies in future studies.

Finally, since the present study was conducted based on a questionnaire survey, the association between components of perceived benefit and risk-taking behavior was examined only in terms of its attitudinal aspect. To test the construct validity of the factors obtained in this study, research on the relationship with actual risk-taking behavior will be required in the future.

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