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THE RELATIONSHIP BETWEEN RISK PROPENSITY AND VIOLATION: AN EXPERIMENTAL STUDY

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Abstract

This study aimed to empirically investigate the relationship between violation and risk propensity. Thirty-six participants were instructed to perform a cognitive task, and were informed that they should save their results. However, the saving can be skipped operationally. Thus, in this study, to skip saving was regarded as violation. Results indicated that risk propensity, especially the tendency to engage in risk-taking according to time and circumstance, was significantly related to violation. On the basis of the results, the mechanisms of violation were discussed in terms of risk propensity.

Key words: violation, risk propensity, risk-taking

1. Introduction

1.1. Current status of accidents and violations in the traffic scene

In 2011, there were 854,489 individuals in Japan who were injured in traffic accidents (691,932 cases), and of them, 4,611 individuals died within 24 hours from the occurrence of the accident (The National Police Agency, 2013). Though these figures are on a yearly decline, we cannot overlook the fact that there are approximately 200 times as many injured as there are dead. According to the National Police Agency (2013), there were 11,835,929 crackdowns on road traffic violations in 2010. These are just the number of crackdowns, and given that some individuals were not arrested for "violations", the actual number of violations is estimated to be much larger. Previous studies have already pointed out that violations can cause traffic accidents (Parker, Reason, Manstead, & Stradling, 1995; Verschurr & Hurts, 2008). It can be said, then, that resolving the violation mechanism will contribute to accident prevention. In this study, these violations are investigated from a psychological viewpoint.

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1.2. Relationship between violations and risk-taking

A violation is defined as "behaviours that involve deliberate deviations from the written rules." (Lawton, 1998)." Since violation-generating mechanisms overlap considerably with that of risk-taking (defined as a dangerous act including choices that can result in negative consequences (Byrnes, Miller, & Schafer, 1999; Haga, 2007), violations are often discussed from the viewpoint of not merely "deviation from regulations", but also risk-taking or the risks associated with violations (Lawton, 1998; Adachi, Usui, Shinohara, Matsumoto, Aoki, 2007). Therefore, it seems most effective to discuss violations based on factors pertaining to risk-taking. Additionally, when applying Heinrich's law—a famous theory in the workplace—unsafe behavior such as risk-taking or violations can result in serious accidents, speaking in terms of probability (Inoue, 1982). In other words, repetition of unsafe behavior can be said to increase the probability. This study will attempt to resolve the mechanism of violations using the concept of risk propensity, which is a propensity towards risk-taking execution.

1.3. Risk propensity and measurement thereof

Risk propensity is defined as "a personal tendency to take or avoid risk" (Sitkin & Weingart, 1995). To measure risk propensity, Moriizumi, Usui, Nakai (2010) developed a Risk Propensity Questionnaire (hereinafter called RPQ) based on the results and challenges acquired from existing scales (Weber, Blais, & Betz, 2002; Oshio, 2001). The RPQ consisted of 17 question items, and based on the factor analysis, classified risk propensity in daily life into four factors—"gambling behaviors", "occasional risk-taking", "risk-taking with individual values", and "risk-avoiding". Gambling behaviors is a factor that indicates a personal propensity for gambling. For example, the more positive an individual's attitude is towards gambling, the higher their score would be in this factor. Therefore, individuals with a high tendency towards this risk propensity tend to act more like a gambler. Situational action is a factor of risk propensity that is seen in behavior that depends on time or circumstance. For example, some individuals may cross a crosswalk even during a red light, if there are no oncoming vehicles. Such individuals who take risks on a situational basis have a high score in this factor. As a background of risk-taking, it is indicated that there are benefits (advantage) associated with risk-taking, as well as costs (disadvantage) incurred when a risk is avoided. Risk-taking with individual values indicates a propensity towards risk for behaviors which are based on a personal belief. It is difficult to say these behaviors by situation. Regarding this factor, for example, "an individual who is prone to be late to important appointments" takes the risk of being late, though he or she recognizes how important the appointment is (has a high cognitive awareness of risk). In this case, since there is no benefit to the behavior of being late, other factors such as this individual's personality are considered to play a more influential role than the benefits associated with risk-taking. Safety consideration is a factor of risk propensity for behaviors involving consideration for security or safety. An individual who values risk prevention—for example, checking whether or not the

door is locked to keep thieves from entering even when going outside for a short amount of time—acquires a low score of this factor.

In the four factors listed above, though cases have been reported in which stable reliability regarding the safety consideration factor was unstable, as a whole, reliability based on internal consistency was shown to be above a certain level, suggesting the validity in relation to other measurements of risk taking (Moriizumi et al., 2010). Furthermore, through verification of relationships between the scale score and the result of tasks in which risk taking was empirically reproduced, the validity of the factor's constructive concept is indicated from the viewpoint of behavioral performance (Moriizumi & Usui, 2012). This means that the reliability and validity of RPQ as a tool to measure risk propensity are good, as a whole. This study focused on an investigation of whether "violations", an unsafe behavior similar to risk-taking, can be explained from various viewpoints of risk propensity that are measured using the RPQ.

1.4. Past studies on violations

Violations have mainly been investigated using questionnaire forms. However, because this method mostly relies on self-reporting, it can be pointed out that the answers to the questionnaires are subject to bias such as social desirability (Parker et al., 1995; Adachi & Usui, 2011). In response to this, there have been a reports of research in which violations were experimentally induced (Adachi & Usui, 2011; Wada & Usui, 2005; Nakasato & Aoyama, 1969). Wada and Usui (2005) performed discriminative judgement tasks with an additional two factors: decision-making regarding whether to take a risk that was associated with violations, and benefit assessment associated with risk. Each task was set with a waiting time when saving data, and participants were able to skip the saving process if they so choose. In other words, to skip the saving process has the benefit of time-saving. On the other hand, by obligating participants to perform the saving process, failing to do so is handled as a "rule violation". Furthermore, the risk of skipping the saving process was set as the "possibility of having to redo the tasks that were not saved due to skipping, when a problem occurs in the program". The result indicated that violation was more prone to occur when the waiting time was longer (5 seconds) compared to shorter (1 second). This suggests that it is possible to induce violation by manipulating risks and benefits associated with the risk, even under experimental circumstances. There are difficulties in corresponding empirical violations to actual ones, but it can be said that the experimental method has an advantage of being able to verify violation occurrences that focus on a particular factor under controlled conditions. In this study, violation behavior is empirically verified in accordance with the experimental paradigm of Wada and Usui (2005).

1.5. Purpose of this study

In the experiment by Wada and Usui (2005), redoing a skipped task was set as a risk associated with violation. However, such instructions were only given orally, and in fact, there was no need

to redo a task even if the saving process was skipped over. So actually performing a violation was not directly associated with risk, and there is still room to examine whether it was an appropriate experiment that emulated "a violation which could bring a disadvantage to the participant." In another experiment by Wada, Usui, Shinohara, Kanda, Nakamura, Murakami, Tachikake, & Yamada (2012), in the same vein as the one mentioned above, influence on committing a violation was investigated by manipulating "the possibility of redoing a skipped task", but a significant result was not achieved. Therefore, it seems necessary for the participants to acknowledge that a risk is actually associated with a violation. Furthermore, the study of Wads and Usui (2005) regards skipping waiting time to save results as a benefit, resulting in confusion due to the equal treatment of risk factors and temporal factors. To specifically investigate how a risk factor exerts an influence on committing violation, it will be necessary to clearly distinguish these risk factors from benefits and set different contents on different levels for each.

Based on these points, in this study, just like the study by Wada and Usui (2005), "skipping temporal costs" was set as a benefit associated with violation. As a risk, in addition to a fixed probability that resulted in actual failure to save data when saving was skipped, a financial penalty was generated when failing to save: a "financial risk". So the participants of this study faced a potential penalty for violations. In this study, the relationship between risk propensity and violation was investigated from the viewpoint of risks and benefits associated with empirically-manipulated violations. Also, in this experiment, the relationship between risks and behavioral indicator was examined with an additional indicator of "absence from the experiment without notice", which was a violation used in the study of Adachi and Usui (2010). This experiment was conducted with the approval of the Ethical Committee of Behavioral Sciences at the Graduate School of Human Sciences of Osaka University.

2. Methods

2.1. Participants

The participants in the experiment were 36 university students (20 males and 16 females), with an average age of 19.67 (SD = 0.96). The participants were told that this experiment intended to "resolve human cognitive functions", and were not informed that it was an experiment relating to violations. After the experiment, the participants were given ¥1000 as gratuity.

2.2. How to measure risk propensity

When seeking participants for the study, risk propensity was measured using Moriizumi and Usui's (2011) RPQ. They were told to answer the RPQ, which consisted of four factors: gambling behaviors (with 5 items: ex. I'm empathetic with the person who spends a lot of money for gambling), occasional risk-taking (with 6 items: ex. to ignore a red light as a pedestrian if cars are not coming), risk-taking with individual values (with 3 items: ex. to break important

promises), and risk-avoiding (with 3 items: ex. to check carefully before leaving, to prevent fire or theft). These factors were evaluated with five tiers of answers, ranging from "Totally disagree" to "Totally agree".

2.3. Device

Control of the experiment tasks and result recording were conducted through a program created using Visual Basic 2008 (Microsoft). A 15.4"-laptop (DELL LATITUDE E5500) was used to present the experiment task, and a mouse and numeric keypad (Sanwa Supply NT-9UHPK) were used to respond to the given task.

2.4. Experiment tasks

The experiment consisted of two types of tasks: the cognitive judgement task and the saving task.

2.4.1. Cognitive judgement task In accordance with past studies (Wada & Usui, 2005; Wada et al., 2012), the participants were given a dummy task to determine accuracy of the presented letters and numbers (Figure 1. left). First, an asterisk (*) was displayed for 1000 msec, and after an interval of 500 msec, a word such as "even number" was displayed. Using this word as criteria for future determinations, after 500 msec from the display of this word, a task stimulus (capital alphabets except "O" and "I", or numbers from 0 to 9) was displayed in blue or red. The participants judged whether the task stimulus displayed matched the criteria. The criteria continued to be displayed on the screen even after the presentation of the task stimulus. Participants were instructed to use a numeric keypad to make their response, and to press 1 when a task stimulus matched the criteria, and press 2 when a task stimulus did not match the criteria. The 6 criteria—even number, odd number, number, alphabet, red, and blue—were presented in random order.

2.4.2. Saving task Immediately after the cognitive judgement task was completed, a "saving task" was given (Figure 1. right). After the cognitive judgment task was finished, a message saying "Save the result" was displayed on the screen with the "Save" and "Next" buttons on the left and right, below the message. When "Save" was clicked, the message "Now saving…" was displayed. After an interval of 5000 msec, "Next" was displayed along with "Save completed", and by pressing "Next", the next cognitive judgment task was given. However, even if the participants

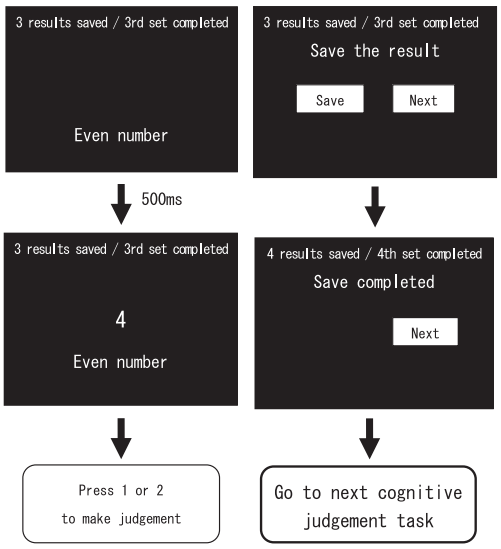

Figure 1. Diagram of cognitive judgement task (L) and saving task (R)

clicked on the “Next” button without first clicking “Save”, they were able to move to the next cognitive judgment task without saving their progress. The program was set up so participants who skipped the saving process for one task could choose to save after the completion of the following task, which would save the results of all tasks up until that point, in bulk. The participants were instructed to save the results of each cognitive judgement task as they completed them. So in this study, to skip a saving task was regarded as a violation, though it also brought about the benefit of skipping the 5000 msec of waiting time.

Setting the course from the start of the cognitive judgement task to the completion of the saving task as one set, and 48 sets as one block, the participants were provided with a total of three blocks, or 144 sets.

2.5. Experimental conditions

As described above, even if a participant skipped the saving process, the program was set so that participants could save in bulk after subsequent tasks. However, in that case, the program was set with a fixed probability for the participant to fail in saving the skipped sets. At the upper left of the task screen, “the number of saved results” and “the current number of sets completed” were always displayed so that the participant could confirm how many times he or she succeeded in saving (Figure 1.). If all sets were successfully saved, “the number of saved results” would be consistent with “the current number of sets completed”. However, if the saving process failed, “the number of saved results” would be displayed without counting the number of results skipped. For example, if a participant skipped saving for 3 results after the 5th set, and was successfully able to save the 9th set result, a message saying “9 results saved/ 9th set completed” would be displayed on the screen. However, if the participants failed in saving, the skipped three results were not reflected and a message saying “6 results saved/ 9th set completed” would be displayed. The probability of failure was 0%, 20%, or 50%. To let the participants know about the probability of failure, they were given a trial in which they could see the failure to save while operating the program. In the 20% failure probability, one of 5 saving tasks failed after saves were skipped, and with 50%, 2 of 4 saving tasks failed. The participants were not given detailed information regarding any of the probabilities of failure, and were told that the “program might stop” concerning the 0% failure probability, though skipping the saving task did not cause the actual saving process to fail. Furthermore, they were told that if they failed to save, ¥50 would be deducted from their gratuity (¥1000) for each failure as a penalty. This procedure was also adopted in the study of Matsuo (2006) where the participants’ gratuity was actually deducted. However, in this experiment, a full amount was paid regardless of failure to save.

Thus, in this experiment, the violation of “skipping saving” went hand-in-hand with the risk of “receiving a penalty.” However, for the purpose of inducing more skipping, the participants were informed that they did not need to pay a penalty for failure in saving up to 3 sets per one block.

2.6. Experimental design

This experiment had a one factorial design in which the probability of failure in saving a skipped result (3 criteria: 0%/20%/50%) was set as the between-participants factor.

2.7. Procedure

Firstly, the participants were given an instruction regarding the procedure for the cognitive and saving tasks, and then performed two trials (24 sets each). During the early part of the 2nd trial (12 sets), the experimenter showed them that skipping the saving process was operationally possible, and that the participant may fail to save with a 20% or 50% possibility of failure. At the start of the actual task after the trials, the participants were told that the experiment consisted of 10 blocks, with 48 sets counted as one block. However, the actual experiment completed after 3 blocks (144 sets). During the experiment, the experimenter moved out of sight of the participants. Upon completion of the 3rd block of the experiment, a debriefing was held to give the participants information about the purpose of the experiment and their false instructions. The actual time spent on the experiment was approximately 60 minutes.

2.8. Analysis indicator

2.8.1. Skipping saving This experiment made it compulsory to "save results", so skipping the saving process in the actual task (144 sets) was regarded as a "violation."

2.8.2. Risk Propensity Questionnaire (RPQ) The average score of questionnaire items within each RPQ factor (gambling behaviors, occasional risk-taking, risk-taking with individual values, and risk-avoiding) were calculated as a "risk propensity score." The items was set so that high scores in each factor meant a strong tendency to engage in risk-taking.

2.8.3. Absence from experiment without notice Besides violations during the experiment, "absence without notice" was factored in as a behavioral indicator, which was adopted as a violation in study of Adachi and Usui (2011). Because all of participants agreed to cooperate in this experiment, absence without notice can be regarded as a "violation of manners." Thus, the subjects of the experiment were categorized into two groups: the "participant group" of 36 individuals who participated in the experiment, and the "absentee group" of individuals who were absent from the experiment without notice.

3. Result

3.1. Violation status within the experiment

Out of 36 participants, 7 individuals[1] skipped the saving task during the experiment (19.4%).

[1] There were 5 males and 2 females. The result through Fisher's exact test showed no significant relationship between the presence of skipping and gender ($p = .43$), so this paper does not refer to gender influence on violation.

The frequency varied between individuals with the maximum being 88 times and minimum being once in the total 144 sets. The number of individuals who skipped was 3 individuals in the 1st block, 5 individuals in the 2nd block, and 4 individuals in the 3rd block. Violations were most committed in the 2nd block, despite the discrepancy being fairly small. Three among 7 individuals performed skipping only once, which may indicate that this skip may have been unintentional or an error. However, there were 144 chances to save for each participant, and 32 individuals never once took the opportunity to skip. This means that skipping the saving task had never occurred in a total of 4608 sets (= 144 × 32), and that the tasks in this experiment were less likely to be skipped as an error. Thus, in this experiment, even one instance of skipping was regarded as a "violation."

Figure 2. shows the number of violators and non-violators by experiment condition (the probability of saving failure: 0%/20%/50%). The experiment aimed to investigate the relationship between an experiment condition and a violation, but a relationship could not be found in the results ($\chi^2 = 1.49$, *n.s.*). Therefore, the experiment conditions were not taken into account in the following analysis of risk propensity and violation.

3.2. Risk propensity's effect on violation

Table 1. shows the average score of each risk propensity factor in the RPQ based on the presence or absence of violation, and the scores in the "Yes" group were higher than those of the "None" group in every factor. This suggests that the Yes group had a tendency to engage in risk. To verify the relationship between these risk propensity factors and violation, an independent t test was conducted with violation as an independent variable and risk propensity score as a dependent variable. As a result, only the factor of occasional risk-taking was significantly

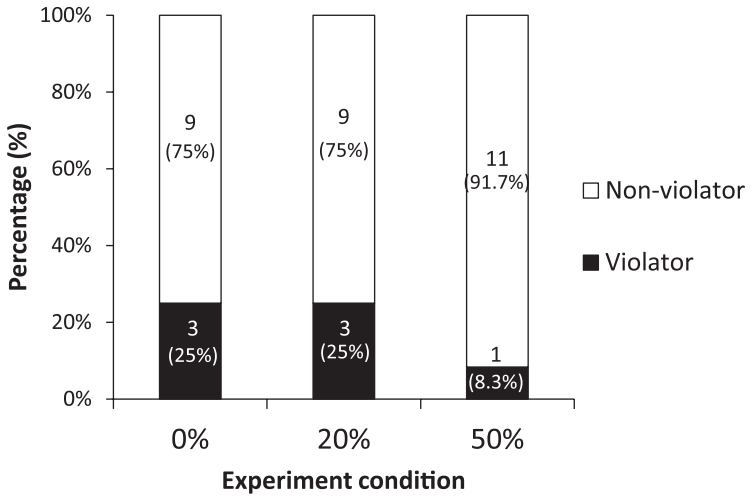

FIGURE 2. The number of violator by experiment condition

Table 1.
Risk propensity score based on the presence or absence of violation

Risk propensity factor	Violation	Average (SD)
Gambling behaviors (α = .70)	Yes	2.34 (0.65)
	None	2.18 (0.77)
Occasional risk-taking (α = .74)	Yes	3.71 (0.58)
	None	2.97 (0.74)
Risk-taking with individual values (α = .64)	Yes	1.90 (0.83)
	None	1.47 (0.49)
Risk-avoiding (α = .49)	Yes	2.48 (1.09)
	None	2.37 (0.92)

Table 2.
Risk propensity's effect on violation

Risk propensity factor	Group	Average (SD)
Gambling behaviors	Absentee	2.33 (0.82)
	Participant	2.21 (0.74)
Occasional risk-taking	Absentee	3.92 (0.29)
	Participant	3.11 (0.76)
Risk-taking with individual values	Absentee	2.73 (0.83)
	Participant	1.56 (0.59)
Risk-avoiding	Absentee	2.20 (1.02)
	Participant	2.39 (0.94)

different between the Yes group and the None group ($t(34) = 2.50$, $p < .05$). This suggests that individuals with a higher score in occasional risk-taking were more prone to committing a violation in the experiment. On the other hand, as for the remaining three factors—gambling behaviors, risk-taking with individual values, and risk-avoiding, a significant difference was not found between these groups (with $t(34) = .52$, *n.s.*, $t(7.04) = 1.32$, *n.s.*, and $t(34) = .79$, *n.s.* respectively).

3.3. Risk propensity of absentees without notice

Six subjects were absent from the experiment without notice. Table 2. shows the average score of each risk propensity factor in the RPQ for the group of 36 participants and the group of 6 subjects who were absent without notice. Excepting risk-avoiding, the absentee group seemingly had a higher score than the participant group. To verify the relationship between risk propensity and absences without notice, an independent *t* test was conducted with the existence or non-existence of absence without notice as an independent variable and risk propensity score as a dependent variable. As a result, a significant difference was found between the participant group

and absentee group in the factors of occasional risk-taking and risk-taking with individual values ($t(39) = 4.01$, $p < .001$ and $t(19.15) = 4.61$, $p < .001$, respectively). This suggests that individuals who had a high score in occasional risk-taking and risk-taking with individual values was more prone to being absent in the experiment without notice. As for the factors of gambling behaviors and risk-avoiding, there were no significant differences between the two groups ($t(40) = .37$, n.s., and $t(39) = -.42$, n.s., respectively).

4. Discussion

This study was intended to empirically investigate violation from the viewpoint of risk propensity, and the result indicated that among the risk propensity factors comprising the RPQ, the "occasional risk-taking" factor which represents a tendency to engage in risk taking depending on circumstance was particularly significantly related to violation in this experiment (Table 1.). Additionally, it was suggested that violation of "absence without notice" can be expected not only by the factor of occasional risk-taking, but also by the factor of risk-taking with individual values, which represents a tendency to engage in risk-taking without being influenced by time or circumstance (Table 2.).

In accordance with the definition set by Moriizumi and Usui (2011) situational action is a habitual tendency to take risks depending on circumstance, while risk-taking with individual values refer to a concept similar to an individual's personality, which is less subject to circumstantial influence. Gambling behaviors represents a personal "tendency" to be in favor of gambling. Thus, the result of this study that the risk propensity factor of occasional risk-taking has a relationship with violations induced by the experiment and the violation of absence from the experiment without notice, means that "rule violation" is not attributable to individual aspects such as personality, but to circumstance. Particularly, violations induced in this experiment were accompanied by a risk of penalty associated with failure to save data, as well as a benefit of saving time (5 seconds) for saving. This result is consistent with past studies (McKenna & Horswill, 2006; Misawa, Inadomi, & Yamaguchi, 2006) that indicated that a rule is not observed simply because "it is a rule" (Lawton, 1998), but because a benefit-cost factor associated with unsafe behavior plays an important role. Furthermore, since occasional risk-taking have a close relationship with benefit-cost factors, the verified relationship between the risk propensity represented by this factor and violation suggests the effectiveness of education to control violation from the view point of risk propensity.

The factor of safety consideration showed no relation to violation in the experiment. This factor represents a risk propensity pertaining to behavior required for consideration of security or safety, and such behavior is determined according to the size of the perceived risk. There are some studies (Matsuo, 2006; Hanoch, Johnson, & Wilke, 2006) stating that motivation for unsafe behavior can be attributed more strongly with benefit perception rather than risk perception,

which suggests that risk perception may be insufficient to explain the act of violations. It seems relevant to the fact that the risk probability manipulated in this experiment had no influence on violation. In this experiment, a uniform amount of penalty was given per violation (¥50). According to Slovic (1987), risk perception towards various risk items such as earthquakes or nuclear power plants consist of "dread risk" and "unknown risk." Therefore, when a person considers a risk, he or she tends to judge it based on emotional aspects such as "how terrifying the risk is to him or her", rather than objective aspects such as "risk probability." This means that even if the objective probability of the risk changes, risk perception will not be a decisive factor for violation as long as the change does not influence an emotional aspect. However, in this experiment, although there was an opportunity to take a trial run in order to get a feel for the risk occurrence probability which was a condition of the experiment, it seemed difficult for the participants to have a precise understanding of this probability. For that reason, risk perception may not have been manipulated according to the conditions. Although there is room to debate whether the risks handled in this experiment were the same as those in the study of Slovic, to investigate how risk affected violation under this experiment's circumstances, it is considered necessary to take into account not risk probability but how the participants emotionally perceived the risk of "penalty."

In this study, only the occasional risk-taking factor had a relationship with the empirically-induced violations. However, the questionnaire survey conducted by Moriizumi and Usui (2010) indicated that, regarding the three risk propensity factors of the RPQ—gambling behaviors, occasional risk-taking, and risk-avoiding—individuals who had experienced traffic violations in the past three years had a higher score of risk propensity than those without such violations. Violations in this study were accompanied by "skipping temporal costs" as a benefit and "possible penalty" as a risk. The behavioral indicator in the study of Moriizumi and Usui was "the presence or absence of traffic violation experience", and details of the violation (ex. speeding) were not analyzed. Thus, the relationship between daily risk propensity and violation may be different depending on the type or severity of the penalty for the violation. This point can also be observed from the result of this experiment: that risk-taking with individual values as well as occasional risk-taking are related to the behavioral indicator of "absence in the experiment without notice." This means that "absence without notice" is a violation that depends on circumstance, much like the violations induced by the experiment, and can be subject to personality factors which are not affected by circumstantial conditions. Although the reason as to why the 6 subjects were absent in the experiment without notice is unknown, this violation seems to be a different type from the violations induced by the experiment. Therefore, further investigation of the relationship between violation and risk propensity will become possible by combining various benefits and risks such as "money acquisition" or "possible physical loss," in addition to "saving temporal cost" and "possible penalty."

This study contributed to the consideration of violations from the viewpoint of daily risk

propensity under controlled experimental conditions, but some issues in the experiment procedure still remained. Firstly, the discrete variable of "the presence or absence of violation" was employed for analysis due to the large personal deviation of the number of violations and the small size of violators, which were 7 (19.4%). In the experiment of Wada and Usui (2005) which was conducted prior to this study, nine of 16 participants (56.3%) committed a violation, and in both studies, skipping of waiting time was regarded as a benefit. The difference in the two results suggests that risk perception regarding a penalty for failure in saving may have suppressed the benefit of skipping waiting time. Thus, it will be necessary to encourage violations by preparing other settings, such as making the waiting time longer. Secondly, a violation was empirically induced to control extraneous variables, and the subjects were restricted to university students. So there is room to consider how empirically-induced violations and daily-life violations (such as traffic violations) are handled to determine the continuity of each violation as well as the applicability of the results. Specifically, further investigation may be necessary by setting actual traffic violation history as an indicator and delving into more detail regarding these violations like Moriizumi and Usui (2010) instead of merely "whether or not a violation was present."

5. Conclusion

This study empirically suggested that the more an individual expresses a tendency to take risks, particularly depending on circumstance in his or her daily life, the more said individual is likely to perform violations. The focus of this study was strictly on violations associated with the risk of "possible penalty", and a benefit of "skipping temporal cost." Actually, a risk in our daily life is not restricted to the money-related one but there are various kinds of risks such as physical damage, loss of social status, or a case mixed with those risks, and it is the same for a benefit. In that sense, this study has just partially resolved the relationship between risk propensity and violation. In future, the study taking into account suppression of violation based on a daily risk propensity will be enabled by resolving the remaining issues of this study and analyzing the relationship between risk propensity and violation deeply from the view point of various kinds of risk and benefit.

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