
Structural Equation Modeling of Risk Avoidance in Everyday Life

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Abstract

The purpose of this study is to examine the effects of decision-making styles (intuitive and deliberate), the number of mass media accessed, cognitive factors (perceived cost, life-risk perception, moral sense, etc.), emotion (anticipated regret), and attitude (facilitatory and inhibitory factors) on behaviors to avoid life-risks in three life-risk situations (lifestyle-related diseases, multiple consumer loans, and NEET (young people who are not in education, employment, or training)). One hundred and ninety Japanese undergraduates completed a questionnaire booklet, and the data were analyzed using structural equation modeling. The results revealed that in the three situations mentioned above, (a) perceived benefit and perceived cost affected life-risk avoidance behavior, mediated by attitude; (b) moral sense and life-risk perception affected life-risk avoidance behavior, mediated by anticipated regret and attitude (inhibitory factor) in two situations (NEET and multiple consumer loans). These results indicated that there are two processes involved in life-risk avoidance behavior (a) cognitive factors affect present avoidance behavior, mediated by attitude; (b) cognitive factors affect present and future avoidance behavior, mediated by emotion and attitude.

1. Introduction

In Japan, there are a number of social problems that are related to personal risk behavior in everyday life. For example, in terms of lifestyle-related diseases, approximately 8,800,000 people are at risk of insulin-independent diabetes mellitus. In five years, this number is expected to increase by about 200,000 (Ministry of Health, Labour and Welfare, 2002). With regard to monetary problems, the number of personal bankruptcies, which are primarily attributed to multiple consumer loans, is increasing every year. This number is currently over 200,000, which is five times more than the number ten years ago (Supreme Court of Japan, 2004). Regarding the present life-related problems, the number of NEET (young people between the ages of 15 and 34 who are not in education, employment, or training) is about 520,000 (Ministry of Health, Labour and Welfare, 2004).

It is important to clearly define an individual's decision-making process to reduce the number of people with life-risk behavior. Timpop (1994) proposed a theoretical model to explain relationships between personality, cognitive factors, affective factors, and risk-taking behavior (Risk Motivation Theory). Mischel and Shoda (1995) proposed the cognitive-affective personality system to dynamically describe the stability of personality and diversity of behavior (CAPS theory). Ueichi and Kusumi (1999) proposed a dynamic risk-taking model to express change in decision-making processes in activities involving repeated risk-taking behavior (gambling and skiing); they suggested that there were two decision-making processes: a process that is acquired by learning and development and one that is acquired at an early stage in life, which remains stable. Previous researches,

however, have not elucidated the definite relationships between internal factors (e.g., relationship between risk perception and regret) and have not examined the relationships involved in risk avoidance situations.

Personal life-risk avoidance behavior is affected by personality and cognitive factors. Ueichi and Kusumi (1998) classified several personal risk situations into three generic categories: physical situations (e.g., diseases and accidents), monetary situations (e.g., investment and theft), and life-related situations (e.g., dismissal and unemployment) and examined the relationships between the five factor model of personality traits (neuroticism, extraversion, agreeableness, consciousness, openness) (e.g., McCrae & Costa, 1991), cognitive factors, and risk behavior. The results indicated two common decision-making processes based on the three generic categories: (a) knowledge and skills affected risk avoidance behavior, mediated by risk perception, (b) consciousness affected risk avoidance behavior, mediated by perceived cost. A more important factor is regret. Ueichi and Kusumi (2000) indicated that the most important factor affecting risk avoidance behavior is anticipated regret. Ueichi (2003) revealed that subsequent regret affected decision making; people assess the degree of regret based on the result; regret affects cognitive factors, which in turn, affects behavior. Regret is affected by decision-making styles. Ueichi and Kusumi (2004) classified decision-making style (e.g., Janis & Mann, 1977) into two types (intuitive and deliberate) and examined the effect of decision-making style on regret by using a vignette-method questionnaire. The results indicated that individuals with a deliberate type of decision-making style felt less regret than individuals with an intuitive type.

The purpose of this study is to propose a common decision-making model to explain the relationships between internal factors and risk avoidance behavior on those life-risks that were recognized to be social problems. We examined the effects of decision-making style, the number of mass media accessed, cognitive factors (perceived cost, perceived benefit, life-risk perception, moral sense, and risk attribution), emotion (anticipated regret), and attitude (facilitatory and inhibitory factors) on present and future risk avoidance behaviors pertaining to life-risks in the three life-risk categories (lifestyle-related diseases, multiple consumer loans, and NEET).

2. Methods

Participants

The participants were 190 Japanese undergraduates (117 males, 71 females, and 2 individuals who did not identify their gender). In December 2004, a survey was conducted using a questionnaire booklet.

Questionnaire

The questionnaire booklet comprised 10 items: decision-making style, the number of mass media accessed, moral sense, risk attribution, perceived cost, perceived benefit, life-risk perception, emotion, attitude, and risk avoidance behaviors pertaining to life-risks. A five-point scale was used for each item (1-5, disagree to agree). The data were analyzed using structural equation modeling (Amos 4.0).

Decision-making style The decision-making style scale measured the degree of the participants' analytical and deliberate thought while making a decision. The scale was composed of two items in each category; the lifestyle-related diseases category had the following items: "I think about how to stay healthy when I grow old" and "I consider what to do to remain healthy in everyday life"; the multiple consumer loans category had the following items: "I consider the interest and the payback period on loans" and "I want to make purchases using my credit card*"; and the NEET category had the following items: "I consider future plans and then decide what to do" and "I instantaneously decide what I want to do*."

The number of mass media accessed The scale was composed of four items in each category. For example, the lifestyle-related diseases category consists of the

following: “I read newspapers for lifestyle-related diseases,” “I watch newscasts for lifestyle-related diseases,” etc. All the items in the multiple consumer loans and NEET categories were the same as those in the lifestyle-related diseases category.

Moral sense The moral sense scale was used to measure the participants’ sense and awareness of life-risk aversion. The scale was composed of three or four items in each category. For example, with regard to lifestyle-related diseases, the items were as follows: “It is necessary to follow a proper dietary regimen to stay healthy,” “I am afraid that I will suffer from lifestyle-related diseases in the future,” etc. With regard to the multiple consumer loans category, the items were as follows: “We have to repay our debts,” “Things will sort themselves out even if I am in debt*,” etc. The NEET category had the following items: “We must find a job,” “I think it is possible to make a living as a part-timer*,” etc.

Risk attribution The risk attribution scale measured the degree to which the participants assumed responsibility for the life-risks that occurred. The scale was composed of 2-4 items on each category. For example, the lifestyle-related diseases category comprised the following items: “Suffering from lifestyle-related diseases is one’s own responsibility” and “It is possible to stay healthy by following a proper dietary regimen”; the multiple consumer loans category had the following items: “Becoming a heavy debtor is one’s own responsibility” and “Everyone will be unable to pay off their debts if future events are unfavorable*,” etc. ; the NEET category had the following items: “Being NEET is one’s own responsibility” and “NEET is not in a position to fulfill his/her liabilities*,” etc.

Life-risk perception The scale was composed of five or six items in each category. For example, the lifestyle-related diseases category consists of the following: “I will suffer from lifestyle-related diseases if I always eat instant foods,” “I will suffer from lifestyle-related diseases if I always eat convenience-store dinners,” etc.; the items in the multiple consumer loans category were as follows: “People who use credit card loans have a high probability of being heavily in debt,” “People who take credit card loans will be unable to payback their debts,” etc. ; the NEET category had the following items: “NEET cannot lead a normal social life,” “NEET cannot get married,” etc.

Perceived cost The scale was composed of 5-7 items in each category. For example, the lifestyle-related diseases category was composed of the following: “It is hard for me to follow a proper dietary regimen,” “It is troublesome to cook my own meals and avoid eating out,” etc. The items in the multiple consumer loans category were as follows: “It is hard to save money to buy the expensive things that I want,” “When I spend more than I should, it is hard to meet my living expenses without borrowing money from my parents, my friends, and others,” etc. The NEET category consisted of the following items: “I feel stress when communicating with other people,” “It is difficult to organize my social life,” etc.

Perceived benefit The scale was composed of four or five items in each category. For example, the lifestyle-related diseases category comprised the following items: “It is convenient to eat out,” “Eating the foods that I like makes me happy,” etc.; In the multiple consumer loans category, the items were as follows: “It is convenient to make use of cash advances,” “It is convenient to use credit card loans,” etc.; the NEET category had the following items: “NEET has free time,” “NEET is free to be involved in other relationships,” etc.

Anticipated regret The anticipated regret scale measured the degree of regret if life-risks are taken. The scale was composed of three items in each category. For example, the lifestyle-related diseases category comprised the following: “If I suffer from lifestyle-related diseases in the future because I did not improve my dietary regimen, in spite of being aware of a disorder in my health checkup, I will regret it,” “If I suffer from lifestyle-related diseases in the future because I did not improve my lifestyle, I will regret it,” etc. In the multiple consumer loans category, the items were “If I am heavily in debt because of taking credit card loans, I will

regret it," "If my creditworthiness in society decreases because of taking credit card loans, I will regret it," etc. In the NEET category, the items were as follows: "If I cannot lead a normal social life because I am unemployed after graduation, I will regret it," "If my credibility is impaired because I am unemployed after graduation, I will regret it," etc.

Attitude The attitude scale was composed of two factors: facilitatory and inhibitory. The facilitatory factor scale was used to measure the degree of the tendency that facilitated taking life-risks. The facilitatory factor scale was composed of 3-8 items. For example, the lifestyle-related diseases category was composed of the following items: "I'm not good at sports," "I want to eat till I am full," etc.; in the multiple consumer loans category, the items were as follows: "When I find something I want, I want to buy it," "I think I can buy anything I want using my credit cards," etc.; the NEET category had the following items: "I feel anxious about entering the professional world," "I have no desire to do anything," etc. The inhibitory factor scale measured the degree of the participants' tendencies to inhibit taking life risks. The Inhibitory factor scale was composed of 4-6 items. For example, the lifestyle-related diseases category was composed of the following items: "It is easy to eat foods that I do not like for the sake of my health," "I am careful about eating a balanced diet," etc.; in the multiple consumer loans category, the items were as follows: "I am alert about the interest on loans," "I want to repay all my debts as soon as possible," etc.; in the NEET category had items such as "I want a better life," "I want to improve my abilities," etc.

Risk avoidance behaviors pertaining to life-risk The risk-avoidance behaviors scale was composed of two factors: risk-avoidance behavior at present and in the future. The present risk-avoidance behavior factor comprised 5-7 items in each category. For example, the lifestyle-related diseases category was comprised the following items: "I maintain a regular lifestyle," "I get enough exercise," etc.; as for multiple consumer loans, the items were as follows: "I save money every month," "the money I usually spend on living expenses has decreased because I have wasted money*," etc.; the NEET category had the following items: "I avoid communicating with other people*," "I have given up searching for a job*," "I waste my time every day*," etc. The future risk-avoidance behavior factor was composed of two or three items in each category. For example, the lifestyle-related diseases category comprised the following items: "I will not be careful about my dietary regimen until a disorder is found in my health checkup*," and "I will not improve my lifestyle until my health checkup reveals a disorder*"; in the multiple consumer loans category, the items were as follows: "I will use credit card loans if I want to make expensive purchases, even though I do not have sufficient money*," "Even though I do not have sufficient money at present, I will take credit card loans for expensive purchases if I can repay them later using my bonus*"; and the NEET category had the following items: "I will remain unemployed if it is possible to lead a normal social life without a job*," "I will not work until I find a glamorous job*" (*scored in the reverse direction).

3. Results

In order to clearly define decision-making processes for lifestyle-related diseases, multiple consumer loans, and NEET, we examined the relationships between internal factors and risk-avoidance behaviors by using structural equation modeling (Amos 4.0). Each error of the model had two constraints: the mean is 0 and the variance is within 1. In the figures, the explicit variables are indicated by rectangles and the implicit variables by ovals. Path coefficients between implicit variables are significant at $p < .05$. The error variables are not indicated in the figures. Bold lines indicate common paths in the two or three categories.

Lifestyle-related diseases

Figure 1 depicts the relationship between internal factors and choice behavior

for lifestyle-related diseases. The indices of goodness of fit are as follows: CFI = .94, PCFI = .88, AIC = 2570.06, and RMSEA = .09 (the reason for the large RMSEA value appears to be that there are a large number of parameters relative to sample size in this model). The perceived benefit (path coefficient is .35) and the number of mass media accessed (-.29) affected the perceived cost. The perceived cost affected the present risk-avoidance behavior, mediated by attitude (facilitatory and inhibitory factors). Risk-avoidance behavior at present (.20) affected risk-avoidance behavior in the future. This means that individuals who read newspapers and newsletters issued by public offices for lifestyle-related diseases and who believe that “it is not convenient to eat out and to eat instant foods” tended to think that “it is easy to follow a proper dietary regimen” and “it is not troublesome to cook my own meals.” They tended to have attitudes such as “I do not eat till I am full” and “I am careful about eating a balanced diet”; therefore, they had present risk-avoidance behaviors such as “I maintain a regular lifestyle” and “I do not eat out.” In addition, individuals who have risk-avoidance behaviors at present tended to reduce a risk in the future, for example, “I will be careful about my dietary regimen” and “I will improve my lifestyle.”

Multiple consumer loans

Figure 2 depicts the relationship between internal factors and choice behavior for multiple consumer loans. The indices of goodness of fit are CFI=.90, PCFI=.84, AIC = 3366.31, and RMSEA=.10. Perceived benefit (.32) affected perceived cost. Perceived cost affected present risk-avoidance behavior, mediated by attitude (facilitatory and inhibitory factors). Risk-avoidance behavior at present (.25) affected risk-avoidance behavior in the future. This means that individuals who thought that “It is not convenient to take credit card loans and make use of cash advances” tended to think that “It is not hard to save money every month” and “It is not hard to save money to buy the expensive things that I want.” They tended to have attitude that “I do not want to buy anything that I want using my credit cards” and “I am cautious about the interest on loans”; therefore, they had present risk-avoidance behaviors such as “I save money every month” and “I have not spent more than my monthly living expenses.” In addition, individuals who have risk-avoidance behaviors at present tended to reduce a risk in the future; for example, “I will not use credit card loans for expensive purchases” and “I will not take credit card loans to make expensive purchases even if I can repay them later using my bonus.”

Moral sense affected emotion (anticipated regret), mediated by life-risk perception. Emotion affected risk-avoidance behavior at present (.40) and in the future (.16). It means that individuals who thought that “we have to repay our debts” and “not everyone will take credit card loans” tended to think that “people who use credit card loans have a high probability of being heavily in debt” and “I think the interest rate is high.” They tended to think that “if I am heavily in debt because of taking credit card loans, I will regret it” and “if my creditworthiness in society decreases because of taking credit card loans, I will regret it”; therefore, they tended to reduce a risk at present and in the future.

Decision-making style affected moral sense (.79) and perceived benefit (.42), mediated by risk attribution (.33). This means that individual who thought deliberately tended to think that “being heavily in debt is one’s own responsibility” and that “we have to repay out debts” and “it is convenient to use credit card.”

NEET

Figure 3 depicts the relationship between internal factors and choice behavior for multiple consumer loans. The indices of goodness of fit are as follows: CFI = .91, PCFI = .86, AIC = 4092.40, and RMSEA = .09. The number of mass media accessed affected perceived cost, mediated by perceived benefit. Perceived cost affected risk-avoidance behavior at present, mediated by attitude (facilitatory and inhibitory factors). Risk-avoidance behavior at present (.41) affected risk-

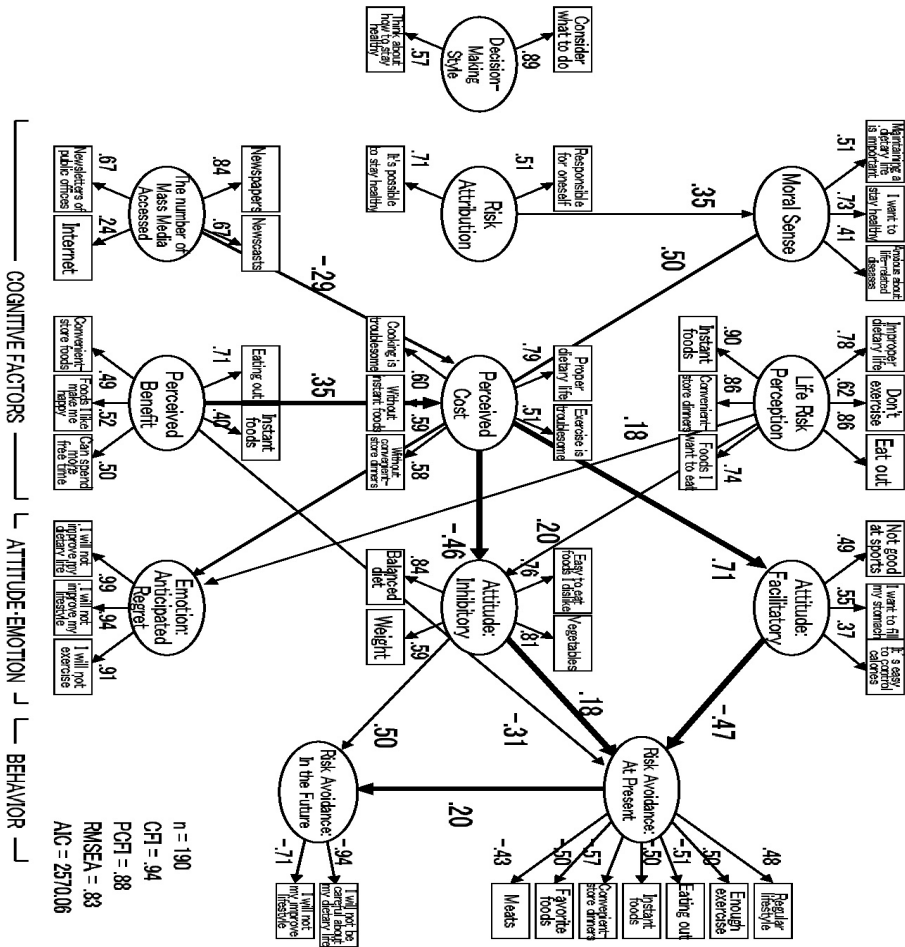


Fig. 1 Structural Equation Modeling for Lifestyle-related Diseases

avoidance behavior in the future. This implies that individuals who did not read newspapers and newsletters issued by public offices for NEET tended to think that “I do not think NEET has free time” and “I think NEET is restricted by an employer”; they also think that “it is not troublesome to communicate with other people” and “it is hard to get a job.” They tended to have the attitude that “I feel easy entering the professional world” and “I want a better life”; therefore, they had risk-avoidance behaviors at present such as “I do not want to avoid communicating with other people” and “I am studying to acquire qualifications.” In addition, individuals who have risk-avoidance behaviors at present tended to reduce a risk in the future; for example, “I will get a job” and “I want to work as soon as possible.”

Moral sense affected emotion (anticipated regret), mediated by life-risk perception. Emotion affected risk-avoidance behavior at present (.40) and in the future (.16). This means that individuals who thought that “we have to find a job” and

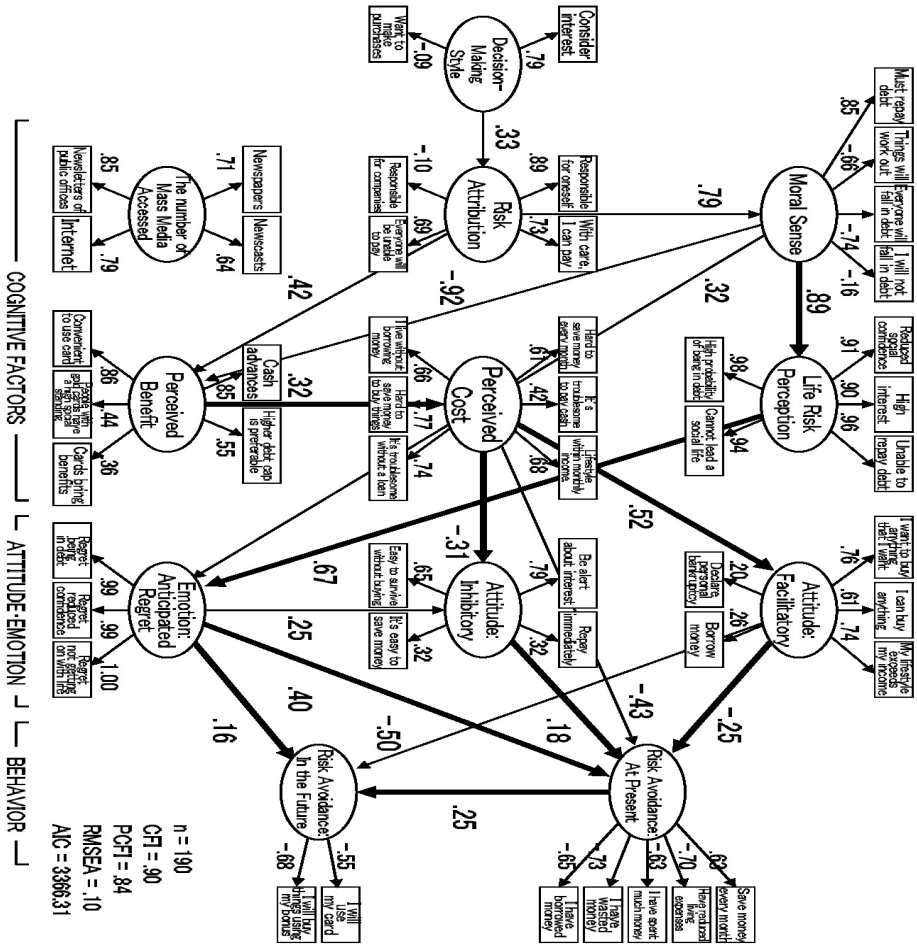


Fig. 2 Structural Equation Modeling for Multiple Consumer Loans

“I do not think it is possible to make a living as a part-timer” tended to think that “NEET cannot lead a normal life” and “NEET cannot get married.” They tended to think that “if I cannot lead a normal social life because I am unemployed after graduation, I will regret it” and “if I am unable to resume social activities because I am unemployed after graduation, I will regret it”; therefore, they tended to reduce a risk at present and in the future.

The decision-making style affected perceived benefit, mediated by risk attribution. It means that individual who thought deliberately tended to think that "being NEET is one's own responsibility," "I do not think NEET has free time," and "I do not think NEET is free to be involved in other relationships".

4. Discussions

The above results revealed that there were common decision-making processes in the three categories: (a) perceived benefit and perceived cost affected present

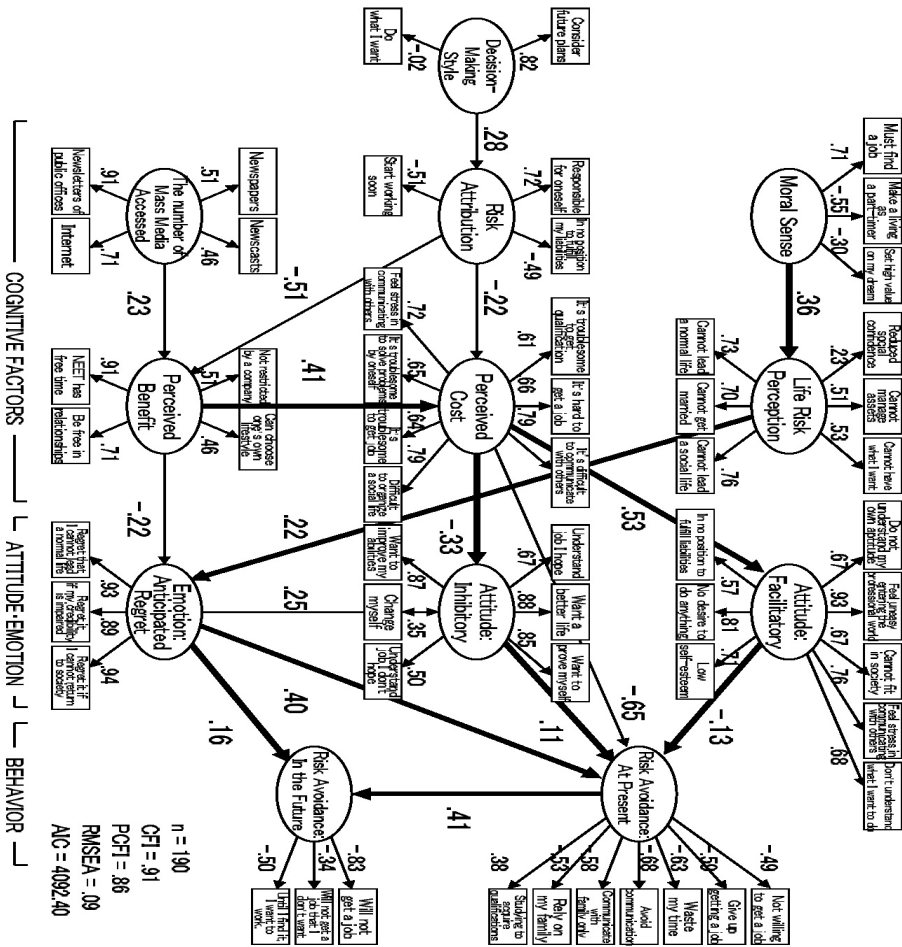


Fig. 3 Structural Equation Modeling for NEET

risk-avoidance behavior, mediated by attitude (facilitatory and inhibitory factors), and present risk-avoidance behavior affected risk-avoidance behavior in the future. It means that individuals who tend to feel less benefit for actions that involve life-risks tend to feel less troublesome while taking actions in order to reduce life-risks. They have more risk inhibitory and less risk facilitatory attitudes; therefore, they take the actions to reduce life-risks. Furthermore, individuals who take the actions to reduce life-risks at present will continue to take the actions to reduce life-risks in the future. One of the important factors in this process is perceived cost. Because perceived cost affected not only risk-avoidance behavior, mediated by two attitude factors but also affected risk-avoidance behavior directly.

In addition, it was found that there were common decision-making processes in two categories (multiple consumer loans and NEET): (b) moral sense affected life-risk perception, and life-risk perception, in turn, affected risk-avoidance behavior at present and in the future, mediated by affected anticipated regret. It

means that individuals who have a stronger moral sense tended to strongly feel life-risks; they feel much anticipated regret, and so they behave in a manner in which they reduce life-risks at present and in the future. We found that the process (b) is same as the result of a previous research (Ueichi & Kusumi, 2000). Decision-making style affected perceived benefit, mediated by risk attribution. It suggests that individuals with a deliberate decision-making style tend to avoid life-risk behavior. However, in the multiple consumer loans category, risk attribution positively affected perceived benefit; in the NEET category, risk attribution negatively affected perceived benefit. For this reason, it appears that they have no problem taking a credit card loan if they use it appropriately (there are some merits of using a credit card), but being NEET is not socially accepted.

It is concluded that there are two common decision-making processes for risk-avoidance behavior in everyday life in life-risk situations: (a) cognitive factors, mediated by attitude, affect risk-avoidance behavior; (b) cognitive factor, mediated by emotion (anticipated regret), affect risk-avoidance behavior. This means that the most important factors are attitude and emotion. These results indicated the definite relationships between internal factors and life-risk behavior, which have not been indicated in previous researches (e.g., Mischel & Shoda, 1995; Trimpop, 1994). Furthermore, these results suggest that the participants consider it not only necessary to try to change their attitude but also to improve their inappropriate actions based on anticipated regret if they want to improve their life-risk behavior. We think that information is one of the most important factors responsible for improving attitude and emotion. In this research, we did not find clear relationships between cognitive factors and the amount of information (the number of mass media accessed). However, previous researches (e.g., Slovic, 1986; Ueichi & Kusumi, 2006; Yamagishi, Kitano, Morinaga, Iwamura, Matsubara, & Nagae, 1999) showed that the amount of information affected cognitive factors that related to attitude and emotion (e.g., risk perception, perceived cost, perceived benefit, and moral sense). Therefore, it seems reasonable to conclude that it is necessary to provide life-risk takers with appropriate information about life-risks if they want to improve their own risk behavior or if someone else (e.g., parents or medical doctors) wants them to improve it. Of course, to change their life-risk behavior to an appropriate behavior, we need to make their external factors (e.g., environment) change. For example, Bynner and Parsons (2002) indicated that, in the United Kingdom, the major factors in entering NEET are not only poor educational achievement but also inner city living for boys and lack of parental interest in their education for girls. It is necessary to develop stronger life-risk taker support systems (e.g., support centers for people taking life-risks, self-support facilities, and vocational centers).

In future researches, it will be necessary to examine the decision-making processes and information that is effective in improving life-risk behavior with data gathered from people who acquire lifestyle-related diseases, multiple consumer loans, and NEET. In addition, what has to be noticed is that people have confirmation bias. Confirmation bias is the tendency to accept information that agrees with one's ideas and beliefs and to resist information that disagrees with them (Lord, Ross, & Lepper, 1979). Moreover there are individual differences in the degree to which persuasion is accepted (Orbell & Hagger, 2006). We should determine what kind of information is effective in improving inappropriate actions. Finally, in this study, we indicated decision-making processes correlatively by using the questionnaire method. Therefore, we need to examine the causal relationships between each factor by means of an empirical approach.

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