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# Happiness and Self-Determination – An Empirical Study in Japan♣

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## Abstract

According to the United Nations' World Happiness Report, Japan's happiness level is not very high, and the freedom to make life choices tends to be limited. Since the 1970s, "why happiness does not necessarily correlate with income levels" has been an important topic in the study of happiness. In this study, we conducted a survey of 20,000 Japanese nationals and analyzed the respondents' data by using income, education, health, human relations, and self-determination as explanatory variables. The results show that the sense of wellbeing in relation to age drops at around mid-life, generating a U-shaped curve, while the sense of wellbeing does not increase in proportion to an increase in income. The findings also indicate that, following health and human relations, self-determination is a stronger determinant of a sense of wellbeing than either income or educational background. It is believed that self-determination in life enhances motivation for and satisfaction with the action chosen and ultimately leads to an increased sense of wellbeing. It is noteworthy that those high in self-determination have a high degree of happiness in Japanese society where the freedom to make life choices is deemed to be narrow.

**Keywords:** happiness, well-being, self-determination, positive thinking, sense of insecurity

**JEL Classification Codes**: I31

## 1. Introduction

This study analyzes factors that affect happiness, using the data of 20,000 Japanese nationals. To

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date, numerous studies on happiness have been conducted in the fields of economics and psychology. Not only did the ancient Greek philosopher Aristotle regard happiness as the ultimate goal of life, but more recently in 2009, the Commission on the Measurement of Economic Performance and Social Progress (CMEPSP), established by then French President Nicolas Sarkozy, published a report on editing each nation's attention to the importance of happiness measurement indices[1]. Happiness is indeed both an old and current subject of study.

Studies on happiness have captured the special attention of psychologists and economists quite considerably since around 1970 showing that happiness does not necessarily correlate with income levels. Among the early studies, the findings of Easterlin's empirical study (1974), which became known as the "Easterlin paradox," motivated many researchers to analyze the factors contributing to the sense of wellbeing (cf. Scitovsky 1976). There are two explanations for the Easterlin paradox[2]. One is the relative income hypothesis, which explains that the level of happiness does not improve even if absolute income increases unless the income level relative to others' increases. The other is the adaptation level theory, which holds that an income rise temporarily increases the sense of wellbeing but then brings it down close to the original level once one adapts to the increased income level[3]. The latter theory can be traced back to Adam Smith who wrote in Chapter III, Part III of *The Theory of Moral Sentiments* as follows[4]:

> Happiness consists in tranquility and enjoyment. Without tranquility there can be no enjoyment; and where there is perfect tranquility there is scarce any thing which is not capable of amusing. But in every permanent situation, where there is no expectation of change, the mind of every man, in a longer or shorter time, returns to its natural and usual state of tranquility. In prosperity, after a certain time, it falls back to that state; in adversity, after a certain time, it rises up to it.

He thus explains that the sense of wellbeing boosted by economic affluence returns to the original state as time goes by Diener (1984) sorted out various factors that bring about a sense of wellbeing and built the foundation for the subsequent advancement of the studies in this field. Recent studies include Diener and Oishi (2000), which claims that a person's sense of wellbeing is affected by interpersonal resources such as friends and partners in addition to material resources such as economic

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[1] Some of Nobel laureates were appointed to the CMEPSP, including the chair Joseph E. Stiglitz of Columbia University, the advisor Amartya Sen of Harvard University, the commissioners Kenneth Arrow of Stanford University and .James Heckman of the University of Chicago. The coordinator was Jean-Paul Fitoussi of IEP de Paris (ref. Stiglitz et al. (2009)).

[2] Later studies on the Easterlin paradox include Veenhoven (1989), Easterlin (2001), and Coleman (2009). Kusago (2007) examined the relation between GDP and well-being by using prefectural data in Japan, and concluded that the relation between them was weak. Recently Easterlin (2017) confirms the paradox by using a long-term time series data.

[3] The adaptation level theory is presented in Helson (1974). Jonathan Haidt (2006) explains this theory as the adaptation principle (p.84). Brickman and Campbell (1971) call it the hedonic treadmill theory and discuss it in detail.

[4] The first edition of "The Theory of Moral Sentiments" was published in 1757 and revised up to the sixth edition. The citation of this paper is taken from page 172 of the reprinted edition published by Cambridge University Press in 2002.

affluence. Other studies take into account not only income and employment but also economic freedom and political factors[5].

The UN World Happiness Report, which was first published in April 2012, is a report on a survey of the state of subjective happiness conducted in over 150 nations and districts[6]. Using regressive analysis, the report finds the contribution of each of the six explanatory variables of happiness: 1) GDP per capita, 2) social support, 3) healthy life expectancy, 4) freedom to make life choices, 5) generosity, and 6) awareness of corruption (trust). The global ranking of happiness levels in this report, showing no correlation between GDP per capita and happiness, seems to confirm the Easterlin paradox.

Under the Japanese social security system, public pension and health insurance services are provided by the national government; therefore, private pensions and insurance are not commonly used in Japan. There is no tax exemption system for donations except for a very few cases, so there are not many people who make private donations. Cases of bribery and corruption are also rare. In addition, Japan is almost homogeneous racially, with only a small number of immigrants. Thus, we excluded the factors of Social Support, Generosity, and Corruption from our analyses as they make little difference to Japanese people

For the United States Bjørnskov (2008) has shown that social trust is positively associated with happiness. For the Korea Han, Kim and Lee (2013) studied the relationship between social capital and life satisfaction. Their results show that all of individual-level social capital variables including organizational participation, perceived helpfulness, and trust in authorities were positively associated with subjective life satisfaction. Bjørnskov, Dreher, and Fischer (2008) made an international comparison of the factors contributing to a sense of well-being at 90,000 sample sizes in 70 countries. Their results show that only a small number of factors robustly influence life satisfaction across countries. We investigated the sense of wellbeing among Japanese people, and analyzed what are strong factors among the Japanese in determining the sense of wellbeing.

There are the studies investigating the relationship between happiness in adulthood and parenting styles in childhood[7]. Raboteg-Saric and Sakic (2014) empirically analyze how parenting styles and friendships in childhood affect a person's sense of wellbeing in adulthood. Yap and Jorm (2015) present an empirical analysis of the effects of parenting styles on the degrees of children's sense of insecurity, depression, and internalization. Nishimura and Yagi (2017) classify parenting styles into five types (supportive, strict, permissive, uninvolved, and harsh) and conclude that those who had supportive parents have higher levels of happiness in adulthood than those with any other type.

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[5] See Jackson (2017) for the relationship between economic freedom and sense of wellbeing. See Frey and Stutzer (2001, 2002) for political factors.

[6] The happiness level of each nation in this report is the average of scores rated from 0 to 10 by individual respondents. In 2018, Finland ranked first, followed by Norway, Denmark, Iceland and Switzerland. U.S. ranked 18$^{th}$, and Japan 54$^{th}$.

[7] There is a broad range of studies on the influences of parenting on children, including Baumrind (1967, 1968), Lamborn et al. (1991), Maccoby and Martin (1983), Maccoby (1992), Kim et al. (2013), and González et al. (2017).

Supportive parenting is characterized by the encouragement of independence.

Lyubomirsky and Ross (1997, 1999) and Lyubomirsky et al. (2001) made an analysis from the perspective of what kind of experience has been accumulated by those who feel happier. Specifically, Lyubomirsky and Ross (1999) suggested that self-esteem is related to the degree of happiness[8]. Meanwhile, Orth (2017) empirically showed that parenting styles and the home environment have strong influences on self-esteem in adulthood.

The analysis of wellbeing has been pursued by those in a wide range of disciplines, including but not limited to psychology, economics, and sociology. In 2000, Springer published its first issue of the Journal of Happiness Studies - An Interdisciplinary Forum on Subjective Well-Being, which helped make the study of the subjective sense of wellbeing recognized as an interdisciplinary specialty.

In this study, we conducted a survey of 20,005 men and women in Japan to investigate the determinant factors of happiness. Out of the six explanatory variables used in the World Happiness Report as in the previous page, social support exhibits rather small individual differences in a country with relatively well-developed social security systems. Individual differences in generosity, when measured by the amount of donations as in the Happiness Report, are also small in a country where the eligible recipients of donations and the amount of tax deductions are limited. Awareness of corruption may vary greatly among nations but individual differences within a nation are considered insignificant. For these reasons, we dismiss these three variables and include income, health, and freedom of choice as variables that can vary among individuals in a nation.

With reference to the freedom to make life choices, we paid attention to the findings of the two aforementioned studies concluding that the either supportive style of parenting facilitates children's independence or that self-esteem is related to happiness. We asked the participants if it was their personal decision to study at their university or to work at their company, and created a variable of self-determination based on their responses. Deci and Ryan (1985, 2000) argue that self-determination is an important factor for motivation, and they provide a detailed discussion on the mechanism for how self-determination affects the sense of wellbeing (Deci and Ryan, 2000). These studies suggest that self-determination is an important determinant of the sense of wellbeing; therefore, we asked about the degree of self-determination in making life choices such as education and career and investigate how it influences the sense of wellbeing in reality.

Since the Cabinet Office in Japan attaches importance to socioeconomic conditions, health, and interpersonal relations in creating subjective happiness indicators, we have added human relations to our explanatory variables.

In addition, this study also included educational background and the degree of difficulty in gaining admission to the university from which the respondents graduated, which are not included in the World Happiness Report or the Cabinet Office indicators. This is because an advanced academic background,

[8] Studies on the relationship between acquired abilities and self-esteem include Kirkeboen et al. (2016).

especially graduating from a highly selective university, matters in job hunting and marriage and contributes to the self-esteem and pride of the person and family in Japan.

For our analysis, we employed the questions of the Oxford Happiness Questionnaire to measure the degree of psychological wellbeing and used income, educational background, self-determination, health, and human relations as explanatory variables. All of these variables can be answered in concrete forms and compared among individuals. We analyzed the responses to the questionnaire to see whether each variable is correlated to the sense of wellbeing in adulthood.

The results have shown that self-determination significantly affects the degree of wellbeing. We also measured the degree of subjective happiness by asking the respondents to choose a number on an 11-point scale (0–10), but no essential difference was found between psychological and subjective happiness levels.

Section 2 below outlines our survey data; Section 3 extracts factors constituting the sense of wellbeing and those expressing the degrees of self-determination by factor analysis; Section 4 proposes self-determination indices; Section 5 analyzes the relativity between the sense of wellbeing and self-determination using multivariable regression analysis; and Section 6 discusses the implications of our empirical analysis results.

## 2. Outline of Our Survey Data

The data used in this study is the result of the online survey on the living environment and happiness conducted in fiscal year 2017 through the marketing research firm Rakuten Research as part of the project "Fundamental Research for Economic Growth and Productivity Improvement in Japan" of the Research Institute of Economy, Trade and Industry. The survey was conducted between February 8$^{th}$ and 13$^{th}$, 2018 on both men and women aged 20 to 69, adjusted by proportionate stratified sampling by gender, age, and prefecture. The questionnaire was distributed to 933,329 Internet users, of which 33,598 responded (return rate 3.6%). The research company gathered survey data in order to bring their age distribution closer to that of the census population. In this survey, sampling was also conducted to bring the age distribution close to the census figures so that the samples would well represent the population. The collected samples were then checked for consistency, and 20,005 samples were eventually used for the analysis.

Data properties can be summarized as follows: while the number of collected samples (frequency) was 20,005, 3,335 did not respond regarding annual household income, so the effective number of observations is 16,670. When annual individual income is used in the analysis instead of annual household income, 2,359 did not respond; therefore, the effective number of observations is 17,646. The gender distribution is almost equal, 50.2% men and 49.8% women. As shown in Table 1, the age ranges from 20 to 69 and the average age is 46.09. The median value is 46, and the skewness was as

small as -0.046, which shows that the age distribution is almost symmetrical. The distribution is almost normal with a kurtosis value of 3 and flatter than normal with the kurtosis value smaller than three.

The average annual household income is JPY 7,535,700（=USD 67,306.53）, which almost corresponds to the median value. According to the 2009 Consumer's Expenditure Survey collected by Japan Cabinet Office, the average annual income of Japanese household is JPY6,486,000 (=USD 58,963). This suggests that the average household income is slightly higher in our survey data. The skewness is 0.667, which is small, and the distribution is slightly skewed to the right. The income distribution in general is skewed to the right just like the log-normal distribution, as shown in this data. The kurtosis value is 1, so the distribution is flatter than normal distribution. The average annual individual income is JPY 3,382,400（=USD 30,210.55）, slightly above from the median value of JPY 2,500,000（=USD 22,327.36）. This is because many of the respondents have no occupation and no income. The skewness value is 1.5, so the distribution of individual income is more skewed to the right than that of annual household income. The kurtosis is close to 3, which is almost the same as the normal distribution.

Table 1 Descriptive Statistics Values

| | | Age | Annual household income (JPY) (n = 16,670) | Annual individual Income (JPY) (n = 17,646) |
|---|---|---|---|---|
| Average | | 46.09 | 7,535,663 | 3,382,353 |
| Median | | 46.00 | 7,500,000 | 2,500,000 |
| Standard deviation | | 13.422 | 3,037,357.6 | 3,185,066.0 |
| Skewness | | -.046 | .667 | 1.501 |
| Kurtosis | | -1.121 | .998 | 3.224 |
| Minimum | | 20 | 100.00 | .00 |
| Maximum | | 69 | 1800.00 | 1800.00 |
| Percentile | 25 | 35.00 | 5,500,000 | 500,000 |
| | 50 | 46.00 | 7,500,000 | 2,500,000 |
| | 75 | 58.00 | 9,500,000 | 4,500,000 |

Table 2 shows the distribution of educational background. The ratio of graduates with bachelor's degree or higher is 23.3%. This is considered a little lower than actual since the percentage of students enrolling in universities increased from 37% in the early 1980s to the current 55% according to the "Basic School Survey" conducted by the Ministry of Education, Culture, Sports, Science and Technology (MEXT).

Table 2 Distribution of Educational Background

| | | Frequency | Percent | Cumulative percent |
|---|---|---|---|---|
| Effective | Junior high school graduate | 630 | 3.1 | 3.2 |
| | High school graduate | 12,456 | 62.3 | 66.1 |
| | Technical school and junior college graduate | 2,094 | 10.5 | 76.7 |
| | University graduate | 3,661 | 18.3 | 95.2 |
| | Graduate degree | 952 | 4.8 | 100.0 |
| | Total | 19,793 | 98.9 | |
| Missing | | 212 | 1.1 | |
| Total | | 20,005 | 100.0 | |

In this research, we asked those with bachelor's degrees or higher about the selectivity (degree of difficulty of admission) of the university from which they graduated in addition to their educational background. The question was worded as follows: "This question is for those with bachelor's degrees or higher. What is the degree of selectivity (difficulty of admission) of the university you graduated from? If you graduated from more than one university, please answer the selectivity of the first university from which you graduated." The answer options were 1) low (with standard deviation score less than 50), 2) middle (with standard deviation score 50 or over but less than 60), and 3) high (with standard deviation score 60 or higher). This question leaves out samples of high school graduates, so we give them a value of 0. The distribution result is: high school graduates or those with a lower educational background, 76.7%; low-difficulty university graduates, 3.1%; middle-difficulty university graduates, 11.8%; high-difficulty university graduates, 8.2%; and missing values, 1.1%.

The respondents' marital status are shown in Table 3, with 30.6% unmarried and 7% divorced. The 7% divorce rate is rather low compared to 35%, which is the ratio of the divorce rate of 17% to the marriage rate of 49% (0.17/0.49) in the data presented in the 2017 Demographic Statistics for Japan.

Table 3 Marital Status

| | | Frequency | Percent | Cumulative percent |
|---|---|---|---|---|
| Effective | Unmarried | 6,122 | 30.6 | 30.6 |

| | | | | |
|---|---|---|---|---|
| | Married | 12,154 | 60.8 | 91.4 |
| | Divorced | 1,395 | 7.0 | 98.3 |
| | Bereaved | 334 | 1.7 | 100.0 |
| | Total | 20,005 | 100.0 | |

In Table 4, unmarried single households are included in “Others.” The 4.9% of three-generation family households in this data is rather low, compared to 10% which is the number based on the national census.

Table 4 Household Structure

| | | Frequency | Percent | Cumulative percent |
|---|---|---|---|---|
| Effective | Married couple only | 4,592 | 23.0 | 23.0 |
| | Couple with child/children | 6,933 | 34.7 | 57.6 |
| | Single parent with child/children | 792 | 4.0 | 61.6 |
| | Couple with child/children and parent(s) | 984 | 4.9 | 66.5 |
| | Others | 6,704 | 33.5 | 100.0 |
| | Total | 20,005 | 100.0 | |

Households with no children account for 39.1%, which include unmarried singles. 35.4% of households have a youngest child of high school age or older, while 25.4% have a youngest child of junior high school age or younger. The average number of children per household with children is 1.88, which is close to 2, the average number of children per married family household based on the national census.

**3. Factors of Psychological Wellbeing and Explanatory Variables**

**3.1 Positive Thinking and Sense of Security**

In this survey, we extracted factors of psychological wellbeing by using factor analysis with a principal axis factoring method. The data was collected by using the questionnaire proposed by Hills and Michael (2002). Since the value of Cronbach's Alpha in a reliability test is 0.733, we concluded that no questionnaire item should be excluded. The eigenvalues calculated in the process of the factor extraction were 1 or larger, resulting in 9.974, 2.890, 1.400, 1.113, and 1.087. The different eigenvalues correspond to the different factors. There is a big difference between the second

eigenvalue and the third and following. Meanwhile, Percentage of Variance represents the explanatory power of the factors; the factors following the third showed much smaller values than the first two. In the analyses following Table 6, only the two factors with large eigenvalues and strong Percentage of Variance are used.

Table 5 Total Variance Explained

| Factor | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | | Rotation Sums of Squared Loadings | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 9.974 | 34.392 | 34.392 | 9.449 | 32.584 | 32.584 | 6.593 | 22.735 | 22.735 |
| 2 | 2.890 | 9.966 | 44.358 | 2.253 | 7.770 | 40.354 | 5.109 | 17.619 | 40.354 |
| 3 | 1.400 | 4.828 | 49.187 | .838 | 2.891 | 43.710 | 2.692 | 9.283 | 30.014 |
| 4 | 1.113 | 3.838 | 53.025 | .676 | 2.330 | 46.039 | 2.562 | 8.834 | 38.848 |
| 5 | 1.087 | 3.747 | 56.772 | .430 | 1.484 | 47.523 | 2.516 | 8.675 | 47.523 |
| Extraction Method: Principal axis factoring, Rotation method: Equamax rotation | | | | | | | | | |

Table 6 shows the factor matrix after the revolution calculated by factor analysis. The questions strongly correlated with the two factors picked up from Table 5 are marked in yellow. In view of the content of the marked questions, we named the factors “positive thinking” and “sense of insecurity.” The correlation coefficients between the questions and the factors in each group are 0.4 or higher, whereas the correlation coefficient between the two factors indicates extremely weak value of -0.091.

Table 6 Rotated factor matrix

| | Positive thinking | Sense of insecurity |
|---|---|---|
| I usually have a good influence on events | 0.7 | -0.295 |
| I always have a cheerful effect on others | 0.688 | -0.188 |
| I am always committed and involved | 0.684 | -0.129 |
| I find most things amusing | 0.66 | -0.322 |
| I find beauty in some things | 0.657 | -0.197 |
| I feel I have a great deal of energy | 0.656 | -0.384 |
| Life is good | 0.647 | -0.49 |
| I feel that life is very rewarding | 0.645 | -0.435 |
| I feel able to take anything on | 0.63 | -0.271 |

| | | |
|---|---|---|
| I have very warm feelings towards almost everyone | 0.619 | -0.063 |
| I laugh a lot | 0.583 | -0.225 |
| I am very happy | 0.531 | -0.517 |
| I am well satisfied about everything in my life | 0.51 | -0.586 |
| I can fit in everything I want to | 0.449 | -0.175 |
| I often experience joy and elation | 0.444 | 0.028 |
| I find it easy to make decisions | 0.433 | -0.161 |
| I feel fully mentally alert | 0.421 | 0.039 |
| I am intensely interested in other people | 0.406 | 0.073 |
| I feel that I am not especially in control of my life | -0.146 | 0.707 |
| I do not think that the world is a good place | -0.293 | 0.632 |
| There is a gap between what I would like to do and what I have done | -0.014 | 0.625 |
| I do not have particularly happy memories of the past | -0.256 | 0.585 |
| I do not have a particular sense of meaning and purpose in my life | -0.267 | 0.564 |
| I don't think I look attractive | -0.272 | 0.551 |
| I don't feel particularly pleased with the way I am | 0.114 | 0.549 |
| I don't feel particularly healthy | -0.186 | 0.537 |
| I am not particularly optimistic about the future | 0.043 | 0.514 |
| I do not have fun with other people | -0.257 | 0.415 |
| I rarely wake up feeling rested | -0.076 | 0.41 |

In Table 7, we show statistics calculated from the factor scores for positive thinking and sense of insecurity, which are calculated from the answers by each respondent. By comparing them with the normal distribution, we can see that the distributions of the factor scores for positive thinking and those for sense of insecurity are slightly skewed and flattened based on the values of skewness and kurtosis. In fact, the small correlation coefficient value of -0.09 confirms that the correlation between positive thinking and sense of insecurity is weak.

Table 7 Psychological Wellbeing-related Statistics

| | | Positive thinking | Sense of insecurity |
|---|---|---|---|
| Number of | Effective | 20,005 | 20,005 |

| | | | |
|---|---|---|---|
| observations | Missing Value | 0 | 0 |
| Average | | .0000 | .0000 |
| Median | | .0202 | -.0674 |
| Mode | | -.2721 | -.1287 |
| Standard deviation | | .9422 | .9217 |
| Skewness | | -.262 | .360 |
| Kurtosis | | 1.730 | .562 |
| Minimum | | -4.7932 | -3.3592 |
| Maximum | | 4.6108 | 3.6496 |
| Percentile | 25 | -.5802 | -.5802 |
| | 50 | -.0674 | -.0674 |
| | 75 | .5080 | .5080 |

In this study, we also investigated the subjective sense of wellbeing by asking "How happy do you usually feel as a whole? Please choose a number that you consider closest on a scale from 0–10." As mentioned in the introduction, the subjective sense of wellbeing is an index of happiness often used in many happiness surveys conducted in the past. We regard it as a referential index in assessing the reliability of the factors of psychological wellbeing.

The average of the subjective sense of wellbeing in this survey is 7.04, with a standard deviation of 2.29. In order to see whether factors of psychological wellbeing are correlated with the subjective sense of wellbeing, correlation coefficients between these variables are shown in Table 8. The correlation coefficient of positive thinking and subjective wellbeing is 0.413, while that of sense of insecurity and subjective wellbeing is -0.619. These figures show strong correlations between the factors of psychological wellbeing and the subjective wellbeing indices. It is fair to say, therefore, that factors of psychological wellbeing reflect a subjective sense of wellbeing to a considerable degree. Psychological wellbeing factors, on the other hand, are considered to contain more information than a subjective sense of wellbeing because they are derived from many questions. Accordingly, we extract factors of psychological wellbeing by factor analysis and then assess the effects of explanatory variables. Subjective sense of wellbeing is analyzed in Section 6.

Table 8 Correlation Coefficients

| | Positive thinking | Subjective wellbeing | Sense of insecurity |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Positive thinking | 1 | .413** | -.091** |
| Subjective wellbeing | .413** | 1 | -.619** |
| Sense of insecurity | -.091** | -.619** | 1 |

** Correlation coefficient is significant at the 1% level (two-sided).

Figure 1 shows the relationship between positive thinking and sense of insecurity by age group. The vertical axis shows the average factor scores of positive thinking and sense of insecurity. As shown in this graph, positive thinking drops from 0.055 at age 35 to -0.080 at age 49 and then goes up again to 0.034 at age 50 or older. Conversely, sense of insecurity goes up from 0.098 at age 35 to 0.113 at age 49 and then drops to -0.148 at age 50 or older.

Figure 1 Positive Thinking and Sense of Insecurity by Age Group

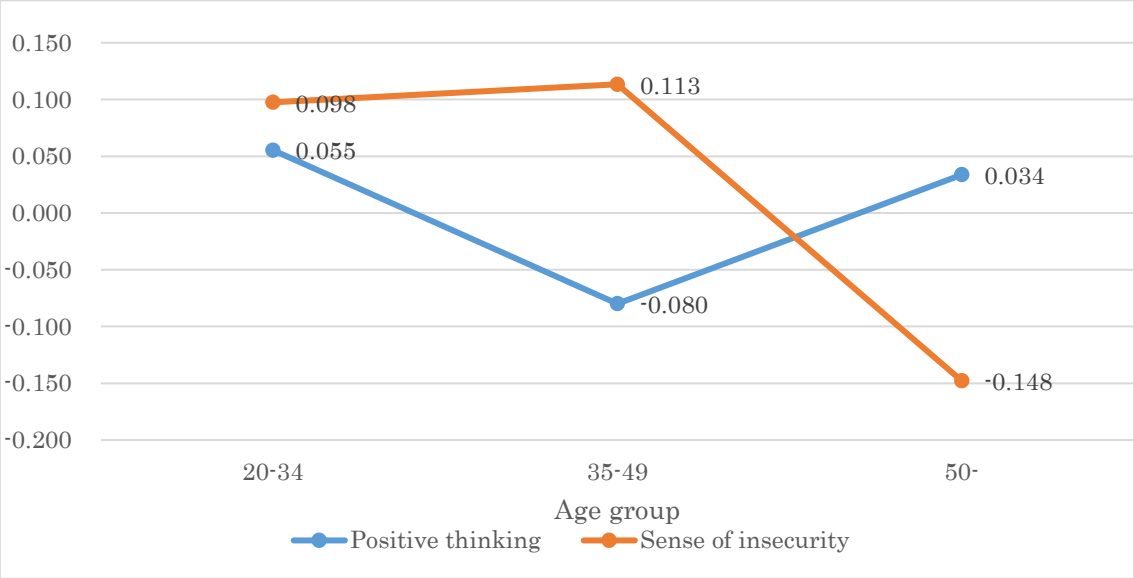
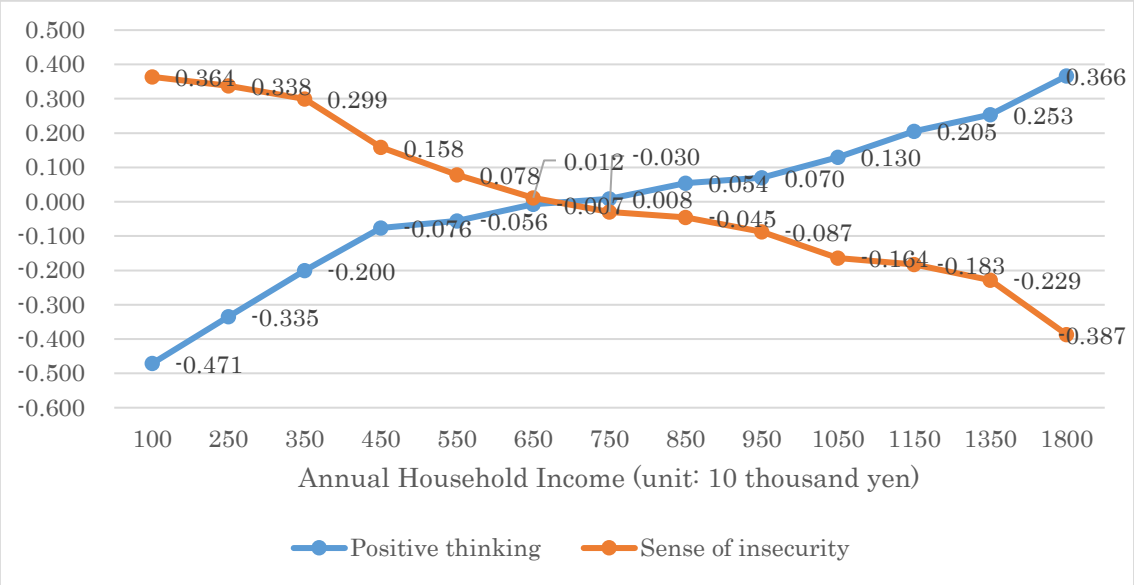



Figure 2 shows the relationship between annual household income and positive thinking or sense of insecurity. The vertical axis represents the average factor scores of positive thinking and sense of insecurity. As shown in this graph, positive thinking increases concomitantly with income, whereas sense of insecurity decreases as the income increases.

Figure 2 Positive Thinking and Sense of Insecurity by Household Income Group




Remark: The figure 3a below shows the three-dimensional chart based on the 1% random sample. The correlation between positive thinking and income is positive, while that of insecurity and income is negative. In the meantime, if the three-dimensional chart is projected on the plane of positive thinking and insecurity, positive thinking and sense of insecurity show little correlation.

Figure 3-a

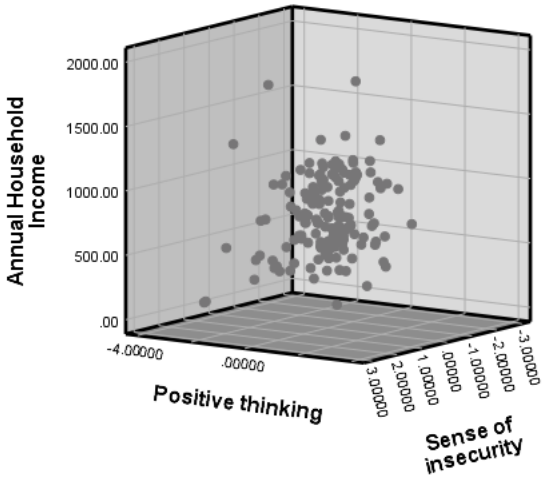



Figure 3- b

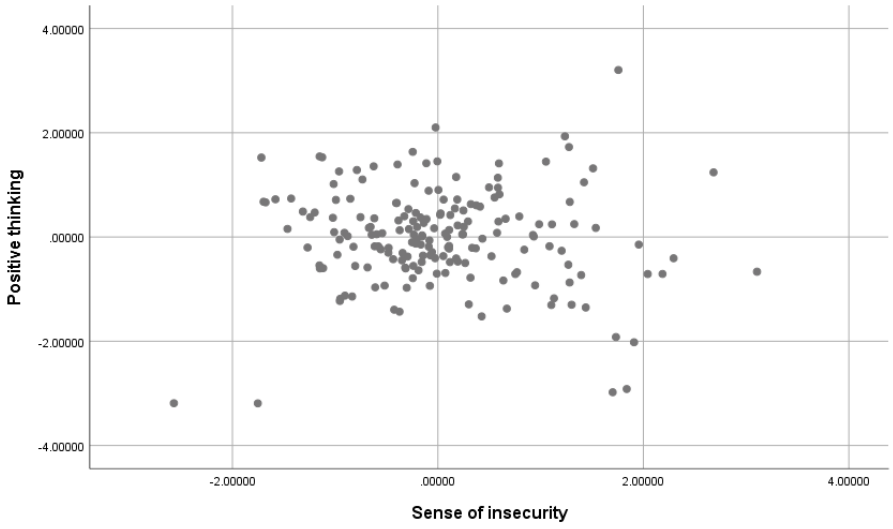
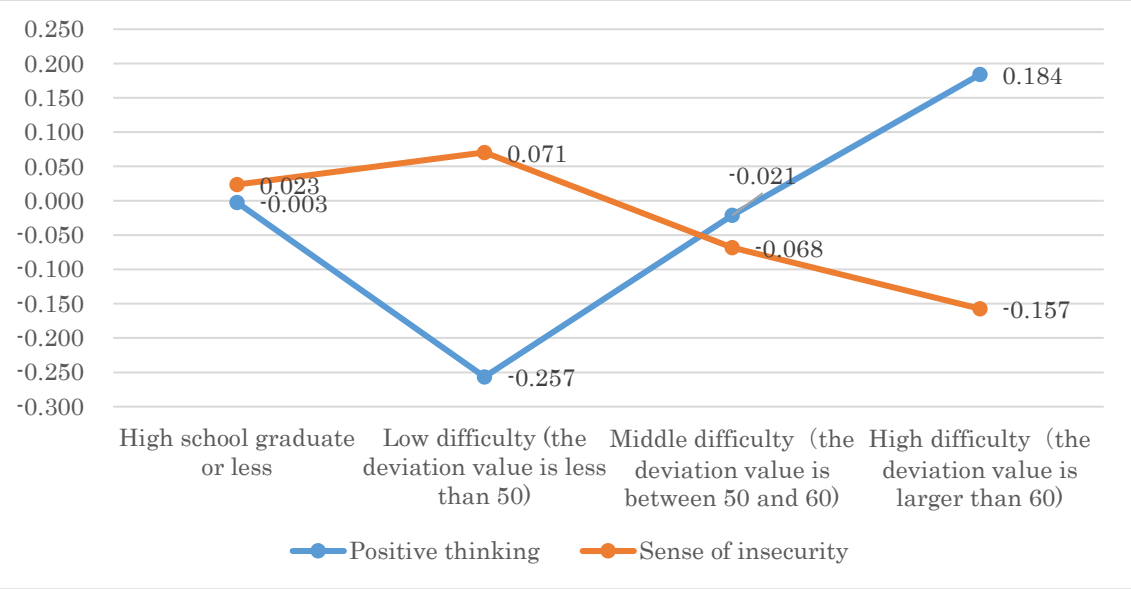



Figure 4 shows the relationship between positive thinking and sense of insecurity by educational attainment (difficulty of admission to the university of graduation). As shown in Table 2, 82.1% of those who are not university graduates are high school graduates. All groups by degree of difficulty include those with bachelor's degree or higher. The vertical axis shows the average factor scores for positive thinking and sense of insecurity. It is noteworthy that the positive thinking of low-difficulty university graduates at -0.257 is much lower than -0.003, which is the score of those who are not university graduates. Meanwhile, the positive thinking of high-difficulty university graduates is 0.184, higher than the score of non-university graduates. A similar trend is observed for sense of insecurity.

The score of low-difficulty university graduates is 0.071, higher than the 0.023 of non-university graduates. The score drops to -0.068 for middle-difficulty university graduates and further down to -0.157 for high-difficulty university graduates.

Figure 4　Positive Thinking and Sense of Insecurity by Educational Attainment




### 3.2 Self-determination Indices

In the survey, the participants responded to the questions “Who chose your high school?” and “Who chose your university?” by selecting from among five answer options: 1) not my choice at all but strongly recommended by people close to me; 2) not so much my choice but recommended by people close to me; 3) unsure; 4) more or less my choice; and 5) totally my own decision.

For the question “Who chose your first job?” the respondents also chose the most applicable from six answer options: 1) not my choice at all but strongly recommended by people close to me; 2) not so much my choice but recommended by people close to me; 3) unsure; 4) more or less my choice; 5) totally my own decision; and 6) never had a job. Option 6) was treated as a missing value.

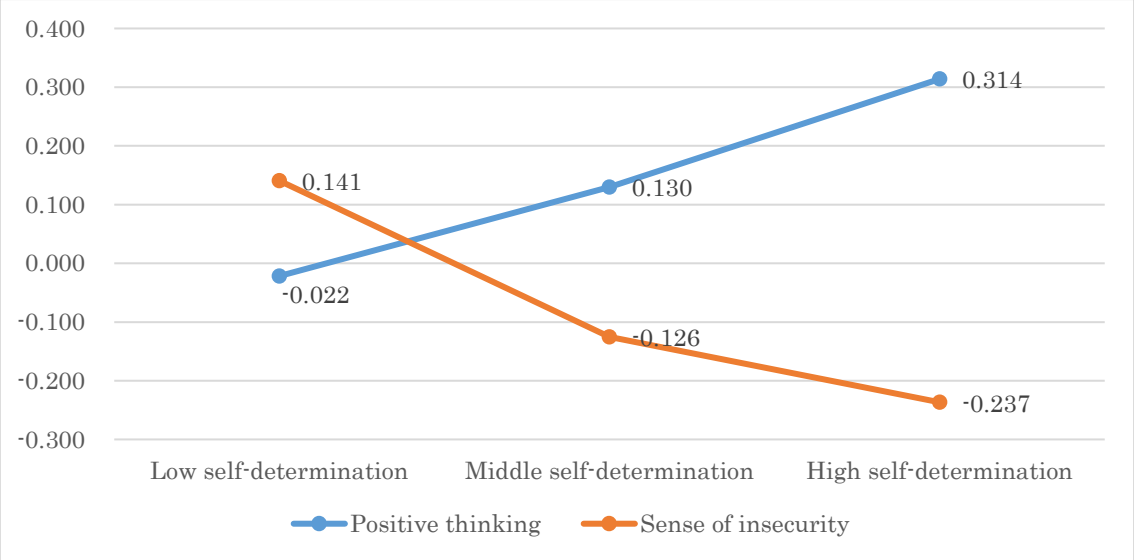
We performed a factor analysis of the above three questions about self-determination to obtain self-determination factors; the factor scores thus calculated are called self-determination indices. The result of our factor analysis conducted to create self-determination variables indicated that the choice of university to attend, the choice of high school to attend, and the choice of occupation were all equally important. It is presumably because of the tendency in Japan that the university that one attends depends on the high school attended and the company to work for depends on the university from

which one has graduated.

The average self-determination indices are 0.0123 for men and -0.0230 for women; however, this difference is not significant because the p-value of the statistical test on the difference is 0.243. Thus, there is no difference between men and women regarding the degree of self-determination in our survey.

There are three groups classified by the self-determination factor scores: the low self-determination group with factor scores in the first quartile, the middle self-determination group with scores in the second and the third quartiles, and the high self-determination group with scores in the top quartile. Figure 5 shows positive thinking and sense of insecurity by self-determination group. The vertical axis represents the average factor scores for positive thinking and sense of insecurity. As shown in the figure, the score of the low self-determination group is -0.022, whereas the score of the high self-determination group is 0.314. The positive thinking score increases proportionately with that of self-determination. As for the sense of insecurity, the scores are 0.141 for the low self-determination group and -0.237 for the high self-determination group, showing an inverse proportion and demonstrating the relationship between the degree of self-determination and the sense of insecurity.

Figure 5 Positive Thinking and Sense of Insecurity by the Degree of Self-determination.




3.3 Health and Human Relations

As briefly mentioned in the introduction, health and human relations are considered as variables that influence our sense of wellbeing. In this study, the respondents were asked about their health status as well as interpersonal relations with their spouse/partner, and colleagues and bosses at the

workplace. They chose one from five answer options; the distributions of their responses are given in Table 9 for health status and Table 10 for human relations.

Table 9 Distribution of Health Status

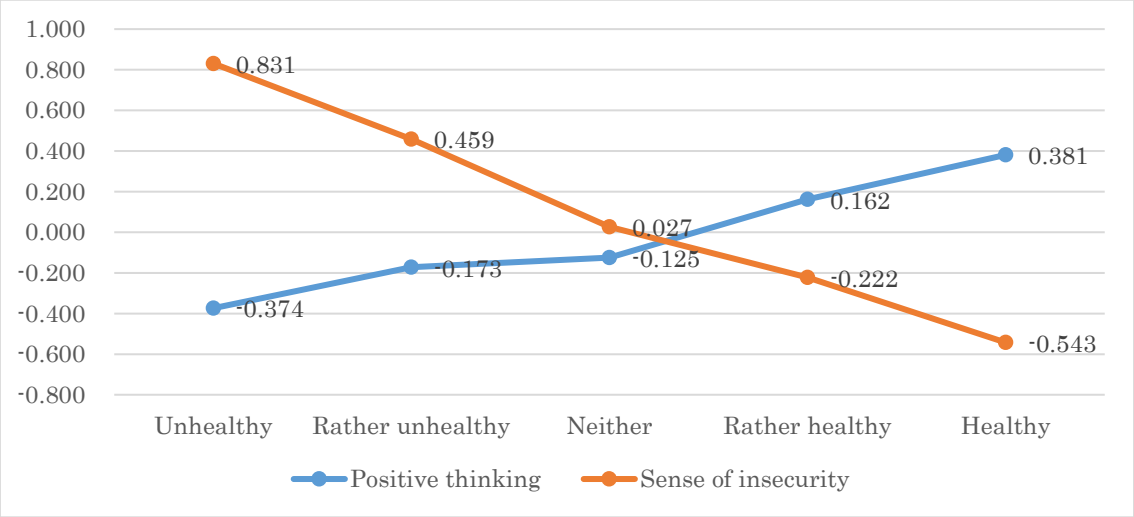
| | Frequency | Percent |
|---|---|---|
| 5. Excellent (healthy) | 3,247 | 16.2 |
| 4. Good (rather healthy) | 4,653 | 23.3 |
| 3. Fair (neither) | 7,484 | 37.4 |
| 2. Not very good (rather unhealthy) | 3,345 | 16.7 |
| 1. Poor (unhealthy) | 1,276 | 6.4 |
| Total | 20,005 | 100.0 |

Table 10 Human Relations

| | | Relations with spouse/partner | | Relations with colleagues | | Relations with the boss | |
|---|---|---|---|---|---|---|---|
| | | Frequency | % | Frequency | % | Frequency | % |
| Effective | 5. Extremely satisfied | 5,193 | 26.0 | 1,423 | 7.1 | 1,159 | 5.8 |
| | 4. Rather satisfied | 3,824 | 19.1 | 4,853 | 24.3 | 3,718 | 18.6 |
| | 3. Neither | 4,379 | 21.9 | 4,873 | 24.4 | 5,428 | 27.1 |
| | 2. Rather dissatisfied | 1,857 | 9.3 | 2,014 | 10.1 | 2,226 | 11.1 |
| | 1. Extremely dissatisfied | 1,653 | 8.3 | 1,007 | 5.0 | 1,639 | 8.2 |
| | Total | 16,906 | 84.5 | 14,170 | 70.8 | 14,170 | 70.8 |
| Missing Values | Not in relationship | 3,099 | 15.5 | 5,835 | 29.2 | 5,835 | 29.2 |
| Total | | 20,005 | 100.0 | 20,005 | 100.0 | 20,005 | 100.0 |

Figure 6 shows positive thinking and sense of insecurity by the state of health. The vertical axis represents the average factor scores. The score for positive thinking is -0.374 for the least healthy group; it gradually increases as the health status improves and reaches the maximum score of 0.381 for the healthiest group. The score for the sense of insecurity, on the other hand, is 0.831 for the least healthy group and decreases as the health status improves and reaches the minimum score of -0.543 for the healthiest group.

Figure 6 Positive Thinking and Sense of Insecurity by the State of Health




For the responses to the questions about human relations, only the rank-order is relevant. Accordingly, we look at the degree of correlation by using Spearman's Rank-Order Correlation. As shown in Table 11, the rank-order correlation coefficient between the relationship with the spouse/partner and that with colleagues is 0.226, while the coefficient between the relationship with the spouse/partner and that with the direct boss is 0.182. Since neither value indicates a strong correlation, the relationship with the spouse/partner is treated as an independent variable. On the contrary, the correlation coefficient between the relationship with colleagues and that with the direct boss is 0.556, indicating a strong correlation. Accordingly, we performed a factor analysis (principal component analysis) of the responses to the questions about the relations with colleagues and those with the direct boss; the principal component scores thus calculated are called workplace human relations indices.

Table 11　Spearman's Rank-Order Correlation for the State of Human Relations

| | | Relations with spouse/partner | Relations with colleagues | Relations with the direct boss |
|---|---|---|---|---|
| Relations with spouse/partner | Coefficient of rank-order correlation | 1.000 | .226** | .182** |
| | p-value (two-sided test) | . | .000 | .000 |
| | Number of observation | 16,906 | 11,950 | 11,950 |

| | | | | |
|---|---|---|---|---|
| Relations with colleagues | Coefficient of rank-order correlation | .226** | 1.000 | .556** |
| | p-value (two-sided test) | .000 | . | .000 |
| | Number of observation | 11,950 | 14,170 | 14,170 |
| Relations with the direct boss | Coefficient of rank-order correlation | .182** | .556** | 1.000 |
| | p-value (two-sided test) | .000 | .000 | . |
| | Number of observation | 11,950 | 14,170 | 14,170 |
| ** Significant at 1% significance level (two-sided test) | | | | |

Figure 7 shows positive thinking and sense of insecurity by the state of the relationship with a spouse or partner. The vertical axis represents the average factor scores for positive thinking and sense of insecurity. As shown in the figure, positive thinking scores were the lowest at -0.259 for the group in extremely dissatisfying relationships; the score gradually rises as the state of the relationship improves and reaches the maximum value of 0.312 for the group with extremely satisfying relationships. Sense of insecurity scores were 0.592 for the group in extremely dissatisfying relationships; it decreases as the state of the relationship improves and reaches the minimum score of -0.404 for the group with extremely satisfying relationships.

Figure 7 Positive Thinking and Sense of Insecurity by the State of the Relationship with Spouse or Partner

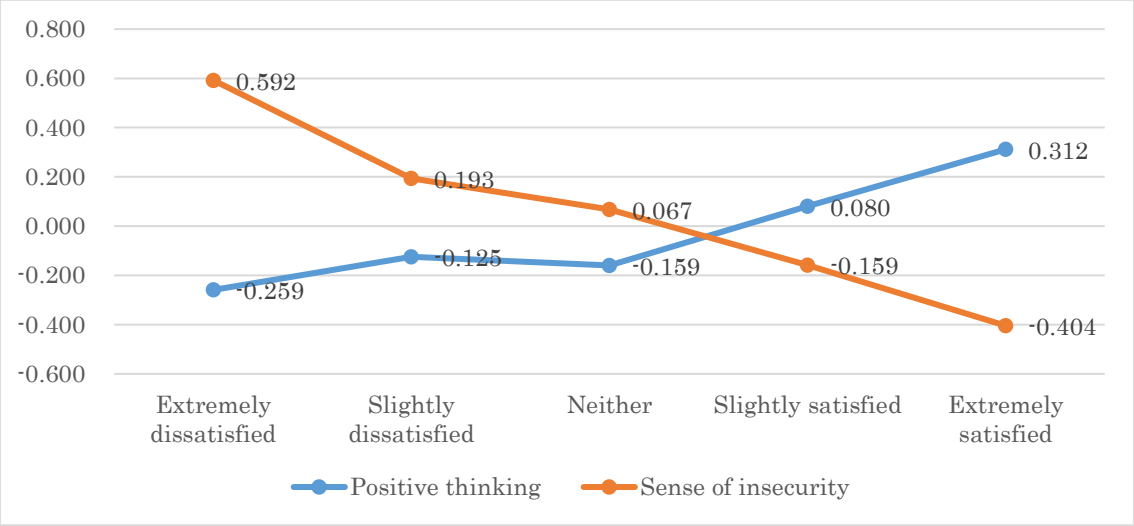



Figure 8 shows positive thinking and sense of insecurity by the state of the relationship with colleagues. The vertical axis represents the average factor scores for positive thinking and sense of insecurity. As shown in the figure, positive thinking scores were the lowest at -0.495 for the group in extremely dissatisfying relationships; the score gradually rises as the state of the relationship improves and reaches the maximum value of 0.496 for the group in extremely satisfying relationships. Sense of insecurity scores were the highest at 0.540 for the group in extremely dissatisfying relationships; it decreases as the state of the relationship improves and reaches the minimum score of -0.321 for the group in extremely satisfying relationships.

Figure 8 Positive Thinking and Sense of Insecurity by the State of the Relationship with Colleague(s) in the Workplace

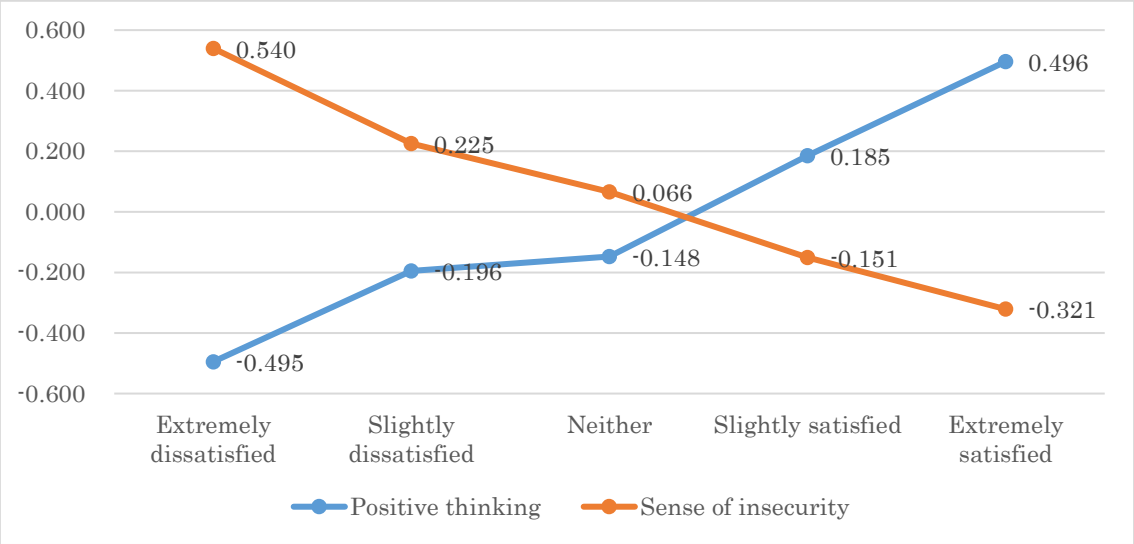
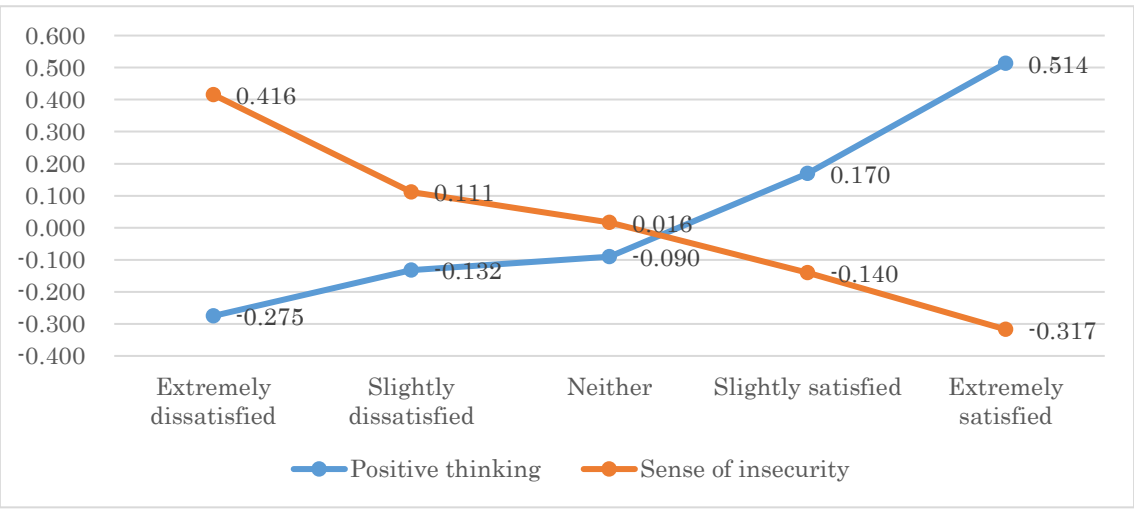



Figure 9 shows positive thinking and sense of insecurity by the state of the relationships with the boss. The vertical axis represents the average factor scores for positive thinking and sense of insecurity. As shown in the figure, positive thinking scores were at -0.275 for the group in extremely dissatisfying relationships; the score rises as the state of the relationship improves and reaches the maximum value of 0.514 for the group in extremely satisfying relationships. Sense of insecurity scores were at 0.416 for the group in extremely dissatisfying relationships; it decreases as the state of the relationship improves and reaches the minimum score of -0.317 for the group in extremely satisfying relationships.

Figure 9 Positive Thinking and Sense of Insecurity by the State of the Relationship with the Direct Boss



**4. Comprehensive Analysis of Factors that Determine the Sense of Wellbeing**

Table 12 shows standardized coefficients obtained by multivariate regression analysis of determinant factors of positive thinking and sense of insecurity. The coefficients of explanatory variables indicate the strength of their influence on explained variables, but the values of these coefficients are dependent on the units of the explanatory variables and the levels of influence among variables cannot be compared. Accordingly, we employ standardized coefficients, converting the coefficients into values not dependent on the units of explanatory variables. By comparing standardized coefficients obtained by multivariate regression analysis among variables, we can compare the levels of influence of explanatory variables on explained variables.

Model 1 shows the result of multivariate regression analysis incorporating all variables that are expected to have an influence on positive thinking, an explained variable. The stability of estimation is confirmed by the fact that no major changes of parameter values are observed when variables are added or excluded in the comparison of parameter values of Model 1 and Model 2; hence, multicollinearity is not suspected. The results of Model 2 indicate that the dummy variable for males is significantly negative and that men are less positive than women. As shown in Figure 1, positive thinking is a concave function in relation to age expressed by quadratic regression; hence it hits the lowest at mid-life. Setting aside uncontrollable attributes such as gender or age, state of health has the greatest influence on positive thinking, followed by workplace relationships, the relationship with a spouse or partner, annual household income, self-determination indices, length of service, dummy variable for married, and university ranking. In a sense, it is considered quite natural that health and human relations have a strong influence on positive thinking. We can easily imagine that people can be less motivated to think positively when feeling unwell or feel less happy when not having good human relations.

Model 3 in Table 12 shows the result of multivariate regression analysis of sense of insecurity as an explained variable, incorporating all the variables that are expected to have an influence into the model. Model 4, on the other hand, shows the result of multivariate regression analysis using only significant explanatory variables. Stability of estimation is confirmed by the fact that no major changes of parameter values are observed when variables are added or excluded in the comparison of parameter values of Model 3 and Model 4; hence, multicollinearity is not suspected. Model 4, which incorporated only statistically significant variables for analysis, shows that the dummy variable for males is significantly positive, indicating that men feel more insecure than women. Age is not significant, which means that sense of insecurity is determined irrespective of age. Setting aside gender, state of health is the most significant determinant factor of sense of insecurity, followed by relationship with spouse or partner, workplace relationships, annual individual income, and self-determination indices. University ranking, dummy variable for married, weekly working hours, annual individual income, and experience of unemployment, are excluded from Model 4, since they are not statistically

significant. It is easy to understand that good health, human relations, and income reduce the sense of insecurity. However, it is not self-evident and therefore noteworthy that self-determination indices significantly reduce the sense of insecurity.

Table 12 Results of Multivariate Regression Analysis of Determinant Factors of Positive Thinking and Sense of Insecurity (Standardized Coefficient)

| | Positive thinking | | Sense of insecurity | |
|---|---|---|---|---|
| | Model 1 | Model 2 | Model 3 | Model 4 |
| Dummy variable for males | -0.074** | -.075** | 0.116** | 0.102** |
| Educational attainment | 0.033* | * | -0.002 | |
| Age | -0.405** | -0.444* | 0.002 | |
| Age squared | 0.403** | 0.426** | -0.104 | |
| Annual household income | 0.084** | 0.074** | 0.002 | |
| Self-determination index | 0.063** | 0.068** | -0.076** | -0.079** |
| Dummy variable for married | -0.034 | | -0.037* | -0.073** |
| Length of service | -0.049** | -0.060** | 0.017 | |
| Weekly working hours | 0.032 | | 0.024 | |
| Annual individual income | -0.016 | | -0.092** | -0.092** |
| Experience of unemployment | 0.017 | | 0.039 | |
| State of health | 0.165** | 0.163** | -0.299** | -0.298** |
| Relationship with spouse/partner | 0.138** | 0.130** | -0.222** | -0.224** |
| Human relations at workplace | 0.157** | 0.153** | -0.165** | -0.161** |
| Adjusted R-square | 0.134 | 0.134 | 0.279 | 0.278 |

** Coefficient is significant at 1% level (two-sided)

*Coefficient is significant at 5% level (two-sided)

**5. Psychological Wellbeing and Income, Educational Background, and Self-determination**

The analysis shown in Table 12 estimated a model incorporating state of health, relationship with spouse or partner, and human relations at the workplace as explanatory variables. By adding these variables, however, missing values increased considerably, especially for the questions concerning colleagues and bosses at the workplace. As a result, the data used for the multivariate regression analysis basically represents married non–self-employed workers. Therefore, to broaden the range of samples to those who are unemployed and/or unmarried, our multivariate regression analysis in this

section excludes relationship with a spouse or partner, human relations at the workplace, length of service, and weekly work hours as explanatory variables. The results of these analyzes are shown in Table 13, and the results of the analysis of Table 13 by gender are shown in the appendix.

First, in Table 13, we compare Model 5, which includes all variables likely to influence positive thinking, and Model 6, which only includes variables with statistically significant influence. Stability of estimation is confirmed by the fact that no major changes of parameter values are observed when variables are added or excluded in the comparison of parameter values of Model 5 and Model 6; hence multicollinearity is not suspected. The result of multivariate regression analysis of Model 6, which incorporated only statistically significant variables, shows that the dummy variable for males is significantly negative, indicating that men are less positive thinkers than women. The relationship between positive thinking and age is recognized as U-shaped as shown in Figure 1, from the result that the squared term is positive. Annual household income, on the other hand, has a significantly positive influence on positive thinking.

Similarly, self-determination indices have a significantly positive effect on positive thinking. By comparing the standardized coefficients among the variables, it is recognized that self-determination indices have a greater influence than income or educational background. In other words, those who have made more decisions on their own think more positively. The dummy variable for married turns out to be statistically significant when the relationship with a spouse or partner is excluded from the model. The educational background here denotes a variable that has taken the university ranking (difficulty of admission) into consideration; the same denotation applies hereafter.

Model 7 and Model 8 show the results of multivariate regression analysis, namely the standardized coefficients of factors that constitute the sense of insecurity. We compare Model 7, which includes all variables likely to influence the sense of insecurity, and Model 8, which only includes variables with statistically significant influence. Stability of estimation is confirmed by the fact that no major changes of parameter values are observed when variables are added or excluded in the comparison of parameter values of Model 7 and Model 8; hence, multicollinearity is not suspected. In Model 8, where all the variables are statistically significant, the dummy variable for males is significantly positive, indicating that men feel more insecure than women. Educational background is not significant with respect to the sense of insecurity. The relationship of sense of insecurity to age is recognized as inverse U-shaped as shown in Figure 1, which can also be confirmed by the negative squared term of age.

Table 13 shows that the impact of family income on positive thinking was significant while that of individual income was not. This is probably because family income matters more than individual income in planning for a future life that would require big expenses such as buying a house. On the other hand, the impact of family income on insecurity was not significant, while that of individual

income was. The reason would be that individual income would help protect their future situations more effectively than family income, regardless of the relationship between the couples. The result of the regression analysis by gender as shown in Table A-1 of the appendix shows that not only individual income but also family income is important for females in explaining their sense of insecurity. We can observe that family income is more significant for females than for males. In the meantime, Table A-1 also shows two other important suggestions about differences between males and females. First is that being married significantly enhances positive thinking for males although it does not have significant impact for females. The second point is that males' sense of insecurity increases with age while age has no relevant impact on the females' sense of insecurity.

In our survey, 21.6% of respondents have experienced unemployment. Table 12, a model with many explanatory variables, indicates that the experience of unemployment is not significant, while Table 13, a model with reduced explanatory variables, shows that the experience of unemployment significantly increases the sense of insecurity. It is considered that the variables correlating with the experience of unemployment absorbs its effect and loses its significance in Table 12. Using the model in Table 13, as shown in Table A-1 of the Appendix, extrapolating the results by gender shows that experiencing unemployment significantly reduces positive thinking for males while it does not have a significant impact on positive thinking for females.

Self-determination has a powerful, significantly negative influence on the sense of insecurity compared to income or educational background. This means that a person who has made his/her own choice of school and job has a low degree of insecurity.

Table 13 Results of Multivariate Regression Analysis of Determinant Factors of Positive Thinking and Sense of insecurity (Standardized Coefficients)

| | Positive thinking | | Sense of insecurity | |
|---|---|---|---|---|
| | Model 5 | Model 6 | Model 7 | Model 8 |
| Dummy variable for males | -.085** | -.087** | .112** | .112** |
| Educational attainment | .038** | .039** | -.006 | |
| Age | -.816** | -.800** | .562** | . 546** |
| Age squared | .773** | .759** | -.672** | -.647** |
| Annual household income | .092** | .093** | -.024 | |
| Self-determination indices | .100** | .098** | -.119** | -.118** |
| State of health | .208** | .208** | -.374** | -.376** |
| Dummy variable for married | .038** | .035** | -.132** | -.140** |
| Annual individual income | .000 | | -.079** | -.095** |

| | | | | |
|---|---|---|---|---|
| Experience of unemployment | .027 | .032** | .067** | . 068** |
| Adjusted R-square | 0.097 | 0. 097 | 0.243 | 0. 245 |

** Coefficient is significant at 1% level (two-sided)

*Coefficient is significant at 5% level (two-sided)

Based on the above discussion, we now compare the values of standardized coefficients by bar graphs in terms of degree of influence of factors such as income, educational background, and self-determination.

Based on Table 13, Figure 10 compares standardized coefficients of determinant factors of positive thinking among statistically significant variables after individual attributes such as gender, age, and health are excluded. As the graph shows, the standardized coefficient of the self-determination index has a significantly higher value than that of income or educational attainment, thereby indicating that it has strong positive effects on positive thinking. It suggests that in order to feel happy, making your own life choices is more important than having an advanced academic career or high income. Those who have chosen their own way would try hard to attain their goals and take responsibility and pride in their achievements. Sense of achievement and self-esteem are factors that lead to positive thinking. The importance of self-determination is a potential solution for attaining a sense of wellbeing. Taking this graph into consideration with the fact that educational attainment is not statistically significant, we can see that self-determination indices have a greater influence than income or educational attainment in reducing sense of insecurity.

Based on Table 13, Figure 11 compares standardized coefficients of factors that determine sense of insecurity among statistically significant variables after individual attributes such as gender, age, and health are excluded. As shown in Table 13, annual individual income was a statistically significant income variable over annual household income; accordingly, we included annual individual income in Figure 10. Taking this graph into consideration with the fact that educational attainment is not statistically significant, we can see that self-determination indices have a greater influence than income or educational attainment in reducing sense of insecurity. We consider that those who have made their own decisions have less chance for educational or job mismatch, are able to try other alternatives even if they fail or prepare these alternatives in advance, and thus reduce their sense of insecurity.

Meanwhile, Nishimura and Yagi (2017) made it clear that a supportive style of parenting has positive effects on all factors such income, education, positive thinking, and sense of security (the opposite of sense of insecurity). Supportive parenting is characterized by encouragement of independence, and independence in turn facilitates self-determination, which is consistent with the findings of this empirical study. Ng et al. (2004) also conducted an empirical study with children aged 7 to 12 and showed that supportive parenting by mothers who encourage independence enhances children's performance. These findings suggest that independence is an important factor in developing

children's abilities.

Figure 10 Importance of Factors for the Determination of Positive Thinking (Standardized Coefficients)

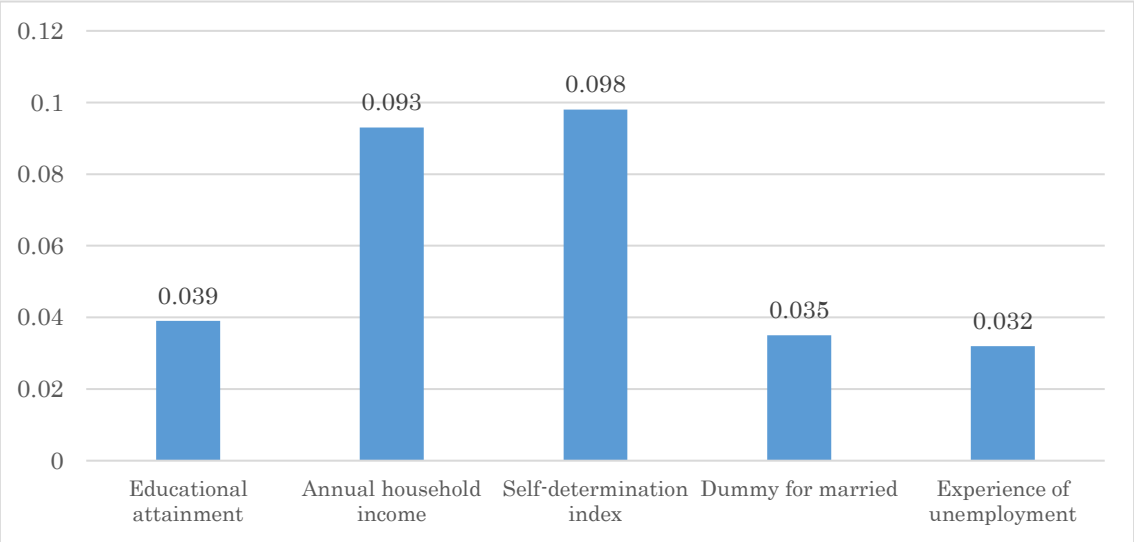
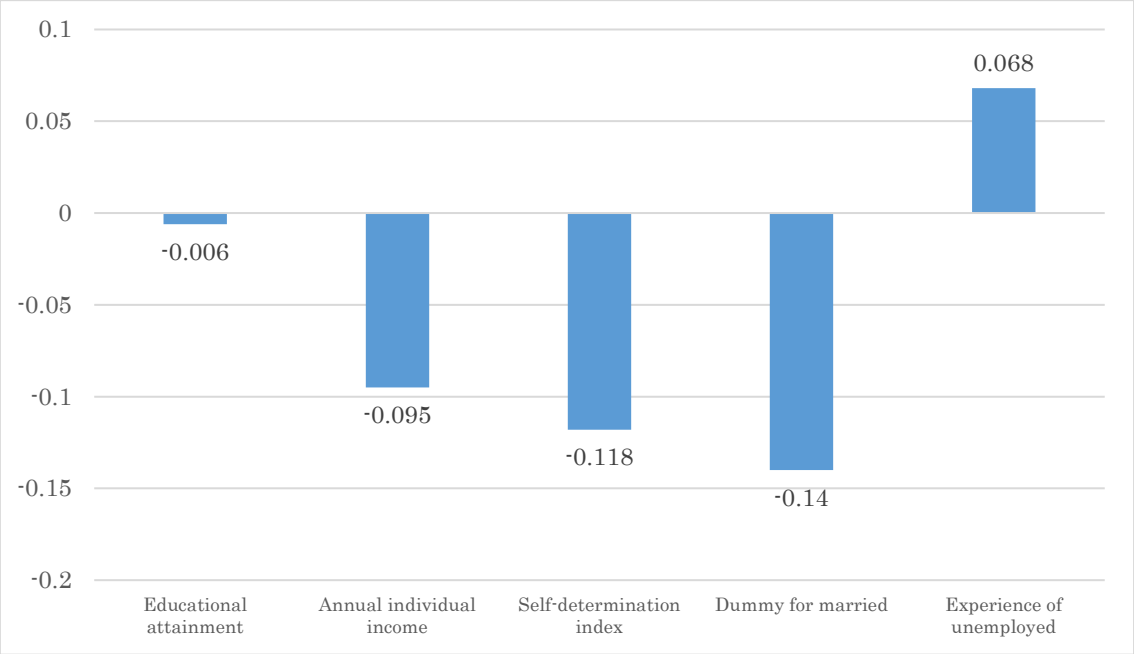



Figure 11 Importance of Factors for the Determination of Sense of Insecurity (Standardized Coefficients)

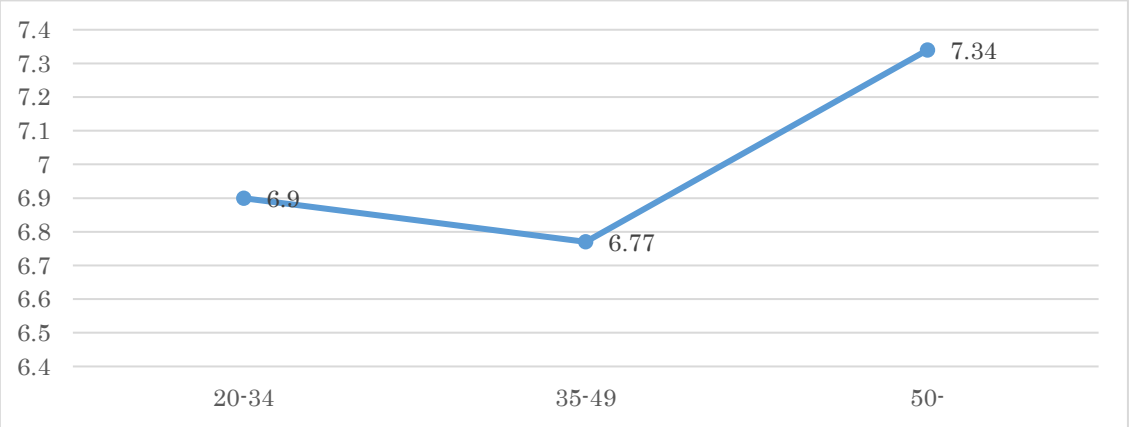


## 6. Subjective Wellbeing and Age, Income, and Self-determination

We have thus far analyzed determinant factors of psychological wellbeing. As discussed in the introduction, however, happiness studies have often dealt with subjective wellbeing in their analyses. Accordingly, in this section, we will examine whether our discussion in this study still holds when subjective wellbeing is used as an index.

It is a generally known that subjective wellbeing by age is expressed as a U-shaped curve, which shows that the sense of wellbeing is high at the beginning and towards the end of life and drops at midlife. (See Blanchard and Oswald (2008) and Kahneman and Deaton (2010) for recent studies.) The data in our study also confirms a similar tendency; as shown in Figure 11, subjective wellbeing drops at ages 35 to 49. This result corresponds with that of positive thinking by age group shown in Figure 12.

Figure 12 Subjective Wellbeing by Age Group




We confirmed the relationship between positive thinking and income in Figure 2. Here, we examine the relationship between income and subjective wellbeing. For this end, we calculated the ratio of the rate of change of subjective wellbeing and that of income to obtain the change in income elasticity of wellbeing. The change rate of the $i^{th}$ income class is obtained by the following:
(the value of $i^{th}$ income class - the value of $i$ -$1^{th}$ income class)/the value of $i$ -$1^{th}$ income class.

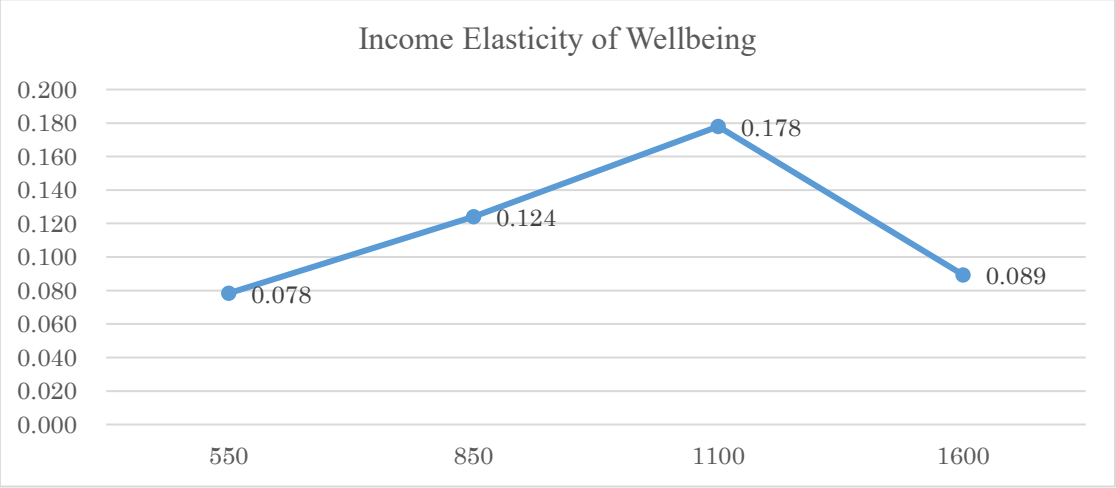
The rate of change of subjective wellbeing of the $i^{th}$ income class is obtained by:
(the average value of subjective wellbeing of the $i^{th}$ income class - the average value of subjective wellbeing of the $i$ -$1^{th}$ income class)/the average value of subjective wellbeing of the $i$ -$1^{th}$ income class.

Income elasticity of wellbeing is obtained by:

the rate of change of subjective wellbeing of the $i$ th income class／the rate of change of income of the $i$ th income class.

Figure 13 shows income elasticity of subjective wellbeing by annual household income class. Since the value of the $i$ -1th class is used to calculate the elasticity, the elasticity of the lowest income class cannot be calculated; hence we calculate the elasticity values of the classes with annual household income of 5.5 million yen or more. As shown in this figure, the elasticity is positive, which means that subjective wellbeing increases concomitantly with income, although it does not increase as much as the income because the elasticity is less than 1. The figure also shows that the ratio of the change rates reaches the peak at 11 million yen (97721 USD).

Figure 13 Income Elasticity of Wellbeing (Horizontal line denotes annual household income classes, unit: 10,000 yen)




In Table 14, we compared Model 9, in which we included all the variables likely to influence subjective wellbeing while taking care not to narrow down the samples, and Model 10, a multivariate regression analysis model in which we included only the variables with statistically significant influence. Stability of estimation is confirmed by the fact that no major changes of parameter values are observed when variables are added or excluded in the comparison of parameter values in Model 9 and Model 10; hence, multicollinearity is not suspected. In Model 10, which represents a multivariate regression analysis performed with statistically significant variables only, the dummy variable for males is significantly negative, indicating that men feel subjectively less happy than women. We can

see that subjective wellbeing in relation to age mimics a U-shape since the squared term is positive. This is consistent with the U-shape shown in Figure 12. Educational attainment, on the other hand, is not statistically significant and has no influence on subjective wellbeing. Annual household income has a significantly positive influence on subjective wellbeing. We can observe from the table in the appendix that family income is more significant for females than for males. Annual individual income, however, has no significant influence, and hence is excluded from Model 10. The self-determination index has significantly positive effects on subjective wellbeing. Based on Table 14, Figure 14 compared standardized coefficients of determinant factors of subjective wellbeing among statistically significant variables after individual attributes such as gender, age, and health are excluded. Educational background is not significant and hence not included in Figure 14. The dummy variable for married is positive, which indicates that the sense of wellbeing increases when married. By comparing the standardized coefficients, this figure shows that self-determination has a greater influence than income or educational background. In other words, those who have made more decisions in life on their own have a higher sense of subjective wellbeing. These results correspond with the findings of the analysis on positive thinking.

As to educational background, graduates of high-difficulty universities are more likely to earn a higher income and feel happier. However, if we isolate the effect of income to evaluate the effects of educational attainment, the former effect on wellbeing is significant but the latter effect on wellbeing turns out to be insignificant. In contrast, self-determination has a significant influence on wellbeing on its own. While there is no difference in self-determination indices between males and females, the influence of self-determination on the sense of wellbeing differs between males and females as the table in the appendix shows. Self-determination indices have stronger influence especially on subjective wellbeing for females than for males. One conceivable interpretation of this is that self-determination indices have less influence on subjective wellbeing for males because they tend to have more responsibilities to support the family budget and hence are exposed to considerable stress at work.

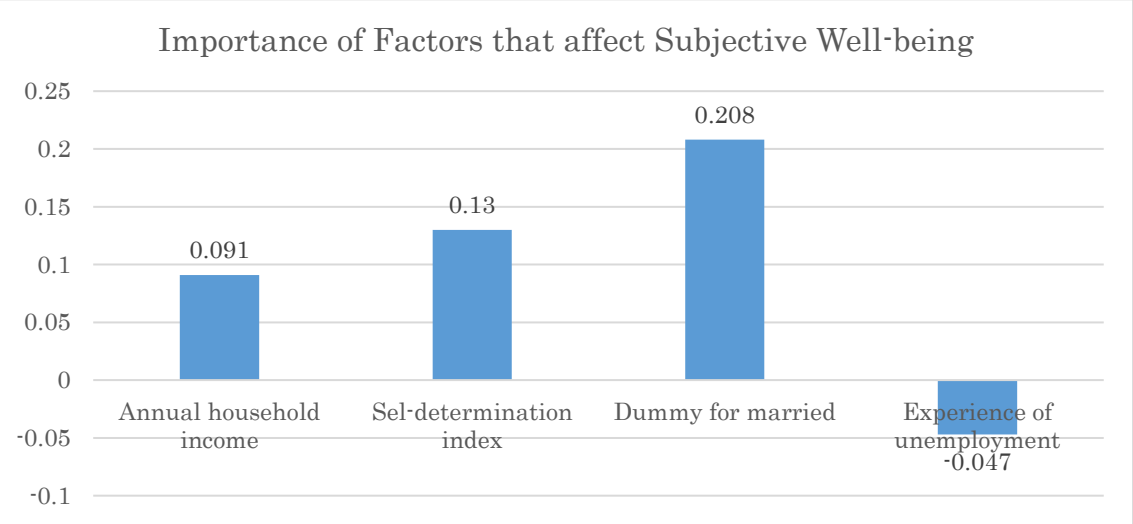
Table 14 Results of Multivariate Regression Analysis of Determinant Factors of Subjective Wellbeing (Standardized Coefficients)

| | Subjective wellbeing | |
|---|---|---|
| | Model 9 | Model 10 |
| Dummy variable for males | -.129** | -.116** |
| Educational background | .015 | |

| | | |
|---|---|---|
| Age | -.703** | -.660** |
| Age squared | .753** | .710** |
| Annual household income | .076** | .091** |
| Annual individual income | .027 | |
| State of health | .377** | .379** |
| Self-determination index | .128** | .130** |
| Dummy variable for married | .210** | .208** |
| Experience of unemployment | -.044** | -.047** |
| Adjusted R-square | 0.284 | 0.284 |

** Coefficient is significant at 1% level (two-sided)

Figure 14　Importance of Factors that Affect Subjective Wellbeing (Standardized Coefficients)




## 7. Conclusion

Few people would object to the idea that income and good education are important and necessary to be happy, whereas many others believe that they can attain their life goals and wellbeing through other means. In this study, we conducted a survey of 20,000 Japanese nationals asking various questions and performed analyses using income, educational background, health status, human relations, and self-determination as explanatory variables. The results show that the sense of wellbeing in relation to age drops at mid-life generating a hairpin curve, while subjective wellbeing increases with a rise of income but not proportionately and the ratio of their change rates reaches a peak at the 11 million yen annual household income level. The findings also indicate that, following health and human relations, self-determination is a stronger determinant factor of sense of wellbeing than income

or educational background. It is considered that self-determination in life enhances motivation for the action chosen, which ultimately leads to an increased sense of wellbeing. According to the United Nations' World Happiness Report, Japan's happiness level is not very high, and the variable of the freedom to make life choices in the nation as a whole is low. It is noteworthy that those high in self-determination have a high degree of happiness in Japan where the freedom to make life choices is limited.

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Appendix

Table A-1 shows the results of multiple regression analysis on the positive thinking, sense of insecurity, and subjective well-being of the model in Table 13 for each gender.

Table A-1 Regression analysis by gender

| | Positive thinking | | Sense of insecurity | | Subjective well-being | |
|---|---|---|---|---|---|---|
| | Male | Female | Male | Female | Male | Female |
| Educational background | .031 | .042 | .007 | -.033 | .013 | .010 |
| Age | -1.057** | -.467** | .738** | .176 | -.924** | -.207 |
| Age squared | .999** | .447** | -.845** | -.281 | .963** | .283 |
| Annual individual income | .018 | -.002 | -.073** | -.073** | .020 | -.002 |
| Annual household income | .073** | .114** | -.005 | -.063** | .070** | .107** |
| State of health | .209** | .208** | -.349** | -.426** | .376** | .385** |
| Self-determination index | .108** | .087** | -.114** | -.134** | .115** | .157** |
| Dummy variable for married | .057** | .011 | -.161** | -.084** | .244** | .133** |
| Experience of unemployment | .041** | .018 | .071** | .058** | -.063** | -.003 |
| Adjusted R-square | .097 | .069 | .242 | .243 | .301 | .227 |

** Coefficient is significant at 1% level (two-sided)