

Subjective Happiness among Adults in Japan during the COVID-19 Pandemic: Socioeconomic Status, Psychosocial Variables, and Loneliness as Predictors

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Abstract

Humankind has pursued happiness for centuries. Given the significance of happiness to people, this study analyzes predictive associations between socioeconomic and psychosocial variables as independent variables and subjective happiness as the dependent variable. The study utilizes data from the Social Science Japan Data Archive (SSJDA), part of the Institute of Social Science at the University of Tokyo, collected in 2022 during the COVID-19 pandemic. The data were reorganized as binary variables and then analyzed in bivariate analyses and subsequently in multivariate models to assess predictive associations between the independent and dependent variables, i.e., subjective happiness. Binary logistic regression analysis identified a model with the following eight independent variables as optimal of all tested models: (1) marital status, (2) self-identified social class, (3) annual household income, (4) affirming one's own merits, (5) perception that people are trustworthy, (6) having a trustworthy neighbor, (7) feeling lonely, and (8) self-rated health. The discussion section focuses on loneliness, as it is the only variable among the eight predictors that has a statistically significant negative association with subjective happiness. The complex interplay among subjective happiness, its predictors—in particular, loneliness—and the COVID-19 pandemic is explored.

1. Introduction

Humanity has been pursuing happiness since immensity. While the first pursuit of happiness by humankind cannot be traced, it is sensible to infer that, after a long period of struggle and search for pure survival, members of the species *Homo Sapiens* have attempted to gain happiness since ancient times. Lomas et al. reviewed the development of the idea of happiness from a global perspective, dating back as early as Egyptian and

Mesopotamian civilizations (Lomas et al., 2021). One of the oldest writings from Mesopotamia, the Epic of Gilgamesh, which dates to circa 3,000 B.C., illustrates human endeavors for happiness and existential reality (Sadigh, 2010).

A few millennia later in Greece, Aristotle, a prominent philosopher, held an ethical view—Nicomachean ethics—that happiness or *eudaimonia* is fulfilling, flourishing, and complete (Aristotle, 2009). Aristotle’s thoughts have impacted contemporary ideas on happiness, along with thoughts of philosophers from not only the schools of ancient Greek philosophy, but also more recent philosophers from the Renaissance and the Era of Enlightenment (Veenhoven, 2015).

In addition to the thinkers mentioned above, various religious traditions, such as Buddhism, Christianity, Hinduism, Islam, and Judaism, have addressed spiritual aspects of happiness for centuries. For instance, the Buddhist term *nirvana* refers to ceasing to suffer through detachment, while *dharma* implies “laws of nature,” both of which are relevant to happiness (Lomas et al., 2021, p.10). Reckoning from the historical events and traces noted above, it is evident that happiness has been crucial for people.

Nonetheless, it is arduous—if not impossible—to quantify and estimate the influence our forebearers’ views have had on the contemporary notions of happiness. However, it is reasonable and sensible to envisage that their ideas, teachings, and doctrines, along with various other psychosocial and socioeconomic factors, have helped shape modern conceptions of happiness, which vary across cultures.

1.1 Present Study: Feasibility and Objective

Given the extensive history and diverse interpretations of happiness, this study adopts a pragmatic approach by examining socioeconomic and psychosocial factors including loneliness and self-rated health as independent variables. Utilizing these variables, this study examines their predictive associations with subjective happiness, the dependent variable, based on people’s self-assessments. To achieve this, a 2022 data set from Japan is statistically analyzed to identify predictive associations.

The fact that the data are from the year 2022 adds an attribute to this study. The year 2022 coincides with the period during which Japan, like many other countries, was still grappling with the COVID-19 pandemic. In effect, at the end of 2022 in Japan, the cumulative number of confirmed positive cases of COVID-19 was 29.2 million—among whom were 57,445 cumulative deaths (Ministry of Health, Labour, and Welfare Japan, 2023). Given the circumstances of the nation at the time, it should not be surprising if the data reflect some impact of the pandemic, even if it is subtle and covert.

For such reasons, the pandemic’s effects are inherent in the data, albeit this study

is not about COVID-19 per se. Put concisely, this study utilizes a data set from Japan in 2022—during the COVID-19 pandemic—and analyzes and identifies socioeconomic and psychosocial variables including loneliness, and self-rated health that are predictive of subjective happiness among the Japanese adult sample.

1.2 Prior Studies

As seen in the Introduction, happiness has been deliberated and examined for a long time in various contexts and from diverse perspectives. However, evidence-based empirical research on happiness from a psychological perspective emerged relatively recently. According to Saeki and Oishi (2014), it began in earnest in the mid-1980s. Since then, there have been many empirical studies (see, for example, Harada, 2014; Okuzono, 2022; Oshio & Kobayashi, 2010; Oshio & Urakawa, 2012; Oshio et al., 2013; Raymo, 2015; and Takahashi et al., 2017). These studies have significantly advanced the scientific understanding of happiness.

Among such studies is one by Shishido and Sasaki (2021). They conducted an evidence-based study utilizing a cumulative data set of the Japanese General Survey (JGSS). They found that the social class of the parents and social opportunities at young ages affect the progression of happiness in later years (p. 348). In addition, they reported that the relative household income was more closely associated with happiness than the absolute household income and that the impact of employment and marital status differed between males and females (Shishido & Sasaki, 2021, p.348). This is one sound example of how studies on happiness can be approached empirically and quantitatively.

There are many heuristic and informative studies, including the works exemplified above, whose objectives and goals partially align with those of the present study. Nonetheless, there are many differences between the aforementioned studies and the present one. The reviewed studies typically share two or three of the following keywords with the present study: happiness, socioeconomic variables, psychosocial factors, loneliness, self-rated health, and the COVID-19 pandemic. However, all of the preceding keywords are essential to the present study. As of June 2024, the authors found no study that includes all of the above keywords in the context of Japan and whose objectives and outcomes are systematically comparable to those of the present study.

2. Methods

2.1 Sample Descriptions

The data analyzed in this study, titled “The Second National Personal Network

Survey, 2022” [title translation by the authors], were provided by the Social Science Japan Data Archive (SSJDA), Center for Social Research and Data Archives, Institute of Social Science, The University of Tokyo, for this secondary analysis. In February and March of 2022, the data were collected from 1,115 respondents using a name generator and snowball sampling methods, also known as network sampling (The Second National Personal Network Survey, 2022). The respondents are adults in Japan aged between 25 and 75. The mean age of the respondents was 54 (SD = 13.72). The original survey aimed to investigate Japanese people’s social relations and changing values regarding social networks. IBM® SPSS® Statistics was used throughout the study.

2.2 Independent Variables

The independent variables examined in this study are mainly socioeconomic and psychosocial. For instance, the socioeconomic variables include marital status, education, self-identified social class, annual household income, and annual income, to name a few. On the other hand, the psychosocial factors include loneliness, variables related to self-affirmation, self-rated health, perception of trust in people, and several variables about social relations.

Most of the data mentioned above have been converted into binary variables. For example, the variable “marital status” originally had six possible answer choices: they are (1) “married,” (2) “not married but have a partner,” (3) “separated, and has no spouse or partner,” (4) “widowed,” (5) “never married or never had a partner,” and (6) “no response.” The six answer choices have been recategorized into a binary variable. The new variable has the first group consisting of married respondents—those selecting (1) “married”—and the second group composed of non-married respondents who have selected (2) “not married but have a partner,” (3) “separated, and has no spouse or partner,” (4) “widowed,” or (5) “never married or never had a partner.” Those selecting (6) “no response” were treated as missing values in the process of calculations. In consequence, the valid responses for the new variable have been re-coded as (1) married ($n = 801$; 72%) or (2) unmarried ($n = 304$; 28%).

For the variable of annual household income, the original variable was dichotomized by rearranging into one group with the annual household income of 5,999,999 yen or less ($n = 654$; 63%) and the other group with 6,000,000 yen or more ($n = 391$; 37%). This dichotomization was based on the average annual household income of the Japanese for 2022: 5,457,000 yen (Ministry of Health, Labour and Welfare, Japan, 2023). The cutoff point (6,000,000 yen) was the closest to the average annual household income (5,457,000 yen). Similarly, most of the independent variables have been

converted into binary variables in the most sensible ways possible as per the researchers' deliberation for ensuring and maintaining the validity of the research.

2.3 Dependent Variable

Table 1 Sociodemographic Characteristics of Respondents at Baseline

Baseline characteristic	Lower subjective happiness group		Higher subjective happiness group		Full Sample	
	<i>n</i>	%	<i>n</i>	%	<i>N</i>	%
	Gender					
Female	139	48	435	53	574	52
Male	148	52	385	47	533	48
Marital status						
Not married	122	43	182	22	304	28
Married	163	57	636	78	799	72
Education						
Up to high school graduate	170	59	369	45	539	49
More than high school education	117	41	454	55	571	51
Occupational category						
Agriculture, forestry, fishery, or other skilled Labor	70	26	139	17	209	19
Sales, service, business, or office work	118	44	339	42	457	43
Professional, technical, or administrative work	39	15	228	28	267	25
Others	41	15	101	13	142	13

Table 1 displayed above lists the sociodemographic characteristics of the respondents. The dependent variable in this study is subjective happiness. The original survey contained a question asking the respondent to assess his/her level of happiness from five answer choices. They are (1) "high," (2) "upper-middle," (3) "lower-middle," (4) "upper-lower," and (5) "low." To dichotomize the original variable, the first two answer choices, "high" and "upper-middle," have been collapsed into one category called the higher subjective happiness group, while the remaining three choices—that is, "lower-middle," "upper-lower," and "low"—have been merged into the other category called the lower subjective happiness group. Consequently, the dependent variable in this study, subjective happiness, has two answer categories: the higher subjective happiness group

($n = 823$; 74%) and the lower subjective happiness group ($n = 288$; 26%).

3. Results

3.1 The First Phase: The Chi-Square Test of Independence and the Phi Coefficients

Table 2 Results of the Chi-Square Tests and Phi Coefficients

Variable	<i>df</i>	chi-square	<i>p</i> -value	Phi coefficient
Socioeconomic				
Marital status	1	44.740	<.001	0.201
Education	1	17.658	<.001	0.126
Occupational category	3	24.766	<.001	0.152
Self-identified social class	1	52.058	<.001	0.218
Annual household income	1	44.115	<.001	0.206
Annual income	1	28.485	<.001	0.163
Psychosocial				
Affirming one's own merits	1	41.079	<.001	0.194
Perception that people are trustworthy	1	58.799	<.001	0.232
Self-rated health	1	75.960	<.001	0.262
Feeling lonely	1	67.801	<.001	-0.249
Having someone close	1	56.722	<.001	0.228
Having a trustworthy neighbor	1	21.149	<.001	0.146
Prioritizing harmonious relationships with people	1	22.031	<.001	0.142
Active participation in groups	1	14.875	<.001	0.117

Note: Dependent variable = Subjective happiness

Table 2 lists the results from the first phase. During the first phase, several chi-square tests were conducted to assess bivariate associations between socioeconomic or psychosocial independent variables on the one hand and subjective happiness on the other. Most of the tested variables are nominal and categorical, with a few exceptions, such as age. The Phi coefficients were also calculated to evaluate the strength of the association. According to Akogul (2018), if the absolute value of a Phi coefficient is greater than 0.15, it indicates a strong association, while that greater than 0.25 suggests a “very strong” or robust association. These reference values were utilized as benchmarks for assessment.

3.2 The Second Phase: Multivariate Analysis

3.2.1 Assumption Checks for Binary Logistic Regression

Following the bivariate analyses, whether the assumptions of binary logistic regression had been satisfied was checked before proceeding with the multivariate analyses. In particular, the conditions of independent observation, absence of outliers, and the dichotomous dependent variable had been confirmed. Moreover, collinearity diagnostics, which examines correlations between independent variables, was executed to ascertain no critical association between the independent variables. In addition, tolerance levels for the independent variables too were checked. All tolerance levels were confirmed to be around 0.9 and the variance inflation factor (VIF) did not approach 10, a general threshold indicating interdependence between explanatory variables (see O'Brien, 2007, for more detail). All the checked items above were cleared. See Table 3 below for the results of the optimal model which is appraised in the following section.

Table 3 Collinearity Diagnostics with Variance Inflation Factor (VIF)

Variable	Collinearity Statistics	
	Tolerance	VIF
Marital status	0.910	1.099
Self-identified social class	0.862	1.160
Annual household income	0.878	1.138
Affirming one's own merits	0.900	1.111
Perception that people are trustworthy	0.929	1.076
Having a trustworthy neighbor	0.945	1.058
Feeling lonely	0.953	1.049
Self-rated health	0.954	1.048

Note: Dependent variable = Subjective happiness

3.2.2 Model Appraisals

After the bivariate analyses and the assumption checks, a series of binary logistic regression analyses with multiple combinations of independent variables were conducted in the subsequent multivariate phase while maintaining subjective happiness as the dependent variable. The outcomes in Table 2 were used as a reference to devise combinations of independent variables.

After a series of binary logistic regression analyses were executed with multiple combinations of independent variables, their results were compared to discern which model was optimal of all. Of all combinations implemented in the multivariate phase, the

model with the following eight independent variables—that is, (1) marital status, (2) self-identified social class, (3) annual household income, (4) affirming one’s own merits, (5) perception that people are trustworthy, (6) having a trustworthy neighbor, (7) feeling lonely, and (8) self-rated health—was identified as the fittest model of all.

The process of model appraisals involved several tests. Table 4 in the following presents the outcomes of the omnibus tests of model coefficients. The results corroborate the model’s effectiveness in predicting the dependent variable: i.e., the significance value for the model ($p < .001$) indicates that the model is significantly more effective than the null model with no predictors.

Table 4 Model Appraisal: Omnibus Tests of Model Coefficients

		chi-square	<i>df</i>	<i>p</i> -value
Step 1	Step	191.775	8	<.001
	Block	191.775	8	<.001
	Model	191.775	8	<.001

Another criterion to evaluate a binary logistic model is a set of pseudo R^2 values. In binary logistic regression analysis, approximations of R^2 values called pseudo R^2 values are used to assess the model’s goodness of fit to the data. These values also facilitate comparisons of different models. Table 5 below enumerates the results of pseudo R^2 values for the optimal model with the eight independent variables noted above. Notably, the model had the highest values of all models examined in this study.

Table 5 Model Summary: Pseudo *R* Square Values

Step	– 2 Log Likelihood	Cox & Snell <i>R</i> Square	Nagelkerke <i>R</i> Square
1	796.619 ^a	0.192	0.288

^a Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Another test applied for assessment is the Hosmer and Lemeshow test. In this test, a non-significant result means that the model fits the data well. The results for the optimal model indicate a non-significant *p*-value: $\chi^2 (8) = 4.264, p < .833$. Hence, it can be stated that the given model fits the data well.

Moreover, there is a set of vital indices to consider in evaluating a binary logistic

regression model: its sensitivity, specificity, and percentage of overall accuracy. Sensitivity refers to a conditional probability in which a given model accurately predicts a positive case, which, in this study, is classified into a higher subjective happiness group. In contrast, specificity is a conditional probability wherein the model correctly predicts a negative case, i.e., being classified into a lower subjective happiness group. The sensitivity of the model under discussion was 94.6%, while the specificity was 34.1%: i.e., the model correctly predicted 94.6% of individuals in the higher subjective happiness group, while its counterpart for the lower subjective happiness group was 34.1%. The overall accuracy rate was 80.3%, accounting for both sensitivity and specificity.

3.2.3. Binary Logistic Regression Statistics

Table 6 Variables Associated with Subjective Happiness in Binary Logistic Regression Analysis

Variable	β	SE	Wald	df	p-value	Exp (β) (OR)	95% CI	
							LL	UL
Marital status	0.471*	0.190	6.147	1	.013	1.602	1.104	2.326
Self-identified social class	1.010***	0.259	15.217	1	<.001	2.745	1.653	4.560
Annual household income	0.556**	0.206	7.290	1	.007	1.744	1.165	2.611
Affirming one's own merits	0.436*	0.184	5.606	1	.018	1.546	1.078	2.218
Perception that people are trustworthy	0.646***	0.180	12.944	1	<.001	1.908	1.342	2.714
Having a trustworthy neighbor	0.413*	0.181	5.195	1	.023	1.511	1.060	2.155
Feeling lonely	-1.093***	0.220	24.803	1	<.001	0.355	0.218	0.515
Self-rated health	1.244***	0.226	30.182	1	<.001	3.470	2.226	5.408
Constant	-1.137	0.270	17.744	1	<.001	0.321		

Note: Dependent variable = Subjective happiness; OR = odds ratio; CI = confidence interval; LL=lower limit; UL=upper limit. *p<.05. **p<.01. ***p<.001.

Finally, Table 6 lists the comprehensive details of the present model, including each variable name, variable's raw score partial regression coefficient (β), standard error (SE), Wald, degree of freedom (df), significant value (p-value), odds ratio (OR), and confidence interval (CI). Notably, every independent variable demonstrates a significant

result, which partially attests to this model's superiority to other implemented models.

4. Discussions

4.1 Outcome Summary

This study has examined associations between socioeconomic and psychosocial variables as explanatory variables and subjective happiness as the dependent variable in two stages: first, in bivariate analyses; and second, in multivariate analyses, i.e., binary logistic regression. The results indicate that the most notable model in binary logistic regression includes the following socioeconomic variables as explanatory variables: (1) marital status, (2) self-identified social class, and (3) annual household income; in addition, the psychosocial variables contained in the model are: (4) affirming one's own merits, (5) perception of people as trustworthy, (6) having a trustworthy neighbor, (7) feeling lonely, and (8) self-rated health. Since feeling lonely or loneliness demonstrated a strong predictive association with subjective happiness, as well as being the only variable with a negative β value, the focus is placed on loneliness in this section.

4.2 Loneliness

In Table 5, the predictive association between feeling lonely and subjective happiness is evident, as the odds ratio is 0.355 (95% *CI* [0.218, 0.515]). Probabilistically, this could mean that a respondent who felt lonely is 0.355 times more likely to be in the higher happiness group than another who did not feel lonely. Put simply, it could be generalized that there is a lower likelihood for lonely people to be in the higher subjective happiness group than the people who are not lonely. Unambiguously, loneliness can impede the subjective feeling and assessment of happiness.

One may ask a simple question: What is loneliness? It is multidimensional and complex (Yanguas et al., 2018). It cannot be equated with being alone or physically isolated, even though either or both can coexist and/or overlap with loneliness. Albeit there are many definitions of loneliness, the one proposed by Peplau and Perlman (1979) remains pertinent even today: They stated, "loneliness exists to the extent that a person's network of social relationships is smaller or less satisfying than the person desires" (Peplau & Perlman, 1979, p.101). Using their definition as a starting point to extend further, the researchers of the present study suggest a succinctly conceptualized version of loneliness as the difference between achieved contact and desired contact, both in terms of quality and quantity. When both the desired and achieved contact are minimal in quality and quantity, a person may not feel lonely. In such cases, a person may prefer solitude.

Solitude is a positive state that is distinct from loneliness, which is usually negative. If, on the other hand, the achieved contact in quality and quantity falls short of the desired levels, loneliness—a negative state—may occur. However, in the Japanese language, both loneliness and solitude are translated as *kodoku* (孤独). Semantically, *kodoku* is more akin to loneliness than to solitude and carries a negative connotation.

Considering loneliness or *kodoku* as an undesirable and negative state, the degree of loneliness (DOL) can be formulated mathematically: the greater the absolute value of the negative difference between achieved contact (AC) and desired contact (DC) (where DC is greater than AC), the higher the DOL a person undergoes. This arithmetical relationship can be streamlined and generalized with the following formula:

$$DOL = | AC - DC | \text{ where } AC < DC, \text{ or alternatively: } DOL = DC - AC \text{ where } AC < DC$$

Developing the ideas by Peplau and Perlman (1979) further, the provisional formulae above have been designed to measure the approximate degree of loneliness for future studies. The two formulae express the same relationship using different notations.

As the achieved contact diminished for many people whilst the desired contact conceivably remained consistent or even increased during the COVID-19 pandemic, is it possible that people's feelings of loneliness increased during the pandemic? In many countries, it seems to be the case. The results of a meta-analysis by Ernst et al. (2022) suggest that people's feelings of loneliness did indeed increase during the COVID-19 pandemic. The researchers systematically reviewed 34 primary articles originally conducted in Spain, Germany, Canada, U.K., Switzerland, Austria, Chile, Sweden, USA, Iceland, the Netherlands, and Hong Kong and concluded that a small increase in loneliness during the pandemic occurred (Ernst et al., 2022).

How was the situation in Japan which is the focus of the present study? Since people in Japan too had to not only practice social distancing but also regulate social contact with others, as in many other countries, it seems likely that the achieved contact could not match the desired contact, leading to increased loneliness in Japan as well. In 2022, the Cabinet Office of Japan administered a survey utilizing the UCLA loneliness scale to 20,000 randomly selected residents of Japan and published a report (The Cabinet Office of Japan, 2022; see also Russell, 1996, for the UCLA loneliness scale; see Arimoto & Tadaka, 2019, for the scale's usefulness in a Japanese context). According to the report, 11,218 or 69.2% of the respondents underwent a decrease in face-to-face contact with people in 2022 due to the pandemic (The Cabinet Office of Japan, 2022), which indicates a reduction in achieved contact. Furthermore, according to the same source, while 43.4%

of the respondents had reported that they felt lonely at least sometimes in 2021, the percentage rose to 48.6% in 2022 (The Cabinet Office of Japan, 2022). An increase of more than 5% is neither trivial nor ignorable.

Moreover, Yanagisawa et al. (2022) conducted a two-wave survey examining the regional differences and distribution of loneliness in Japan: the first wave in 2021, and the second wave in 2022, both times during the pandemic. They found not only that the level of loneliness had increased in 2022 ($t = 4.80, p < .001$) but also that this increase was more conspicuous in the eastern part of Japan (Yanagisawa et al., 2022). In other words, they found increases in both prevalence and degree of loneliness in 2022. Furthermore, according to the National Institute of Infectious Diseases (2022), in 2022, the incidence of COVID-19 infection also increased especially among people in their 60s.

5. Implications

The final question addressed in this study is this: “How can one improve one’s subjective happiness?” The results of this study suggest several pointers. Other than reducing loneliness, the findings implicate that a comfortable economic standing, a self-affirming mindset, fulfilling relationships, and sound health conditions may positively contribute to subjective happiness. Furthermore, it can be conjectured that improving these aspects could indirectly (or possibly directly) lower the degree of loneliness as well, which may further enhance subjective happiness. It is evident that subjective happiness is intricate and encompasses psychological, social, and economic well-being and health.

6. Conclusion

The results of this study indicate that marital status, self-identified social class, annual household income, affirming one’s own merits, perception of people as trustworthy, having a trustworthy neighbor, feeling lonely, and self-rated health are significant predictors of subjective happiness. Conceptual formulae ($DOL = | AC - DC |$ where $AC < DC$, or $DOL = DC - AC$ where $AC < DC$) to facilitate the quantification of loneliness as well as discernment of loneliness and solitude were suggested. During the COVID-19 pandemic, an increase in the prevalence and incidence of loneliness was observed in many countries including Japan. The effectiveness of establishing and maintaining robust social relations and social capital is buttressed to a degree by such variables as perception of people as trustworthy, having a trustworthy neighbor, marital status, and annual household income as significant predictors in the present study.

Moreover, psychological factors, including affirming one's own merits and self-rated health alongside loneliness, illuminate the importance of mental well-being in subjective happiness. The results of this study highlight that these socioeconomic and psychosocial variables are significant predictors of subjective happiness.

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