

Does Participation in Community Activities Increase One's Subjective Well-Being? Quantitative Analysis Considering Causality and External Effect in Japan

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地域活動への参加は住民の主観的幸福度を向上させるか?

——我が国における因果性と外部性を考慮した定量分析——

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Abstract

In recent years, interest in community activities has been growing. Although the relationship between community activity participation and subjective well-being has been pointed out, does community participation really increase one's subjective well-being? To tackle this question, this study examines the causal relationship between them, using data from a nationwide online questionnaire survey. To verify the causal relationship, the instrumental variable method is used, exploiting the frequency of one's parents' and/or grandparents' participation in community activities in his/her childhood. The results obtained from several regressions show that participation does increase subjective well-being, and it would also increase the well-being of non-participants through improvements to the local living environment and the propagation of the sense of well-being. These results support the significance of policy initiatives to community activities and indicate that such policies could be evaluated in terms of well-being.

Keywords: community activity, subjective well-being, social capital, endogeneity, instrumental variable method

要旨

近年、地域活動に対する関心が高まってきている。地域活動への参加と個人の主観的幸福度との間には深いつながりがあることがこれまでも指摘されてきたが、地域活動への参加は本当に主観的幸福度の向上につながるのだろうか？本稿では、全国的なインターネット調査から、地域活動への参加と主観的幸福度との関係を検証した。分析にあたっては、逆の因果関係などによって生じる内生性の問題に対処するため、回答者の子供の頃の両親・祖父母の地域活動への参加を操作変数として用いた推定を行った。結果、地域活動への参加することが個人の主観的幸福度を高めていること、また、地域の生活環境の改善や幸福感の伝播といった経路を通じて活動に参加していない人の幸福感を高める可能性があることが分かった。以上の結果は地域活動への政策的取組みの意義をサポートするものであり、地域活動の価値を幸福度という側面からも評価できる可能性があることを示している。

キーワード: 地域活動、主観的幸福度、社会関係資本、内生性、操作変数法

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1. Introduction

The growing global interest in well-being has led to a need to clarify what factors and policies increase it. At the initiative of former French President Nicolas Sarkozy, the Commission on the Measurement of Economic Performance and Social Progress, led by Joseph Stiglitz, Amartya Sen, and Jean-Paul Fitoussi, challenged to evaluate social well-being other than Gross Domestic Product (GDP). In response, the Organisation for Economic Co-operation and Development (OECD) has been working on a country-by-country index of well-being and has published a report titled *How's Life?* The United Nations Network for Sustainable Development Solutions has also been releasing the *World Happiness Report* since 2012. These trials show that countries or societies experience several challenges to evaluate well-being. If well-being is to be used as goals and policy outcomes, it is important to clarify the causal relationships between various factors and well-being and to consider what policies could enhance societal well-being.

In Japan, voluntary community activities have been attracting increasing interest in recent years. These activities range between town development, childcare support, preservation of cultural buildings, street cleaning, and so on, and are expected to contribute to maintaining and revitalizing local communities, alongside supplementing public services that local governments are unable to provide because of fiscal constraints. If such activities lead to supplementing public services, revitalizing local communities, and increasing people's well-being, policymakers would pay more attention to policies supporting such activities. Although evaluating the outcomes of these activities is not easy, once the relationship with well-being is shown, it would also be possible to evaluate such policies from the perspective of improving well-being².

On the basis of this motivation, this study examines quantitatively whether voluntary community activities by residents affect people's subjective well-being, taking into

account causality. This study also examines the external effect of community activities. The result obtained is that communal participation increases subjective well-being. Furthermore, community activities have beneficial outcomes for the well-being of non-participants through channels such as improving the community's living environment and propagating the sense of happiness.

As for participation in activities, the relationship with well-being has been pointed out (Helliwell and Putnam, 2004; OECD, 2015; Cabinet Office of Japan, 2019). However, if people with a high level of well-being and a relaxed state of mind are more likely to participate, then participation in such activities is a mere result of their current well-being. That is, volunteer and community activities are more popular in societies with many happy people. As Thoits and Hewitt (2001) pointed out, volunteer activities can increase the well-being of participants, but there is also a reverse causality between people with high levels of well-being and volunteer activities. Thus, to better understand the impact of voluntary community activities on well-being, the causal relationship must be taken into consideration.

Although many researchers have tried clarifying the causal relationship between volunteer activities and well-being, it is still unclear. Richards et al. (2013) reviewed 7 randomized controlled trial (RCT) studies, 4 non-RCT studies, and 29 cohort data studies. They concluded that the causal relationship between volunteering and well-being was unclear because the relationship was visible in the cohort data studies but was unconfirmed in the experimental studies.

Whillans et al. (2016) is one of the existing studies that pointed out the lack of causal relationship. They surveyed a Catholic university in the United States enrolled in the community service learning (CSL) educational program to examine the impact of volunteering on well-being. In the CSL educational program, participation in volunteer activities is included, and those who registered are placed on a participation waitlist. However, not everyone who registered can participate. They utilized this as a

² Adler and Seligman (2016) pointed out the importance of using well-being as a measure to assess and design policy and the research is underway to consider life satisfaction in social cost effectiveness analysis (see Fujiwara and Campbell, 2011).

natural experiment and compared the group of students who engaged in volunteer activities ($n=232$) versus those who did not ($n=56$), finding no causal relationship between volunteer activities and well-being³.

In contrast, several studies show a causal relationship between volunteering and happiness (Meier and Stutzer, 2008; Thoits and Hewitt, 2001; Borgonovi, 2008; Chen et al., 2014; Binder and Freytag, 2013)⁴. Recently, Lawton et al. (2020) examined the causal relationship using large panel data based on two surveys of United Kingdom households (British Household Panel Survey and Understanding Society). They examined the impact of volunteering on well-being by using the fixed effects and first difference models. The data used are extremely large, with a sample size of over 200,000, and show that participation in volunteer activities has a positive effect on happiness and happiness increases as the frequency of participation increases⁵.

Mixed results have been obtained depending on the method of analysis and country. This indicates that further verification is needed to clarify the relationship between volunteer activities and subjective well-being. In Japan, several studies examined the relationship between life satisfaction and community and volunteer activities (Moriyama, 2012; Matsushima and Matsunaga, 2015; Kanai, 2016). As far as the author knows, however, there are no studies in which causality is explicitly considered⁶. This study contributes by examining the causal effect of participation in voluntary community activities on subjective well-being by exploiting the frequency of participation in community activities by parents and/or grandparents as an instrumental variable, and adding the evidence indicating the external effect of community activities on non-participants.

In the following, Section 2 explains the data and method used; Section 3 presents the results of estimations; Section 4 investigates the external effect of community activities; and Section 5 concludes.

2. Data and method

2.1. Data

To find more accurate evidence in which the causal relationship is considered requires conducting an RCT, in which subjects are randomly divided into two or more groups, and comparing the treatment group with intervention and the control group without intervention. For social behaviors such as community and volunteer activities, however, attempting such experiments with a large sample is not easy. Additionally, the effects of such activities may only appear after a certain period has elapsed since the activities' initiations. In such cases, long-term experiments are necessary.

Analysis using panel data is a way to deal with causality. Empirical analysis using panel data can address endogeneity caused by factors that are difficult to treat explicitly as variables in estimation, such as individual propensity and temperament. Constructing panel data, however, requires continuous survey of individual participation in activities and well-being. Unfortunately, there are no official statistics in Japan that explicitly investigate the level of well-being, and it is difficult to obtain nationwide panel data on subjective well-being and community or volunteer activities. Furthermore, to the best of the author's knowledge, there are no comparable data that are obtained before and after an event such as a natural disaster that

³ The index of well-being used is a composite index of positive affect, negative affect, and life satisfaction, created from questionnaires conducted at the time of program enrollment and six months later.

⁴ Meier and Stutzer (2008) utilized the integration of East and West Germany as a natural experiment. In Thoits and Hewitt (2001), Borgonovi (2008), and Chen et al. (2014), the instrumental variable method is used to address endogeneity in their estimations. In Binder and Freytag (2013), to reduce selection bias, propensity score matching (PSM) is used.

⁵ The index of well-being used is developed from the question about life satisfaction, and is a seven-level variable.

⁶ For example, Moriyama (2012) examined the relationship between elderly people's participation in social contribution activities defined as activities that contribute to the public within the community, held by NPOs, volunteer groups, neighborhood associations and community associations and life satisfaction. The results show that elderly people who participate in social contribution activities have a higher level of life satisfaction than those who do not. Matsushima and Matsunaga (2015) examined the relationship between social capital and happiness by using participation in volunteer activities as one of the indicators of social capital, and pointed out that there is a significant positive relationship between them. However, causal relationship is not examined in these studies.

can be used as a natural experiment and contain both subjective well-being and activity participation in Japan.

The data used in this study are obtained from an online questionnaire survey (hereinafter referred to as questionnaire survey) conducted in Japan under the research and development project named “An Investigation regarding the Mechanism of Intergenerational Inheritance of Social Capital” supported by the Japan Science and Technology Agency. The survey was conducted in two parts to gather more respondents. The first and second surveys were conducted in March 2017 and July 2017, respectively, for the same respondents of the first survey. The number of respondents to the first and second surveys was 11,371 and 7,498, respectively. The regional distribution of the respondents from the first survey was 36.7% in large cities (23 wards of Tokyo and ordinance-designated cities), 23.0% in medium cities (with a population of $\geq 100,000$), 31.9% in cities (with a population of $\geq 50,000$ and $< 100,000$), and 8.4% in other municipalities (with a population of $< 50,000$).

The questionnaire survey includes several questions about the respondents’ attributes such as gender, age, and education, including their level of participation in community activities. In the questionnaire survey, community activities are defined as efforts to protect and enhance community resources shared or used by members of the community such as public facilities (cf. community cultural centers and parks), environment of living in the community, public safety, liveliness, scenery, local festivals, and traditional events. Community cleaning by neighborhood associations, community revitalization by shopping district associations, local crime prevention activities, and child-rearing support activities by volunteer groups are used as examples of community activities⁷. Respondents are asked to choose their frequency of participation from the following levels: “almost every week,” “about two or three days a month,” “about one day a month,” “several times a year,” and “do not participate.”

Current happiness and life satisfaction are used in this study as the index of subjective well-being. In the questionnaire survey, respondents were asked “How happy are you as a whole? If ‘very

happy’ is 10 and ‘very unhappy’ is 0, what do you think your score would be?” Their answer is used as an indicator of current happiness. As for life satisfaction, the answer to the question “How satisfied are you with your life as a whole? If ‘not at all satisfied’ is 0 and ‘very satisfied’ is 10, what do you think your score would be?” is used as an indicator.

Thus, the questionnaire survey includes necessary questions for analyzing the relationship between community activities and subjective well-being.

2.2. Preliminary analysis

Figure 1 compares the relationship between current happiness and the frequency of participation in community activities, whereas Figure 2 compares life satisfaction with frequency of participation in community activities. In these figures, the sample is divided into five groups by participation frequency, and the mean values of current happiness and life satisfaction are compared.

For current happiness, the average of the group that does not participate in community activities is approximately 5.5, whereas the average of those participating several times a year is approximately 6.4, showing a significant difference. Contrastingly, the averages of participates only a few times a year and those participating 1 day a month or 2 or 3 days a month are almost identical and do not show significant differences. However, the average of those participating almost every week is approximately 7.0, which shows a significant difference compared with the groups that participate less frequently.

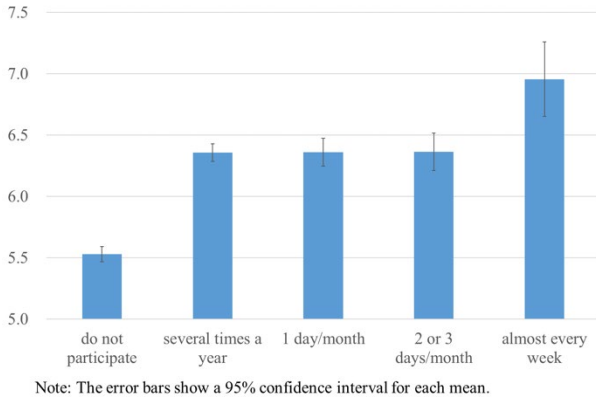
A similar trend is observed for life satisfaction. The more often participants participate, the higher their life satisfaction tends to be, and there is a significant difference between the group participating several times a year and the group participating 2 or 3 days a month.

Thus, the level of subjective well-being of communal participants is generally higher than that of non-participants, and those who participate weekly tend to have higher levels of

⁷ Some community activities are not necessarily voluntary and involve compulsory participation due to personal relationships. Therefore, there is a possibility that some of the respondents who answer they participate in community activities do so involuntarily.

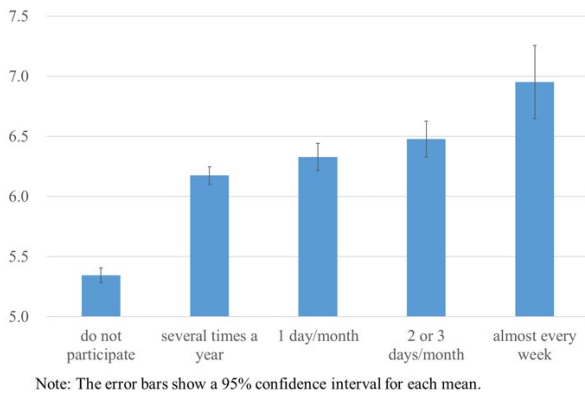
subjective well-being. These results, however, may reflect that people with high subjective well-being may be more actively involved in community activities and causality needs to be considered.

Figure 1 Frequency of participation and current happiness



Source : Author

Figure 2 Frequency of participation and life satisfaction



Source : Author

2.3. Method for analysis

This study examines the impact of community activities on subjective well-being by estimating the following equation.

$$SWB = \alpha_0 + \alpha_1 \cdot community_act + \beta_1 \cdot x_1 + \beta_2 \cdot x_2 + \dots + \beta_n \cdot x_n + \varepsilon \quad \dots(1)$$

SWB means subjective well-being, *community_act* is a dummy variable that takes 1 if the person participates in community activities and 0 otherwise, $x_1 \dots x_n$ are variables such as personal attributes, and ε is an error term.

There are two reasons why participation in community activities is treated as a binary variable. Firstly, it is unclear whether the impact of a change from “I do not participate” to “several times a year” is the same as that of a change from “once a month” to “two or three days a month”⁸. Secondly, if treated as a binary variable, the coefficient obtained from the estimation can be interpreted as how much the level of subjective well-being improves on average when people who do not participate start participating in community activities and can be easily compared with the effects of other variables.

According to Dolan et al. (2008), factors that influence subjective well-being include personal attributes (income, age, gender, ethnicity, personality, etc.), social characteristics and circumstances (education, occupation, etc.), daily work and activities (working hours, caring for others, community activities, etc.), individual factors (marriage, having children, social ties, etc.), and socioeconomic environment (income inequality, unemployment rate, climate, natural environment, etc.).

On the basis of their discussion, various variables are considered in this study. The personal attributes used as independent variables are gender (dummy variable with a value of 1 for female), age (dummy variable for each age group from 20s to ≥80s), education (dummy variables for less than high school graduate and college graduate and above), employment status, personal relationships (presence of children, presence of

⁸ In order to confirm this point, on the basis of a suggestion from an anonymous reviewer, I estimated the same equation as in columns (1) and (3) of Table 2, using dummy variables for each frequency of participation. When current happiness is used as the dependent variable, the coefficient of “several times a year” is 0.245, “one day a month” is 0.204, “two or three days a month” is 0.224, and “almost every week” is 0.524, and all are significant. Similarly, when life satisfaction is used as the dependent variable, the coefficient of “several times a year” is 0.263, “once a month” is 0.382, “two or three days a month” is 0.520, and “almost every week” is 0.774, and all are significant. These results are consistent with Figures 1 and 2, and the effect of increasing frequency of participation may not be proportional, especially for current happiness. The result of this additional estimation is available upon request.

spouse, and whether there is someone to rely on), self-rated health status, household income, and household financial assets⁹. To take into account regional factors, regional dummy variables (prefecture dummies) and population size dummies for the municipality (23 wards of Tokyo and ordinance-designated cities, cities with a population of ≥100,000, cities with a population between 50,000 and 100,000, and cities with a population of <50,000) are included as independent variables.

In the estimation of equation (1), the ordinary least squares (OLS) method and the instrumental variable method (two-stage least squares method) are used to compare their results. When using the instrumental variable method, it is necessary to find a variable that is correlated with the variable considered to be endogenous and not correlated with the error term.

In this study, parents' and/or grandparents' frequency of participation in community activities when the respondent was a child (parents_exp) is used as an instrumental variable. The following equation is estimated in the first stage.

$$community_act = \gamma_0 + \gamma_1 \cdot parents_exp + \delta_1 \cdot x_1 + \delta_2 \cdot x_2 + \dots + \delta_n \cdot x_n + \mu \quad \dots(2)$$

How parents and/or grandparents were involved in community activities would affect what their children and grandchildren experienced and learned. In families where both parents and grandparents actively participate in community activities, there are more opportunities to be exposed to community activities, and this is thought to increase the awareness of being involved in their community and enhance their motivation to join communal activities. However, how their parents and/or grandparents were involved in community activities in their childhoods does not have a direct relationship with their current subjective well-being. This idea causes me to exploit this variable as an instrumental variable.

Table 1 Descriptive statistics

	Number of obs.	Mean	Std. Dev.	Min	Max
Current happiness	11,371	5.940	2.312	0	10
Life satisfaction	11,371	5.794	2.352	0	10
Community act	11,371	0.477	0.499	0	1
Parents_exp	10,112	3.461	1.110	1	5
Gender(female = 1)	11,371	0.392	0.488	0	1
Age					
20s	11,371	0.044	0.205	0	1
30s	11,371	0.215	0.411	0	1
40s – reference –	11,371	0.190	0.393	0	1
50s	11,371	0.190	0.392	0	1
60s	11,371	0.251	0.434	0	1
70s	11,371	0.096	0.295	0	1
≥ 80s	11,371	0.013	0.113	0	1
Spouse					
Unmarried – reference –	11,371	0.249	0.432	0	1
Married	11,371	0.681	0.466	0	1
Separated	11,371	0.049	0.217	0	1
Widowed	11,371	0.020	0.142	0	1
Children	11,371	0.610	0.488	0	1
Dependable person	7,267	0.350	0.477	0	1
Self-rated health status	11,371	3.606	1.107	1	5
Education					
Less than high school graduate	11,371	0.022	0.147	0	1
High school graduate and other – reference –	11,371	0.461	0.498	0	1
College graduate and above	11,371	0.517	0.500	0	1
Employment status					
Student, housewife, househusband, retired	11,371	0.345	0.476	0	1
Employee – reference –	11,371	0.524	0.499	0	1
Self-employed	11,371	0.071	0.258	0	1
Independent professional	11,371	0.027	0.161	0	1
Worker at Family business	11,371	0.008	0.089	0	1
Other worker (without an employee relationship)	11,371	0.025	0.155	0	1
Household income					
< 2	11,371	0.139	0.346	0	1
2 – 4	11,371	0.256	0.437	0	1
4 – 6 – reference –	11,371	0.244	0.429	0	1
6 – 8	11,371	0.159	0.366	0	1
8 – 10	11,371	0.101	0.302	0	1
10 – 15	11,371	0.075	0.264	0	1
≥ 15	11,371	0.026	0.158	0	1
Household financial assets					
< 2	11,371	0.280	0.449	0	1
2 – 4	11,371	0.152	0.359	0	1
4 – 6 – reference –	11,371	0.121	0.326	0	1
6 – 8	11,371	0.075	0.263	0	1
8 – 10	11,371	0.078	0.268	0	1
10 – 15	11,371	0.079	0.270	0	1
≥ 15	11,371	0.215	0.411	0	1

Source : Author

⁹ The index of self-rated health status is a five-level variable based on the answers to the question “How do you feel about your health at present?” The response to the question has five levels; “healthy,” “somewhat healthy,” “undecided,” “somewhat unhealthy,” and “not healthy.” To determine if there are people who can be relied upon, the responses to the question “How much do you think you can rely on your neighbors, family members, relatives, friends and acquaintances (outside of the workplace), and coworkers to help you with problems and concerns in your daily life?” are used. On the basis of the answers, a dummy variable takes 1 if respondents answer “much dependable” for any one of them and takes 0 if not.

The questionnaire survey includes questions about the respondents' childhood, asking to what extent their parents and grandparents participated in community activities¹⁰. Respondents were asked to select one of six options: "actively participated," "participated to some extent," "cannot say either way," "did not participate much," "did not participate at all," or "don't know."

In the estimation, "actively participated" is defined as 5, "participated to some extent" as 4, "cannot say either way" as 3, "did not participate much" as 2, and "did not participate at all" as 1¹¹.

The descriptive statistics of the variables used in our estimation are in Table 1.

3. Estimation results and robustness

3.1. Estimation result

The results of estimation by the OLS method are in columns (1) and (3) of Table 2, the results of estimation by the two-stage least squares method are in columns (2) and (4).

The coefficient of the female dummy is significantly positive. The difference in subjective well-being by gender has been pointed out in existing studies (Blanchflower and Oswald, 2004; Alesina et al., 2004), and our results are consistent with existing findings. As for age, the 60s, 70s, and ≥ 80 s dummies are significantly positive for both current happiness and life satisfaction. For current happiness, although the dummy for 20s is not significant, the dummy for 30s is significantly positive for estimation using the instrumental variable method. For life satisfaction, the dummies for 20s and 30s are significantly positive as shown in columns (3) and (4) of Table 2. A U-shaped relationship between age and subjective well-being is pointed out by existing studies (Blanchflower and Oswald, 2008; Blanchflower, 2009), and this study obtains the same result.

Concerning the respondents' relationships with their families and others, the subjective well-being of married people is higher than that of unmarried people, and this tendency is the same even if the respondents have been separated or widowed. In contrast, whether respondents have children is not significant when either

current happiness or life satisfaction is used as a dependent variable. Whether respondents have a dependable person is significantly positive at the 1% level in all cases, indicating that the level of subjective well-being is higher when there is a dependable person among family, friends or neighbors.

The self-rated health status is a 5-point rating of one's current state of health, which is also significantly positive. It is consistent with existing studies that people who feel they are in good health have higher levels of well-being.

The level of subjective well-being of those who have not graduated from high school is significantly lower compared with that of those who have graduated for current happiness. However, the coefficient is not significant for life satisfaction. The coefficient of higher education is not significant in both cases, indicating that the level of subjective well-being of college graduates is not different from high school graduates. Regarding employment status, students, housewives, and others have a higher level of well-being compared with regular workers. The level of subjective well-being is lower when annual income is low and increases with higher annual income. Although the relationship between financial assets and happiness is not as clear as that for annual income, subjective well-being decreases when financial assets are < 2 million yen and increases when financial assets are ≥ 15 million yen.

For the aforementioned variables, the results are generally similar whether current happiness or life satisfaction is used in the estimations as a dependent variable, and the conclusion does not change depending on the estimation method.

The coefficients of participation in community activities are significantly positive in all cases. As shown in Table 2, however, the coefficients are larger in columns (2) and (4) than in columns (1) and (3). For current happiness, the estimated coefficient using the OLS method is 0.245, whereas that of the instrumental variable method is 0.870, indicating a large change. This suggests that the effect of participation in community activities on subjective well-being might be underestimated in the OLS method. This impact is also larger than the effect of higher income, which is the effect of changing the income bracket from 4–6 million yen to ≥ 15 million yen (0.452).

¹⁰ The definition of community activities is the same as that of the respondents.

¹¹ The answer "don't know" is treated as a missing value.

Table 2 Estimation results

Dependent variable Method of estimation	Current happiness		Life satisfaction	
	OLS (1)	2SLS (2)	OLS (3)	2SLS (4)
Community act	0.245 (0.049) ***	0.870 (0.240) ***	0.341 (0.050) ***	0.778 (0.245) ***
Gender (female = 1)	0.288 (0.055) ***	0.309 (0.058) ***	0.346 (0.057) ***	0.344 (0.060) ***
Age (reference = 40s)				
20s	0.155 (0.141)	0.216 (0.146)	0.363 (0.149) **	0.486 (0.155) ***
30s	0.112 (0.074)	0.132 (0.078) *	0.149 (0.077) *	0.172 (0.081) **
50s	0.108 (0.075)	0.082 (0.079)	0.105 (0.077)	0.084 (0.081)
60s	0.776 (0.075) ***	0.713 (0.080) ***	0.783 (0.076) ***	0.743 (0.082) ***
70s	1.115 (0.098) ***	0.944 (0.114) ***	1.160 (0.098) ***	1.018 (0.115) ***
≥ 80s	1.074 (0.215) ***	0.979 (0.233) ***	1.089 (0.215) ***	0.924 (0.232) ***
Spouse (reference = unmarried)				
Married	0.879 (0.083) ***	0.771 (0.091) ***	0.870 (0.083) ***	0.783 (0.092) ***
Separated	0.311 (0.134) **	0.276 (0.141) *	0.318 (0.135) **	0.262 (0.141) *
Widowed	0.421 (0.202) **	0.451 (0.216) **	0.484 (0.194) **	0.527 (0.207) **
Children	0.002 (0.070)	-0.055 (0.078)	-0.050 (0.069)	-0.077 (0.076)
Dependable person	0.808 (0.049) ***	0.761 (0.054) ***	0.679 (0.051) ***	0.636 (0.055) ***
Self-rated health status	0.645 (0.024) ***	0.626 (0.027) ***	0.624 (0.025) ***	0.612 (0.027) ***
Education (reference = high school graduate and other)				
Less than high school graduate	-0.484 (0.185) ***	-0.476 (0.197) **	-0.271 (0.177)	-0.233 (0.189)
College graduate and above	-0.048 (0.049)	-0.059 (0.052)	0.062 (0.050)	0.062 (0.053)
Employment status (reference = employee)				
Student, housewife, househusband, retired	0.121 (0.060) **	0.169 (0.064) ***	0.088 (0.062)	0.154 (0.065) **
Self-employed	0.069 (0.092)	-0.030 (0.096)	-0.098 (0.099)	-0.159 (0.103)
Independent professional	0.273 (0.151) *	0.323 (0.160) **	0.126 (0.162)	0.150 (0.171)
Worker at family business	-0.291 (0.310)	-0.431 (0.333)	-0.383 (0.294)	-0.523 (0.314) *
Other worker (without an employee relationship)	0.357 (0.168) **	0.480 (0.166) ***	0.065 (0.178)	0.251 (0.179)
Household income (reference = 4 – 6)				
2 <	-0.353 (0.088) ***	-0.379 (0.094) ***	-0.242 (0.089) ***	-0.301 (0.095) ***
2 – 4	-0.170 (0.066) **	-0.221 (0.070) ***	-0.156 (0.068) **	-0.228 (0.072) ***
6 – 8	0.065 (0.071)	0.084 (0.074)	0.098 (0.074)	0.109 (0.077)
8 – 10	0.207 (0.087) **	0.194 (0.090) **	0.248 (0.088) ***	0.219 (0.090) **
10 – 15	0.290 (0.090) ***	0.332 (0.096) ***	0.349 (0.094) ***	0.371 (0.099) ***
≥ 15	0.401 (0.155) ***	0.452 (0.160) ***	0.639 (0.150) ***	0.673 (0.155) ***
Household financial assets (reference = 4 – 6)				
2 <	-0.206 (0.082) **	-0.171 (0.089) *	-0.378 (0.084) ***	-0.353 (0.091) ***
2 – 4	-0.051 (0.087)	-0.066 (0.092)	-0.092 (0.089)	-0.111 (0.093)
6 – 8	0.108 (0.101)	0.067 (0.107)	0.153 (0.102)	0.120 (0.106)
8 – 10	0.047 (0.102)	0.017 (0.106)	0.044 (0.102)	0.029 (0.106)
10 – 15	0.159 (0.098)	0.121 (0.102)	0.052 (0.105)	0.038 (0.108)
≥ 15	0.330 (0.083) ***	0.279 (0.087) ***	0.296 (0.085) ***	0.248 (0.088) ***
Constant	2.039 (0.150) ***	2.043 (0.162) ***	1.941 (0.156) ***	1.970 (0.167) ***
Adjusted R ²	0.314	—	0.296	—
First-stage partial R ²	—	0.054	—	0.054
First-stage F statistic	—	394.587	—	394.587
Endogeneity test	—	7.376 (0.007)	—	3.042 (0.081)
Number of obs.	7,267	6,496	7,267	6,496

Notes: Robust standard errors are shown in parentheses.

***, **, and * indicate significance at 1%, 5% and 10% levels, respectively.

The endogeneity test reports the robust score test by Wooldridge (1995). P-values are shown in parentheses.

The results of prefecture dummies and population size dummies are omitted.

Source : Author

The F-value in the first stage estimation is quite large, and the null hypothesis that participation in community activities is an exogenous variable is rejected at the 1% level of significance in column (2) and the 10% in column (4), respectively. These results indicate that the instrumental variable used in these estimations seems appropriate.

Thus, participation in community activities increases a person's subjective well-being, and the magnitude of this effect is not small compared with that of an increase in household income. This indicates that communal participation plays an important role in improving individuals' well-being.

3.2. Additional verification for robustness

To confirm the robustness of the aforementioned results requires verifying the influence of missing variables and reverse causality of household income.

As stated by Dolan et al. (2008), various variables may impact well-being and individual personality is included. Although it is not easy to consider an individual's personality properly as an independent variable, if this factor is correlated with other independent variables and is not considered in estimation, it may cause endogeneity. Therefore, adding such factors in the estimation helps to deal with this problem.

Tsutsui et al. (2009) stated that since economic behaviors such as consumption and saving are determined by preference parameters, time preference and risk attitude may affect happiness through these activities. They also pointed out that the way people feel happiness and individual's absolute level of happiness might be affected by them. Their empirical analysis using survey data in Japan shows that people with higher time discount rates and those who are more risk-averse tend to be unhappy.

The questionnaire survey includes the following questions regarding the respondents' risk attitude and time preference. Regarding risk attitudes, the question is "Suppose you can choose between 'receiving 60,000 yen for sure' or 'drawing a lottery that will give you 120,000 yen if you win, but not if you miss.' The lottery contains three winners out of ten. In this case, would you

draw the lottery or not draw the lottery and receive 60,000 yen?" From the answers, the dummy variable taking 1 if the respondent chooses to draw a lottery and taking 0 otherwise, is created. As for time preference, the respondents are asked "Which would you choose, to receive 60,000 yen today or to wait until a week later to receive 60,050 yen?" By using the answers, another dummy variable taking 1 if the respondent wants to receive 60,000 yen today and taking 0 otherwise, is created. These two dummy variables are added to the estimation.

Alongside these personality-related variables, two other factors are also considered: social capital and respondents' residential environment. Helliwell (2003) and Helliwell and Putnam (2004) have shown that generalized trust in others has a positive effect on life satisfaction and happiness. It is a typical indicator of social capital. In contrast, participation in community activities is also used as a variable for social capital (see Putnam, 2000; Scrivens and Smith, 2013). Therefore, the aforementioned results may be obtained as a proxy variable for social capital. In the questionnaire survey, the question "Generally speaking, do you think that most people can be trusted, or that you can't be too careful in dealing with people?" from the World Values Survey is included. The answer is used as an indicator of generalized trust in the following estimation.

Questions relating to respondents' living environment are also included in the questionnaire survey, and respondents are asked to select one of five options: "very dissatisfied," "somewhat dissatisfied," "neither dissatisfied nor satisfied," "somewhat not dissatisfied," or "not dissatisfied at all." Because dissatisfaction with local living environment is thought to have a particular impact on life satisfaction, the responses to the following items are considered: "lack of liveliness and bustle," "low standard of public safety," and "too much garbage and illegal dumping on the streets."

Table 3 presents the estimation results. As for the added variables, risk attitude is not significant except in column (3), and time preference is not significant in all columns. Thus, economic propensity of respondents does not seem to be related to one's

well-being¹². In contrast, generalized trust is significant at the 1% level, and the sign of the coefficient is positive. For the variables related to living environment, the results for the lack of liveliness and bustle and the garbage and illegal dumping on the streets are significant at the 1% level. The value of these variables is larger as the level of dissatisfaction is low, indicating that there is a robust positive relationship between satisfaction with living

environment and subjective well-being. Concerning public safety, although the coefficient is not significant when life satisfaction is used as a dependent variable, the result is significant at the 5% level in the OLS estimation and at the 10% level in the estimation using the instrumental variable method when current happiness is used.

Table 3 Estimation results (verification of robustness)

Dependent variable Method of estimation	Current happiness		Life satisfaction	
	OLS (1)	2SLS (2)	OLS (3)	2SLS (4)
Community act	0.238 (0.048) ***	0.820 (0.247) ***	0.323 (0.050) ***	0.691 (0.252) ***
Risk attitude	-0.055 (0.069)	-0.119 (0.075)	0.127 (0.068) *	0.079 (0.075)
Time preference	0.027 (0.051)	0.036 (0.054)	-0.006 (0.053)	0.009 (0.055)
Generalized trust	0.092 (0.014) ***	0.076 (0.016) ***	0.093 (0.015) ***	0.085 (0.017) ***
Local living environment				
Lack of liveliness and bustle	0.163 (0.028) ***	0.182 (0.029) ***	0.152 (0.028) ***	0.167 (0.030) ***
Low standard of public safety	0.085 (0.035) **	0.072 (0.037) *	0.048 (0.036)	0.035 (0.038)
Garbage and illegal dumping on the streets	0.121 (0.033) ***	0.124 (0.036) ***	0.157 (0.034) ***	0.157 (0.036) ***
Adjusted R ²	0.334	—	0.315	—
First-stage partial R ²	—	0.050	—	0.050
First-stage F statistic	—	358.353	—	358.353
Endogeneity test	—	5.885 (0.015)	—	1.936 (0.164)
Number of obs.	7,267	6,496	7,267	6,496

Notes: Robust standard errors are shown in parentheses.

***, **, and * indicate significance at 1%, 5% and 10% level, respectively.

The endogeneity test reports the robust score test by Wooldridge (1995). P-values are shown in parentheses.

Same independent variables used in Table 2 such as gender, age, spouse, education and household income are included in estimation.

The results of other independent variables are omitted. These results are available upon request.

Source : Author

The coefficients of participation in community activities are slightly smaller compared with that in Table 2, but still significant at the 1% level. These results suggest that participation in community activities has significant impact on subjective well-being even after controlling for various factors that are thought to influence subjective well-being and people with high social capital could enhance their well-being through community participation.

As for the reverse causality of household income, another approach is attempted. High level of subjective well-being may increase a person's productivity and in turn lead to an increase in

income (see Graham et al., 2004; Fujiwara and Campbell, 2011; Powdthavee, 2010). If this causes the endogeneity problem, a person's own income is mainly affected by the reverse causality.

In the questionnaire survey, respondents were also asked about personal income alongside their household income. On the basis of their answers, it is possible to separate the respondent's own income from their household income. By using this result, I attempt to conduct the same regression in Table 2 only for those who do not have their own income. Here household income is a variable that is exogenously determined for the target sample and thus is less likely to cause endogeneity problems. Furthermore,

¹² This result is not consistent with Tsutsui et al. (2009). This may be partly because the questions used to make variables, which represents time preference and risk aversion, are different and the method of making variables is also different.

Table 4 Estimation results (endogeneity of household income)

Dependent variable Method of estimation	Current happiness		Life satisfaction	
	2SLS (1)	2SLS (2)	2SLS (3)	2SLS (4)
Community act	1.412 (0.721) *	0.884 (0.240) ***	1.731 (0.722) **	0.801 (0.245) ***
ln (Household income)	0.481 (0.135) ***	0.240 (0.071) ***	0.415 (0.131) ***	0.174 (0.071) **
First-stage partial R ² (parents_exp)	0.062	0.054	0.062	0.054
First-stage partial R ² (co-residents' income)	—	0.406	—	0.406
First-stage F statistic (parents_exp)	61.057	198.949	61.057	198.949
First-stage F statistic (co-residents' income)	—	1707.550	—	1707.550
Eendogeneity test	3.223 (0.073)	5.359 (0.005)	4.980 (0.026)	6.745 (0.001)
Number of obs.	814	6,496	814	6,496

Notes: Robust standard errors are shown in parentheses.

***, **, and * indicate significance at 1%, 5% and 10% levels, respectively.

The endogeneity test reports the robust score test by Wooldridge (1995). P-values are shown in parentheses.

Same independent variables used in Table2 such as gender, age, spouse and education are included in estimation.

The results of other independent variables are omitted. These results are available upon request.

Source : Author

the income of co-residents might be a candidate as an instrumental variable because it is exogenous and correlated with household income.

The results for those without personal incomes are in columns (1) and (3) of Table 4. Columns (2) and (4) show the results when co-residents' income is used as an instrumental variable¹³. In both cases, communal participation is significant at the 10%, 5%, or 1% level, and the coefficient for income is also significant and positive. In columns (1) and (3) of Table 4, the coefficient for participation is larger than 1, showing quite a huge impact on subjective well-being. The reason for this may be because most of the people with no income are already retired or engaged in housework, and participation in community activities is an important means of self-realization and forming outside connections, and it has huge impact on personal well-being.

4. External effect of community activities

The aforementioned result indicates that participation in community activities increases participants' subjective well-

being. Inaba et al. (2015) and Aminzadeh et al. (2013) pointed out that the level of neighborhood residents' involvement in community activities has a positive impact on individuals' subjective well-being by using a multi-level analysis approach. This implies that external effects of community activities may exist.

The questionnaire survey asks what kind of community activities are being conducted in the area where respondents live, and the option of "no community activities are being conducted or I don't know whether or not community activities are being conducted" is a possible answer. From the answers, it is possible to divide non-participants into those who living in areas with community activities and those in areas without (including the cases where respondents are unaware of community activities). By using this, a dummy variable can be created in which those who answer "no community activities are conducted or I don't know whether or not community activities are being conducted" are set to 0 and the rest are set to 1. By including this as the independent variable, it can be verified whether or not people

¹³ In Table 4, in order to treat household income as cardinal numbers in estimation, the log of the median of each income class is used. For example, the value of the income class of 2–4 million is 1.0986 (=ln(3)). However, regarding the income class of ≥ 15 million yen, the median cannot be defined. Regarding the income class of < 2 million, the average income of this class is different from the median based on the 2017 Family Income and Expenditure Survey of Japan. Therefore, average household income of these income classes reported by the 2017 Family Income and Expenditure Survey of Japan is used.

living in areas with community activities show higher level of well-being.

Table 5 presents the results of estimation. The OLS method is used in the estimation under the assumption that the endogeneity

problem does not arise because all the people included in the sample are non-participants. Columns (2) and (4) show the results when additional independent variables used in Table 3 are included in estimation.

Table 5 Estimation results (external effect)

Dependent variable Method of estimation	Current happiness		Life satisfaction	
	OLS (1)	OLS (2)	OLS (3)	OLS (4)
Recognition of community activities	0.317 (0.069) ***	0.259 (0.068) ***	0.142 (0.071) **	0.081 (0.071)
Risk attitude	—	-0.009 (0.112)	—	0.121 (0.114)
Time preference	—	-0.065 (0.074)	—	-0.105 (0.076)
Generalized trust	—	0.136 (0.021) ***	—	0.150 (0.022) ***
Local living environment				
Lack of liveliness and bustle	—	0.164 (0.041) ***	—	0.132 (0.043) ***
Low standard of public safety	—	0.120 (0.051) **	—	0.074 (0.053)
Garbage and illegal dumping on the streets	—	0.105 (0.050) **	—	0.154 (0.053) ***
Constant	1.738 (0.206) ***	0.038 (0.264)	1.669 (0.217) ***	-0.003 (0.274)
Adjusted R ²	0.324	0.350	0.287	0.313
Number of obs.	3,743	3,743	3,743	3,743

Notes: Robust standard errors are shown in parentheses.

***, **, and * indicate significance at 1%, 5% and 10% levels, respectively.

Same independent variables used in Table2 such as gender, age, spouse, education and household income are included in estimation.

The results of other independent variables are omitted. These results are available upon request.

Source : Author

Where current happiness is used as the dependent variable, the coefficient of recognition of community activities is significantly positive at the 1% level, and those who know that community activities are conducted have significantly higher level of current happiness than those who are unaware. As for life satisfaction, however, the results are different. In column (4) of Table 5, where the living environment is considered, recognition of local activities is not significant.

How do community activities increase the subjective well-being of those who are not involved? One possible explanation is that a community’s living environment is improved through community activities and this improvement brings about higher well-being. The fact that the dummy variable relating to recognition of community activities is not significant when the variables regarding local living environment are used as independent variables may suggest that the improvement of the

living environment around them has a positive impact on their life satisfaction.

Regarding current happiness, however, even taking into account the local living environment, being aware of community activities enhances a person’s current happiness. This result may imply the existence of other external effect channels. Fowler and Christakis (2008) show that happiness can propagate to surroundings. On the basis of their discussion, it may be possible that happiness can be transmitted from happy people to others even if they are not communal participants and that participation enhances the level of communal happiness by improving the local living environment and spreading happiness itself.

These results also indicate that community activities are not mere results of high levels of well-being and support that community activities impact people’s well-being.

5. Conclusions

This study estimated the relationship between participation in community activities and subjective well-being by instrumental variable method using parents' and/or grandparents' frequency of participation in community activities. The results show a significant causal relationship between an individual's participation and subjective well-being, indicating that communal participation may increase an individual's well-being. Additionally, community activities have external effects; they may also increase the subjective well-being of non-participants through propagating a sense of well-being to others, alongside improving the living environment.

It is becoming more important to make communities better from a perspective of residential happiness and satisfaction. Clarifying what kind of initiatives increase people's well-being has become an important challenge. The result that participation in community activities increases people's subjective well-being suggests the significance and importance of encouraging participation and supporting community activities as a policy initiative, as there is a growing trend to evaluate the wealth of countries and societies in terms other than economic aspects such as GDP. Furthermore, causal effects of community activities on people's subjective well-being suggest the validity to evaluate policy initiatives that support these activities from the perspective of people's well-being.

On the basis of this study's results, it can be suggested that for those who want to participate in community activities but are unable to do so because of work or family commitments, or for those who have not been able to participate because of a lack of opportunities or unwillingness to dealing with unfamiliar people, it may be possible to increase their subjective well-being by

developing the environment that facilitates participation and encouraging them to join.

The analysis is based on an online questionnaire survey and contains several limitations. Endogeneity of participation in community activities is considered, but further verification of validity of the instrumental variable might be needed because the responses to how often parents and/or grandparents participated in community activities are based on subjective memories of respondents¹⁴. Furthermore, there might be other variables that contain the problem of endogeneity alongside participation and household income¹⁵. Although it is not easy to conduct an experimental approach in community activities, further accumulation of evidence through various methods would be required.

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¹⁴ An anonymous reviewer kindly pointed out that the sample used in the estimation included more than 30% elderly people aged 60 and above, and that there was concern about using memory-based responses as instrumental variable for the elderly. On the basis of this suggestion, I limited the sample to those under 60 years old and conducted the same estimation as in Table 2. A significantly positive result was obtained for participation in community activities, and the F-values in the first stage were also sufficiently large. Thus, the same results as in Table 2 were obtained even when the sample was limited to respondents whose memories were considered to be clearer than those of the elderly. These results are also available upon request. Another anonymous reviewer kindly pointed out that while the participation of parents and/or grandparents in community activities is influenced by their level of happiness, it may also have an impact on the level of happiness of their children and grandchildren. The intergenerational effect of well-being is considered to be a new research issue, and it remains for further research to examine the validation of the instrumental variable, including this point.

¹⁵ Other variables such as self-rated health status, marital status, and education also may have an inverse causal relationship with subjective well-being. It remains for further research to address the endogeneity of these variables.

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