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The Keio University Joint Research Center for Panel Studies started the Japan Household Panel Survey (JHPS) in 2009. The most recent survey was implemented in 2012 (the JHPS 2012, fourth wave). The JHPS 2012 included 2,821 subjects, with an 89.3% retention rate from the third wave. This article provides an overview of sample characteristics of the fourth wave and reports some basic results of selected issues of special interest in this wave.
First, a probit analysis for panel continuation revealed that the parallel use with interview method caused the probability of response continuation to decrease in the second wave. However, this did not have any effect subsequent to the third wave, and it was determined that more visits by surveyors during previous fielding caused the rate of response continuation to decrease. Second, we report the characteristics of intergenerational financial assistance, from parents to their children and vice versa, using an array of variables, such as education, co-residence with parents, and employment status. Third, we report distributions of a sense of happiness as well as its relationship with employment, income, and health. Finally, basic statistics of the reasoning test included as an indicator of cognitive ability are presented, and spousal correlation, age differences, and relationship with education and income from work are described.

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[1] Corresponding author: H. Akabayashi (email: hakab@econ.keio.ac.jp). This paper is an English version of DP-2012-006 of the Keio University Joint Research Center for Panel Studies. This English version was translated into by an external translation service supplier from the Japanese version DP2012-06 issued in March 2013. Note that information included in this paper is as of March 2013.

Section 1 Introduction†

This study provides an overview and discussion of the summary and responses, and of the recently completed the JHPS 2012 results conducted by the Keio University Joint Research Center for Panel Studies.

The JHPS started in 2009, making the 2012 survey the fourth wave of its kind. The response rates, sample characteristics, and sample representativeness of each survey are reviewed in Naoi and Yamamoto (2010), Naoi et al. (2010), and Ishii (2012). Naoi and Yamamoto (2011) analyzed the relationship between the differences in survey methods and sample attrition in the JHPS second wave. However, the sample attrition trends in the third and fourth waves have not been analyzed. In this paper, we examined the response conditions of the JHPS 2012 and the trend of sample attrition since the second wave.

In addition, we analyzed the characteristic items, "family assistance," "happiness," and "reasoning" included in the JHPS 2012. The newly introduced items of the JHPS 2012 include items concerning financial assistance between parents and children. With the declining birth rate and aging population, discovering the realities of intergenerational transfer; that is, the assistance from parents to their children or vice versa, is a crucial step toward enacting future social insurance policy.

Recently, Gross National Happiness (GNH) has been drawing attention as an indicator of a country's prosperity. Items related to happiness have been introduced since the JHPS 2011 (third wave), not only investigating happiness at the time of the survey completion but during multiple periods (e.g., the past year, entire life). Factors

† Individual data of the Japan Household Panel Survey were offered by the Keio University Joint Research Center for Panel Studies for this article. Also, valuable comments were received from Dr. K. Sakamoto (Keio University). We would like to express our gratitude here. All remaining errors are ours. The opinions expressed in this paper are the authors' alone and do not in any way reflect those of the authors' affiliations or of individuals involved in the survey.

such as gender differences, age differences, and effects of employment status and income on happiness were examined using descriptive statistical analysis.

Furthermore, this paper explains the results of the reasoning test as a simple indicator of cognitive ability; this has not been previously conducted in a large-scale panel survey on Japanese adults. The reasoning test was answered by the subjects in the JHPS 2011 and by their spouses in the JHPS 2012. We explain the test and describe basic statistics such as the spousal correlation of scores, age differences, and education–income relationship.

This paper is organized as follows. Section 2 reviews the response retention rate and sample attrition in the JHPS 2012. Section 3 explains the results of "family assistance," "happiness," and "reasoning." Section 4 summarizes this chapter.

Section 2 Overview and Sample Characteristics of the JHPS 2012

This section provides an overview of the JHPS 2012 and explains the sample characteristics and sample attrition. The JHPS is an annual household panel survey that has been conducted since January 2009 by the Keio University Joint Research Center for Panel Studies, as part of the Ministry of Education, Culture, Sports, Science and Technology's "The Promotion of the Joint Research Center for Human Studies and Social Sciences." In the first wave, the subjects included men and women at the age of 20 or older (born before January 1989) who were registered in the Basic Resident Registry in Japan as of January 31, 2009. The first phase of sample selection comprised the selection of survey locations, with the 2005 National Census basic districts as selection units. In the second phase, individuals were selected at random using the Basic Resident Registry of the selected locations. The final sample size was 4,022 (the data include an extra 22 individuals who were surveyed as a back-up sample). The JHPS 2012 (fourth wave) introduced in this paper was conducted on January 31, 2012, comprising a total of 3,170 subjects; this number included a total of 3,160 valid subjects

from the third wave and 10 individuals who abstained from the third wave but elected to participate in the fourth.

Table 1 presents the number of respondents and the retention rates from the first (JHPS 2009) to the fourth (JHPS 2012) wave, indicating instances of respondents among both the original subjects and the original subjects plus their spouses. In case of married subjects, JHPS is designed to ask questions about the subject's spouse; these questions are nearly identical to those about the subject. Therefore, a married subject allows for analysis including their spouse's information. As seen in Table 1, the retention rate in the JHPS 2012 was 89.3%, a decrease since the JHPS 2011's 91.1%, and sample attrition was greater in the JHPS 2012 than in the JHPS 2011. The shift in the retention rates was the same even when including spouses. Cohort A and Cohort B of Keio Household Panel Survey (KHPS) [2] is based on a similar sample selection. Figure 1 displays the cumulative attrition rate (rate = (number of cumulative attrition in each wave/ number of respondents in the first wave) × 100) from the second to fourth wave of the KHPS Cohort A (since 2004) and Cohort B (since 2007). Figure 1 shows that the attrition rate of the JHPS is less in comparison to the KHPS Cohort A, beginning in 2004, and marginally higher (especially in the fourth wave) compared to the KHPS Cohort B, beginning in 2007.

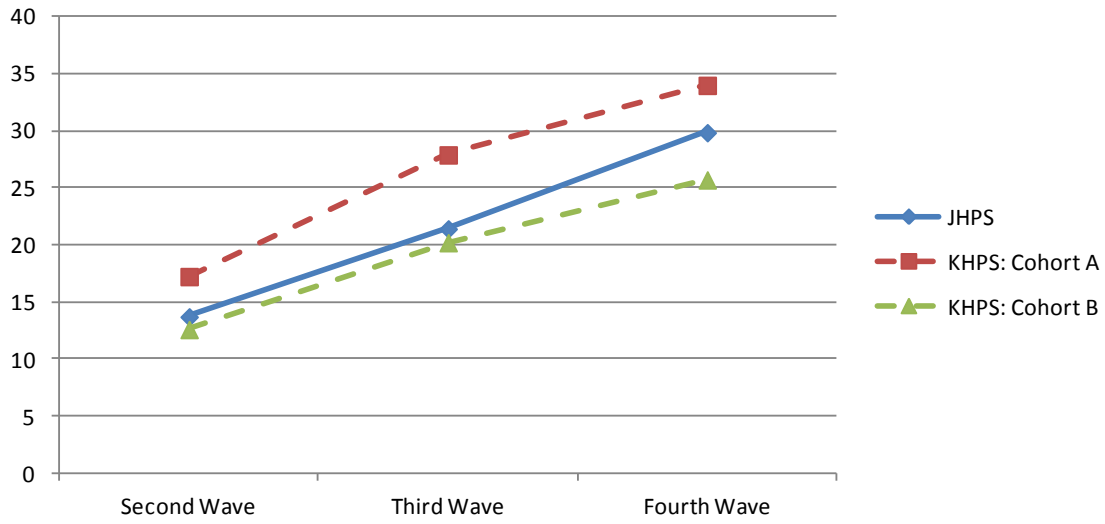
[2] The age range of the KHPS sample selection was 20–69.

Table 1　Number of JHPS Respondents and Panel Retention Rate

Survey Year	Number of Respondents (People)		Retention Rate (%)	
	Subjects	Spouses Included	Subjects	Spouses Included
2009	4,022	6,911	–	–
2010	3,470	6,010	86.3	87.0
2011	3,160	5,497	91.1	91.5
2012	2,821	4,903	89.3	89.2
2012 (Excluding returning sample)	2,811	4,888	89.0	88.9

Note 1: “Number of respondents” represents the subjects that responded to that year’s survey.
Note 2: “Retention rate” is the number of respondents in one year divided by the number of respondents in the previous year.
Note 3: “2012 (Excluding returning sample)” includes the subjects that responded to all waves from 2009 to 2012.
Note 4: “Spouses included” is the sum of the number of subject respondents and spousal respondents.
Source: Produced by the authors from JHPS2009–2012.

Figure 1　Cumulative Sample Attrition Rate of the JHPS and KHPS (%)



Note 1: Cumulative attrition rate = (number of cumulative attrition in each wave / number of respondents in the first survey) × 100
Note 2: The first surveys conducted by JHPS, KHPS Cohort A, and KHPS Cohort B were in 2009, 2004, and 2007, respectively.
Source: Produced by the authors from JHPS2009–2012 and KHPS2004–2012.

Sample attrition is a major problem when collecting panel data. Panel data are obtained by conducting surveys with the same individuals every year; however, with time, respondents are unable or unwilling to respond for a variety of reasons, such as

death, health issue, and relocation, which makes continuous panel data collection with these individuals impossible. This does not become an issue if sample attrition is random; however, if attrition is non-random, any analysis using that panel data will require caution because of some sort of bias.

Sakamoto (2006a) investigated the factor of sample attrition, with the Japanese Panel Survey of Consumers (JPSC), conducted by the Institute for Research on Household Economics since 1993. The results showed high attrition rates among people planning to get married and newlyweds. Many respondents dropped out of the sample when they got married, due to the difficulties in understanding their spouses enough to answer the survey's questions regarding their spouses and family constructions, and due to the high moving rate of newlywed samples. In addition, this attritional bias was shown to have an effect on estimates of marriage preference functions. Moreover, the KHPS has been analyzed by Miyauchi et al. (2006) and Naoi (2007, 2009) in this regard. While Miyauchi et al. (2006) indicated that "moving" is a factor that reduces the panel retention rate, "years of education" and "marital status" increase the panel retention rate. This analysis was based on the Missing At Random (MAR) hypothesis, stated by Fitzgerald, Gottschalk and Moffitt (1998) and Lillard and Panis (1998), who analyzed the reason for sample attrition based on the Panel Study of Income Dynamics (PSID), which states that attrition at any given time can be predicted by observable values up until that point. Naoi and Yamamoto (2011) analyzed the relationship between sample attrition and survey methods of the JHPS second wave. The results showed that the configuration of the bonus reward upon completion in the first wave caused the probability of continuation to decrease in the second wave. However, they also showed that the effects that raised the response rate in the first wave, with its bonus reward upon completion, were greater than the effects lowering the probability of continuation in the second wave. In addition, they demonstrated that the combined use of interview

surveys resulted in a decreasing the probability of continuation, and that there were no differences in the probability of continuation between web and paper surveys.

In this section, we reviewed the trends in sample attrition in the JHPS third and fourth waves based on the MAR hypothesis. Probit analysis for panel continuation was conducted with the sample continuing responses as 1, and the sample dropping out as 0. Estimations were conducted in each survey with the panel continuation for the JHPS 2010 as "Continued Participation (second wave)," for the JHPS 2011 as "Continued Participation (third wave)," and for the JHPS 2012 as " Continued Participation (fourth wave)" [3].

The explanatory variables in this analysis regarding the subject and family are as follows: "Gender: dummy variable with female as 1, and male as 0"; "Age: categorical variable with 20–29 years as reference category, 30–39 years, 40–49 years, 50–59 years, and 60 years and above"; "Marriage: dummy variable with spouse present as 1, and spouse absent as 0"; "Level of Education: categorical variable with junior high school graduate as the reference category, high school graduate, technical school/other graduate, junior college/technical college graduate, and university/graduate school graduate"; "Household Size: number of household members living together"; "Number of Children: number of children living together"; "Regular Employment: dummy variable with regular employment as 1, and no regular employment as 0"; and "Health Degree: categorical variable from healthy (1) to unhealthy (5)."

Variables related to alternative survey methods were used in addition to these variables. During the JHPS 2009, the surveyors distributed questionnaires to the subjects at their houses, and randomly sorted subjects between at-home surveys, where

[3] JHPS has four cases of subjects in the sample who are dead or missing, so the survey is continued by requesting the cooperation of their spouse. However, these subjects are only included up to the last survey year that they themselves responded. There are also 10 cases of subjects who abstained from a certain survey and returned in the following survey. They were excluded from this subject analysis as these samples were predicted to have differing behavior from the other samples.

the surveyor would return to collect completed questionnaires, and combined interviews and questionnaires, where a questionnaire component was conducted orally in an interview format. Naoi and Yamamoto's (2011) estimation results on the response continuation of the second wave showed that the probability of response continuation was significantly lower in "subjects with combined interview and questionnaire," and that interview surveys incur a temporal cost of visitation, as well as the possibility of resistance to directly answer to the surveyor. Therefore, this section uses the variable "Combined Interview Dummy: dummy variable with subjects with combined interview surveys as 1, subjects with at-home surveys as 0." Furthermore, JHPS provides an Internet response option in addition to the usual question sheet response method. Naoi and Yamamoto's (2011) analysis on the second wave did not find a difference in the probability of response continuation between web survey respondents and paper survey respondents. To confirm whether this had an effect on the probability of response continuation in the third and fourth waves, this section uses the variable "Web Survey Dummy: dummy variable with web survey respondents as 1, paper survey respondents as 0."

Inability to follow-up with subjects due to a change of residence is a plausible reason for discontinuing the survey. JHPS requires surveyors conducting the survey to complete surveyor confirmation forms, which include questions such as the number of visits and recovery of questionnaires. This surveyor survey includes a question regarding the subject's condition at the time of survey, which provides information on whether the subject has changed residence. This section uses the variable "Change of Residence Dummy: dummy variable with 1 if the subject has changed residence, and 0 if the subject has not."

In addition, the surveyor's survey form includes a multiple-choice question in case the questionnaire was recovered from the subject; it is, however, excluded if the questionnaire is improperly completed, or in cases where on visiting, the subject refused

to participate in the survey. Here the surveyor needed to provide the reason explaining their refusal (Table 2). Looking at these reasons, many subjects provided the following reasons for refusal: “too busy to fill in the survey,” “bad health,” “too many survey items,” “already cooperated enough,” and “vague reasons.” To display the effects of the manner of refusal, this section uses the variable “Number of surveyor visits: number of times the surveyor visited this household.” In addition, all these explanatory valuables, with the exception of “Change of Residence Dummy,” use information from the last wave answered before opting out.

Table 3 displays the basic statistics of the variables used in analysis for each survey in terms of the continued response sample and attrition sample. The variables related to household attributes showed that the tendency for people to drop out changes based on the number of surveys. For example, with regard to marital status, the attrition sample comprised a high percentage of unmarried subjects in the second and third waves ($p < 0.001$); however, this trend was not apparent in the fourth wave. Meanwhile, there were similar trends in number of children and highest level of education in every wave, and the attrition sample tended to have fewer children and a lower level of education ($p < 0.05$). Subjects changing their residences had a similar trend, and in each survey, the attrition sample had a higher percentage of the subjects changing residence during the wave ($p < 0.001$).

Table 2　Reasons for Survey Refusal (Multiple Answers, %)

	Second Wave (413 cases)	Third Wave (197 cases)	Fourth Wave (184 cases)
Physically or psychologically disease	16.9	19.3	19.0
Too busy to fill the survey	41.9	47.2	51.1
Difficult to fill in due to the number of survey items	27.1	20.8	25.0
Unwilling to participate in interview survey	9.0	7.1	6.0
Suspiciousness of surveys in general	3.6	1.5	0.5
Suspiciousness of this survey's questionnaire	4.6	3.0	1.6
Already cooperated enough, as survey items are similar to the last survey	18.2	18.3	32.1
Survey items are difficult to understand	7.0	5.1	4.3
Objectionable questions infringing on privacy	5.1	3.0	0.5
Do not want to answer due to family circumstances	3.4	8.6	6.0
Family is opposed to it	7.0	7.6	6.5
Vague reasons, do not want to do it, it's an inconvenience and a bother	19.4	13.7	13.0
Have not received announcement or report afterward	—	—	—
Little recompensation	0.2	—	—
Other	11.4	18.8	13.0

Source: Produced by JHPS2009–2012 (Surveyor Forms).

Table 3　Descriptive Statistics

	Second Wave (2010)				Third Wave (2011)				Fourth Wave (2012)			
	Continued Participation		Attrition		Continued Participation		Attrition		Continued Participation		Attrition	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Variables regarding household attributes												
Respondent's gender (Reference: Male)												
Female	0.51	0.50	0.55	0.50	0.51	0.50	0.53	0.50	0.51	0.50	0.51	0.50
Respondent's age (Reference: Under 30)												
30–39	0.17	0.38	0.17	0.37	0.17	0.38	0.12	0.32	0.17	0.37	0.11	0.31
40–49	0.18	0.38	0.12	0.33	0.18	0.39	0.15	0.36	0.20	0.40	0.15	0.36
50–59	0.17	0.37	0.15	0.36	0.17	0.37	0.15	0.36	0.17	0.37	0.17	0.38
60 or above	0.36	0.48	0.35	0.48	0.38	0.48	0.41	0.49	0.38	0.49	0.46	0.50
Marital Status (Reference: Unmarried)												
Married	0.73	0.44	0.64	0.48	0.74	0.44	0.65	0.48	0.74	0.44	0.75	0.43
Number of Family Members	3.63	1.59	3.57	1.61	3.62	1.56	3.63	1.54	3.59	1.57	3.60	1.61
Number of Children	1.04	1.06	0.83	1.01	1.06	1.07	0.91	1.06	1.08	1.07	0.94	1.04
Sample Size	3464		548		3152		312		2811		341	
Respondent's Highest Level of Education (Reference: Junior High School)												
High School	0.45	0.50	0.43	0.50	0.45	0.50	0.46	0.50	0.46	0.50	0.46	0.50
Technical School/Other	0.06	0.24	0.06	0.24	0.06	0.24	0.06	0.24	0.07	0.25	0.05	0.22
Junior College/Technical College	0.13	0.33	0.12	0.32	0.13	0.33	0.13	0.33	0.13	0.33	0.12	0.32
University/Graduate School	0.26	0.44	0.25	0.43	0.27	0.44	0.22	0.41	0.27	0.44	0.24	0.43
Respondent's Health (Reference: Good)												
Somewhat Good	0.24	0.43	0.22	0.41	0.25	0.43	0.24	0.43	0.27	0.44	0.25	0.43
Average	0.33	0.47	0.36	0.48	0.34	0.47	0.35	0.48	0.34	0.47	0.41	0.49
Not Very Good	0.09	0.29	0.09	0.28	0.09	0.29	0.13	0.34	0.10	0.30	0.11	0.31
Bad	0.02	0.13	0.02	0.15	0.01	0.10	0.03	0.16	0.02	0.13	0.02	0.12
Respondent's Regular Employment	0.33	0.47	0.31	0.46	0.33	0.47	0.28	0.45	0.33	0.47	0.31	0.46
Sample Size	3427		540		3107		305		2747		332	
Respondent's Change of Residence†	0.02	0.15	0.14	0.34	0.03	0.18	0.12	0.33	0.03	0.18	0.08	0.26
Variables Regarding Survey												
Survey Mode (Reference: At-home Survey)												
Combined Interview	0.49	0.50	0.53	0.50	0.49	0.50	0.49	0.50	0.49	0.50	0.49	0.50
Response Mode (Reference: Paper Survey)												
Web Survey	0.02	0.15	0.02	0.15	0.03	0.17	0.02	0.14	0.03	0.17	0.03	0.17
Number of Visits By Surveyors†	2.82	1.18	2.95	1.28	2.99	1.15	3.25	1.23	3.09	1.55	3.24	1.60
Sample Size	3403		539		3107		305		2747		332	

Note: Basic statistics are shown for the largest sample size in each estimation. † indicates variables produced from surveyor forms. Only "Respondent's change of residence" uses the current wave data, all other variables use values from the previous wave data.

Source: Produced from JHPS2009–2012 and Surveyor forms.

The survey-related variables showed that there was a higher percentage of combined interviews than at-home surveys among the attrition sample in the second wave ($p < 0.05$); however, there was no difference in the percentages of at-home and combined interviews between the continuing sample and attrition sample from the third wave onward. Further, the web survey made no difference between the continuing and attrition sample in any waves. The number of surveyor visits was higher in the attrition sample in every wave ($p < 0.05$), and subjects who tended to be uncooperative in the previous survey tended to opt out of subsequent waves, though the reasons for not wanting to cooperate are unclear.

Table 4 shows the estimation results of the probit model for panel continuation. This shows that the "Change of Residence dummy" significantly decreases the probability of continuation in each survey, and that the majority of subjects that drop out do so because of a change of residence. As for other variables related to household attributes, higher age and education levels were correlated with higher probability of continuation in the second wave; however, these connections were not as visible in the third and fourth waves. In addition, unmarried subjects or particularly respondents with bad health conditions in the previous wave tended to drop out in the third wave. Respondents with more family members and fewer children tended to drop out in the fourth wave. Furthermore, the female dummy and the regular employment dummy (introduced as an indicator of busyness), had very little effect on the probability of continuation.

Similarly to Naoi and Yamamoto (2011), variables related to the survey tended to cause attrition among subjects of the interview survey in the second wave. However, it was not the case in the third and fourth waves, demonstrating that this did not affect the probability of continuation for subjects who had accepted the interview survey by the second wave. In addition, the number of surveyor visits in the previous wave tended to lower probability of continuation in every survey, and subjects difficult for the

surveyor to approach tended to drop out, whether for voluntary (e.g., do not want to participate, too much of a bother) or involuntary (e.g., too busy) reason.

Table 4　Probit Model of Response Continuation

	Continued Participation (Second Wave)			Continued Participation (Third Wave)			Continued Participation (Fourth Wave)		
Variables regarding household attributes									
Female Dummy	−0.0184*	−0.0167	−0.0146	−0.00562	0.00316	0.00248	−0.00099	0.00129	−0.000486
	[0.0108]	[0.0118]	[0.0118]	[0.00953]	[0.0104]	[0.0100]	[0.0109]	[0.0121]	[0.0119]
Age (Reference: 20–29)									
30–39	0.0456***	0.0445**	0.0527***	0.0413***	0.0485***	0.0394***	0.0440**	0.0493***	0.0483**
	[0.0175]	[0.0175]	[0.0169]	[0.0150]	[0.0137]	[0.0143]	[0.0197]	[0.0189]	[0.0188]
40–49	0.0702***	0.0702***	0.0591***	0.0258	0.0314*	0.0149	0.0265	0.0275	0.021
	[0.0169]	[0.0170]	[0.0179]	[0.0175]	[0.0163]	[0.0179]	[0.0224]	[0.0220]	[0.0224]
50–59	0.0456**	0.0498***	0.0419**	0.0165	0.0216	0.00193	0.00214	0.00546	−0.00365
	[0.0187]	[0.0186]	[0.0192]	[0.0185]	[0.0175]	[0.0198]	[0.0248]	[0.0244]	[0.0250]
60 or above	0.0497***	0.0649***	0.0561***	0.00596	0.0228	−0.00273	−0.00858	−0.00896	−0.0192
	[0.0179]	[0.0191]	[0.0193]	[0.0175]	[0.0183]	[0.0191]	[0.0227]	[0.0241]	[0.0241]
Married Dummy	0.0153	0.0143	0.0142	0.0320**	0.0286**	0.0263**	−0.0118	−0.0167	−0.0185
	[0.0149]	[0.0151]	[0.0150]	[0.0139]	[0.0137]	[0.0134]	[0.0143]	[0.0140]	[0.0136]
Highest Level of Education (Reference: Junior High School)									
High School		0.0547***	0.0533***		0.0204	0.02		0.0286	0.0302
		[0.0176]	[0.0175]		[0.0157]	[0.0153]		[0.0186]	[0.0184]
Technical School/Other		0.0608***	0.0580***		0.0238	0.0232		0.0315	0.0319
		[0.0191]	[0.0189]		[0.0200]	[0.0194]		[0.0239]	[0.0234]
Junior College/Technical Colleg		0.0575***	0.0590***		0.012	0.01		0.0203	0.0237
		[0.0177]	[0.0173]		[0.0186]	[0.0183]		[0.0215]	[0.0208]
University/Graduate School		0.0590***	0.0611***		0.0342**	0.0313**		0.0302	0.0334*
		[0.0177]	[0.0173]		[0.0160]	[0.0156]		[0.0193]	[0.0188]
Number of Family Members	−0.00265	−0.00458	−0.00384	−0.00474	−0.00644	−0.00797**	−0.00962**	−0.0125***	−0.0131***
	[0.00458]	[0.00471]	[0.00468]	[0.00396]	[0.00393]	[0.00375]	[0.00460]	[0.00453]	[0.00450]
Number of Children	0.0139*	0.0152*	0.0150*	0.00533	0.00636	0.00736	0.0183**	0.0206***	0.0218***
	[0.00812]	[0.00816]	[0.00806]	[0.00700]	[0.00688]	[0.00671]	[0.00812]	[0.00789]	[0.00767]
Health (Reference: Standard: Good)									
Somewhat Good		0.00593	0.00236		−0.0123	−0.0157		−0.00865	−0.00708
		[0.0146]	[0.0148]		[0.0137]	[0.0138]		[0.0159]	[0.0158]
Average		−0.018	−0.0245*		−0.0198	−0.0233*		−0.0329**	−0.0327**
		[0.0140]	[0.0143]		[0.0130]	[0.0131]		[0.0153]	[0.0156]
Not Very Good		0.00167	0.00353		−0.0454**	−0.0479**		−0.0159	−0.016
		[0.0206]	[0.0204]		[0.0217]	[0.0218]		[0.0222]	[0.0224]
Bad		−0.0294	−0.0246		−0.129*	−0.139*		0.00815	0.011
		[0.0471]	[0.0458]		[0.0711]	[0.0715]		[0.0414]	[0.0393]
Regular Employment Dummy		0.00417	0.00855		0.00718	0.0082		−0.00832	−0.00918
		[0.0134]	[0.0135]		[0.0120]	[0.0115]		[0.0139]	[0.0139]
Change of Residence Dummy			−0.359***			−0.196***			−0.137***
			[0.0427]			[0.0405]			[0.0429]
Variables regarding survey									
Combined Interview Dummy			−0.0216**			−0.00111			−0.00338
			[0.0108]			[0.00932]			[0.0110]
Web Survey Dummy			−0.00298			0.0179			−0.0347
			[0.0369]			[0.0247]			[0.0401]
Number of Surveyor Visits			−0.00962**			−0.0159***			−0.00694**
			[0.00451]			[0.00368]			[0.00319]
Residence Dummy	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Regional Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
City and District Scale Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample Size	4,012	3,967	3,942	3,464	3,412	3,412	3,152	3,079	3,079
Log Likelihood	−1575	−1543	−1482	−1026	−993.6	−965.2	−1065	−1029	−1019

Note: ***, **, and * indicate that the coefficient is statistically significant at 1%, 5%, and 10% levels, respectively. Numbers in brackets are the standard error.
Source: Produced from JHPS2009–2012 and Surveyor forms.

Section 3 Overview of the Selected Results in the JHPS 2012

3.1. Family Assistance

The JHPS 2012 included questions concerning the level of financial assistance provided between the subject or subject's spouse and their parents,[4] and the reasons involved. Previous surveys included questions about inheritance and lifetime gifts; however, there have been only few surveys investigating mutual financial assistance of parents including spouses, and asking for specific details, such as the amount given or received.[5] This section presents basic findings based on the data obtained from these questions.[6]

The JHPS 2012 began with a sample of 2,821 subjects (739 single, 2,082 married). Because the survey asked married subjects the same questions about their spouse as about themselves, the spouse's responses were added to the sample of married subjects (because the households of married couples show up twice in the sample due to this manipulation, further analysis will be conducted on single and married subjects separately). Finally, excluding respondents whose parents are deceased or who did not respond, the sample totaled 3,014 respondents (513 single, 2,501 married).

The survey questioned the level of financial assistance that respondents provided to their parents or that received from their parents in the previous year, and inquired about the amount and reasons.

Table 5 shows the incidence ratio of the four patterns made by "presence of financial assistance from parents" and "presence of financial assistance to parents" within the

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[4] Hereafter, "parent" or "parents" refers to the subject's own biological parents, unless stated otherwise.

[5] The "Japanese Panel Survey of Consumers" (Institute for Research on Household Economics) asks whether children provide financial assistance to their parents, in addition to parents giving lifetime gifts to their children. KHPS asks only the total amount of assistance given to the subjects' and spouse's parents.

[6] Considerable literature exists regarding the motivations and policy implications of financial assistance and remittance within the family or extended family (e.g., Lucas and Stark, 1985; Altonji et. al., 1997; Hayashi, 1995; Horioka, 2002; Yamada, 2006; and Sakamoto, 2006b.

samples by marital status. First, it is evident that the ratio of financial assistance sent to parents was higher among single respondents than married respondents. Further analysis of the data revealed that single respondents do not tend to provide financial assistance to their parents if they received financial assistance from their parents (p = 0.06). Conversely, married respondents tended to provide financial assistance to their parents if they received financial assistance ($p < 0.01$). This indicates that financial assistance between parents and children is possibly from the motivation to ensure earnings in the case of single respondents, but may be motivated by reciprocity in the case of married respondents.[7]

Table 5 Financial Assistance between Parents and Children (According to Marital Status)

		Provide Financial Assistance to Parents	
Marital Status	Receive Financial Assistance from Parents	No	Yes
Single	No	50.9%	29.4%
	Yes	14.4%	5.3%
Married	No	78.3%	7.8%
	Yes	11.2%	2.7%

Note: Sample size = 3,014
Source: Produced from JHPS 2012.

Next, we confirm the reasons provided for financial assistance to and from the respondents' parents. Figure 2 shows the ratio of respondents who chose one of the following reasons among those who answered "received financial assistance from parents" or "provided financial assistance to parents": "living expenses," "medical expenses," "housing purchasing assistance," "rent," "other," or "no purpose." First, the most common reason, among both single and married respondents, why respondents provided financial assistance to their parents was for "living expenses." This was followed by "rent" and "other" for married respondents. In Japan, it is customary for single individuals living with their parents to pay rent to their parents as their co-residence fees and expenses; it is likely that this is what is meant by providing rent

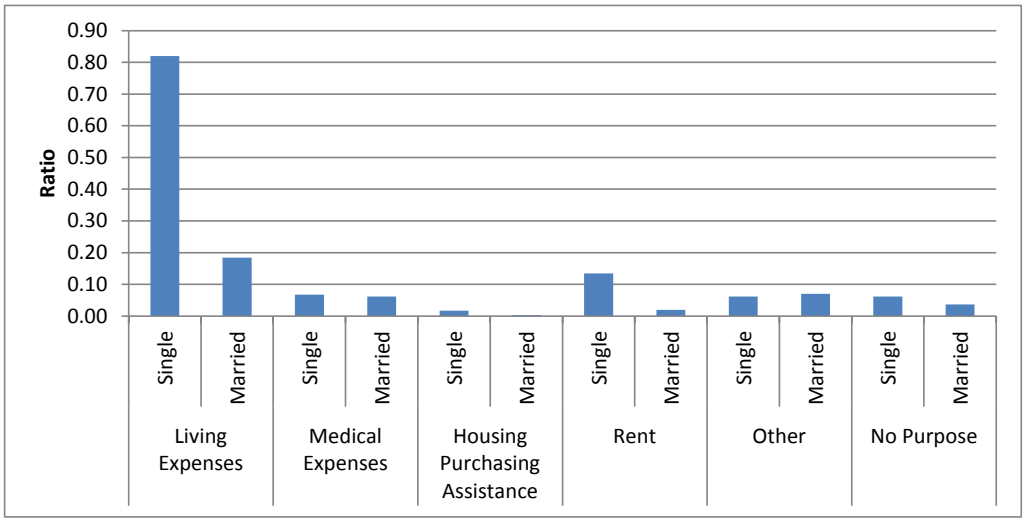
[7] The economic motives of intra-family financial assistance are summarized in Cox and Fafchamp's (2007).

in this context. In fact, we confirm that 95% of single respondents providing monetary assistance to their parents for rent purposes actually reside with their parents.

Alternatively, among respondents, the primary reason why parents provided financial assistance to their children was for "living expenses"; the secondary reason was "other," for both single and married respondents. This indicates that these include inter-vivos given to children with no specific purpose.[8] In addition, only minimal assistance is provided for home purchases. This is natural, considering the low incidence rate of purchasing a home.[9]

Figure 2　Reasons for Financial Assistance

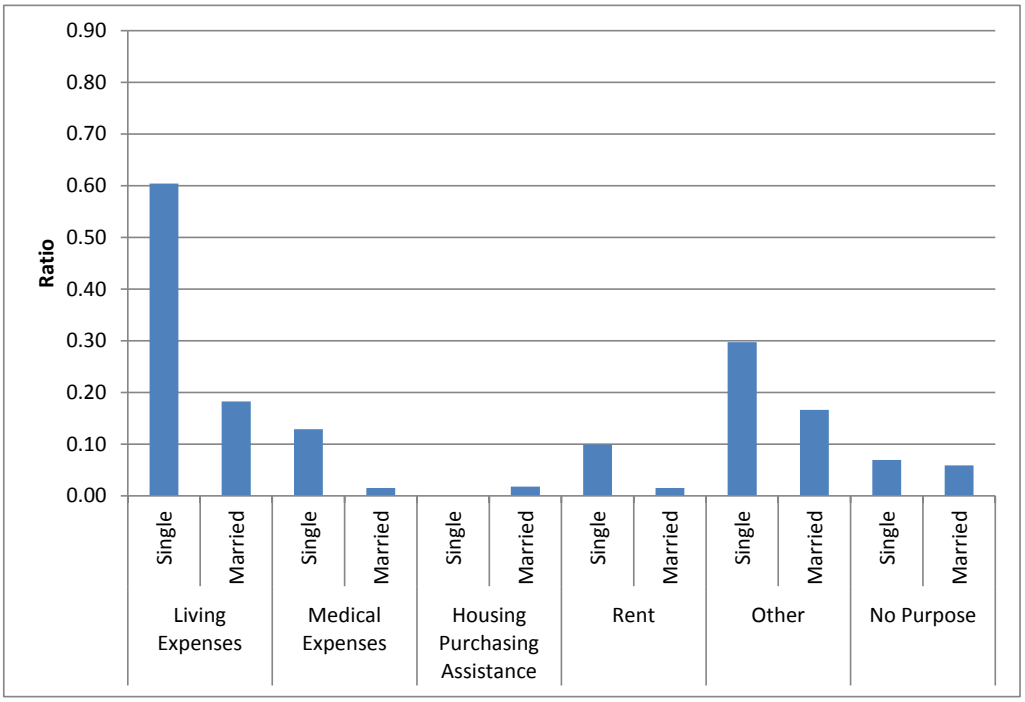
(a) From Respondents to Parents



[8] The questions have the following note attached to it: "Please exclude inheritance items, but include housing purchases, rent, land rent, living expenses and other financial assistance and allowances.."

[9] However, there is literature that indicates the importance of the relationship between inter-vivos and home purchase (Yukutake et al., 2011).

(b) From Parents to Respondents



Note: Each ratio indicates the proportion of subjects and their spouses who answered "provide assistance to parents" or "receive assistance from parents" that chose one of these reasons.
Source: Produced from JHPS2012.

We now confirm the relationship between attributes of the respondents and their parents, and the financial assistance between parents and children. First, we refer to the balance of the amount of assistance provided, both to and from parents, as "net financial assistance." Confirmation of net financial assistance is required owing to the fact that many households provide/receive financial assistance to/from their parents simultaneously.

Table 6　Relationship between Respondent/Parent Attributes and Financial Assistance

(a) Gender

		Male	Female	p-value	Test Results
Single	Give Financial Assistance to Parents	0.37	0.32	0.21	NS
N=505	Receive Financial Assistance from Parents	0.17	0.23	0.09	*
	Net Financial Assistance to Parents (in units of 10,000 yen)	26.56	3.71	0.16	NS
Married	Give Financial Assistance to Parents	0.12	0.09	0.06	*
N=2462	Receive Financial Assistance from Parents	0.13	0.14	0.48	NS
	Net Financial Assistance to Parents (in units of 10,000 yen)	−3.47	−6.55	0.47	NS

(b) Education

		Below University	University or Higher	p-value	Test Results
Single	Give Financial Assistance to Parents	0.32	0.40	0.08	*
N=502	Receive Financial Assistance from Parents	0.19	0.21	0.49	NS
	Net Financial Assistance to Parents (in units of 10,000 yen)	7.98	27.45	0.25	NS
Married	Give Financial Assistance to Parents	0.11	0.09	0.19	NS
N=2404	Receive Financial Assistance from Parents	0.13	0.16	0.03	**
	Net Financial Assistance to Parents (in units of 10,000 yen)	−3.80	−7.25	0.46	NS

(c) Living Together With or Separately From Parents

		Separate	Together	p-value	Test Results
Single	Give Financial Assistance to Parents	0.15	0.41	0.00	***
N=505	Receive Financial Assistance from Parents	0.12	0.22	0.02	**
	Net Financial Assistance to Parents (in units of 10,000 yen)	2.35	19.52	0.36	NS
Married	Give Financial Assistance to Parents	0.09	0.20	0.00	***
N=2462	Receive Financial Assistance from Parents	0.13	0.21	0.00	***
	Net Financial Assistance to Parents (in units of 10,000 yen)	−2.95	−19.12	0.01	***

(d) Parents' Health Problems

		No	Yes	p-value	Test Results
Single	Give Financial Assistance to Parents	0.30	0.40	0.02	**
N=505	Receive Financial Assistance from Parents	0.22	0.17	0.20	NS
	Net Financial Assistance to Parents (in units of 10,000 yen)	18.54	11.85	0.68	NS
Married	Give Financial Assistance to Parents	0.09	0.11	0.03	**
N=2462	Receive Financial Assistance from Parents	0.15	0.13	0.26	NS
	Net Financial Assistance to Parents (in units of 10,000 yen)	−3.18	−5.96	0.54	NS

(e) Respondent's Employment Status

		Employed	Unemployed	p-value	Test Results
Single	Give Financial Assistance to Parents	0.39	0.19	0.03	**
N=465	Receive Financial Assistance from Parents	0.17	0.29	0.09	*
	Net Financial Assistance to Parents (in units of 10,000 yen)	21.36	−1.97	0.52	NS
Married	Give Financial Assistance to Parents	0.11	0.05	0.25	NS
N=2020	Receive Financial Assistance from Parents	0.14	0.05	0.12	NS
	Net Financial Assistance to Parents (in units of 10,000 yen)	−5.48	−0.44	0.79	NS

(f) Respondent's Work Status

		Regular Employment	Irregular Employment	p-value	Test Results
Single	Give Financial Assistance to Parents	0.45	0.26	0.00	***
N=412	Receive Financial Assistance from Parents	0.15	0.24	0.03	**
	Net Financial Assistance to Parents (in units of 10,000 yen)	30.15	4.15	0.23	NS
Married	Give Financial Assistance to Parents	0.12	0.08	0.03	**
N=1889	Receive Financial Assistance from Parents	0.13	0.16	0.06	*
	Net Financial Assistance to Parents (in units of 10,000 yen)	−2.70	−13.34	0.08	*

(g) Presence of Children (Married, N = 2462)

		No Children	Children	p-value	Test Results
Married	Give Financial Assistance to Parents	0.11	0.10	0.52	NS
	Receive Financial Assistance from Parents	0.09	0.15	0.00	***
	Net Financial Assistance to Parents (in units of 10,000 yen)	−4.37	−5.21	0.88	NS

Note: "Other" under Highest Level of Education was classified as not completed University education. "Parents' health problems" were given a value of 1 if either parent had a history of cancer, cardiovascular/endocrine/metabolic disorder, or stroke/cerebrovascular disease. "Financial assistance to parents" and "financial assistance from parents" are dummy variables; the numbers to the right represent the ratio of "assistance present." Difference tests were conducted by chi-squared tests for dummy variables, and t-tests (2-sided) for continuous variables.
Source: Produced from JHPS2012.

Table 6 describes the effects of the attributes of the respondents and their parents on the provision and amount of assistance for single and married respondents. Test results are summarized below:

(a) Single female respondents tended to receive more financial assistance from their parents, and married male respondents tended to provide more financial assistance to their parents; however, these differences were marginal.

(b) University graduates tended to provide more assistance to parents in the case of single respondents, and receive more assistance from parents in the case of married respondents, than non-university graduates.

(c) Respondents living together with parents provided more assistance to, and received more assistance from, parents than respondents not living with parents.

(d) Both single and married respondents increased the financial assistance provided to parents in case of health issues compared to if they did not.

(e) In the case of single respondents, those unemployed provided less assistance to parents and received more assistance from parents than employed respondents. In all cases, respondents with non-regular employment provided less financial assistance to parents and received more financial

assistance from parents, than respondents with regular employment. The difference in incidence of parental assistance between regularly and non-regularly employed respondents was greater among single respondents than married respondents.

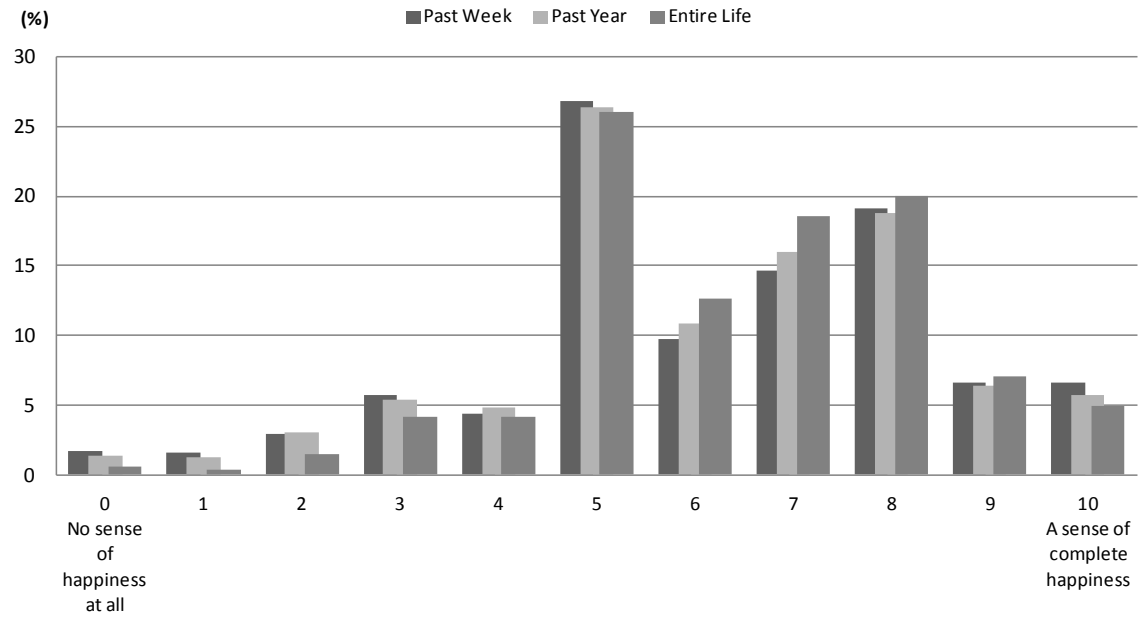
(f) Having children resulted in increased financial assistance from parents.

Multivariate analysis methods are required to provide a more detailed explanation; however, (d), (e), and (f) are meaningful in that they suggest financial assistance with the motivation of risk-sharing between parents and children.

3.2. Happiness

Since the 2011 survey, JHPS has asked for a subjective rating of the respondent's happiness in the three periods of "past week," "past year," and "entire life," on a scale of 0, "having no sense of happiness at all," to 10, "having a sense of complete happiness." The JHPS 2012 obtained valid answers from 4,856 individuals, including subjects and their spouses, on these three items. Figure 3 displays the response distribution of these three items as percentages. The distributions are similar for all three items, and over one-quarter of the cases rated their happiness as 5, the central value on the scale, in every stage of life.

Figure 3　Frequency Distribution of Happiness



Note: The percentage indicates the ratio with the total number of each response, "past week," "past year," and "entire life" as 1.
Source: Produced from JHPS 2012.

Averages for all three items were determined on the whole and by gender, and the differences in happiness levels by time period, gender, and age were reviewed. No differences were found in the average happiness in "past week" and "past year"; however, average happiness over the respondents' "entire life" was significantly higher than the other two variables. This did not change when comparing male and female respondents separately ($p < 0.001$) (Table 7). Happiness among females was significantly higher than among males for all three time periods ($p < 0.001$). Happiness tended to be significantly higher as age increased in the "past week" period ($r = 0.04$, $p < 0.001$); however, no age differences were found for other time periods.

Table 7　Gender and Age Differences in Happiness

	Total (N = 4856)		Male (n = 2385)		Female (n = 2471)		Gender Difference	Effect of Age (r)
	Mean	SD	Mean	SD	Mean	SD		
Past Week	6.17	2.23	6.02	2.25	6.30	2.20	***	.04 ***
Past Year	6.17	2.15	6.05	2.15	6.28	2.14	***	.02
Entire Life	6.41	1.90	6.34	1.91	6.48	1.89	***	−.02

Note: *** indicates that the coefficient is statistically significant at 1% level.
Source: Produced from JHPS 2012.

The correlation of happiness for these three time periods was high, at r = 0.83 between "past week" and "past year," r = 0.69 between "past week" and "entire life," and r = 0.76 between "past year" and "entire life" (p < 0.001 across the three values). In addition, highly similar correlations were observed of couples' happiness levels from the 2,037 pairs of valid answers from both the subjects and their spouses, at r = 0.45 for "past week," r = 0.48 for "past year," and r = 0.45 for "entire life" (p < 0.001 across the three values).

Recently, there has been a considerable amount of active research explaining the determining factors of happiness in the field of economics (Frey, 2008). This section considers the relationship of happiness with employment, income from work, household income, and health conditions.

Each JHPS asks whether they were engaged in employment that earned their income during the month prior to the survey (including family business and part-time work). If the respondent indicated that they had worked, they were asked to choose one of the following: "I worked fulltime," "I worked besides attending school," or "I worked besides doing housework." Conversely, if the respondent indicated that they had not worked, they were asked to choose one of the following: "I was absent from work," "I was looking for a job," or "I was attending school/housework/other." This was asked to better determine the individual's situation. Excluding "I worked besides attending school," which had less than 10 responses, the average happiness values in the "past week" for

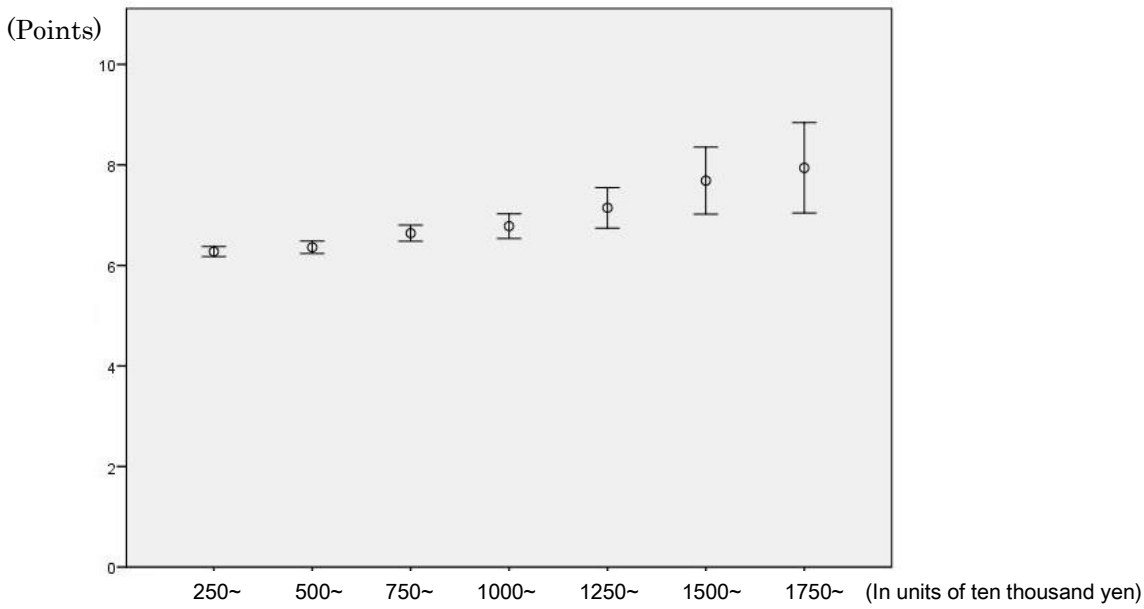
each group that chose each option are shown in Figure 4. No significant difference was found between the happiness of people who "worked fulltime," which comprised more than half of the cases, and those who "worked besides attending school" and "were absent from work"; however, their happiness was significantly higher than the people who did not work and "were looking for a job" ($p < 0.001$), and significantly lower than people who did not work and "were attending school/housework/other" ($p < 0.001$).

Figure 4　Employment and Happiness (Past Week)

Note: Error bars show 95% confidence interval.
Source: Produced from JHPS2012.

Among working respondents, JHPS asks the amount of income generated from their primary job, before taxes and social insurance deductions, over the past year. These self-generated incomes were categorized into seven levels, and their relationship to their individual "entire life" happiness was examined as shown in Figure 5. This showed that happiness was proportional with income; the correlation was significant at $r = 0.12$ ($N = 3{,}115$, $p < 0.001$).

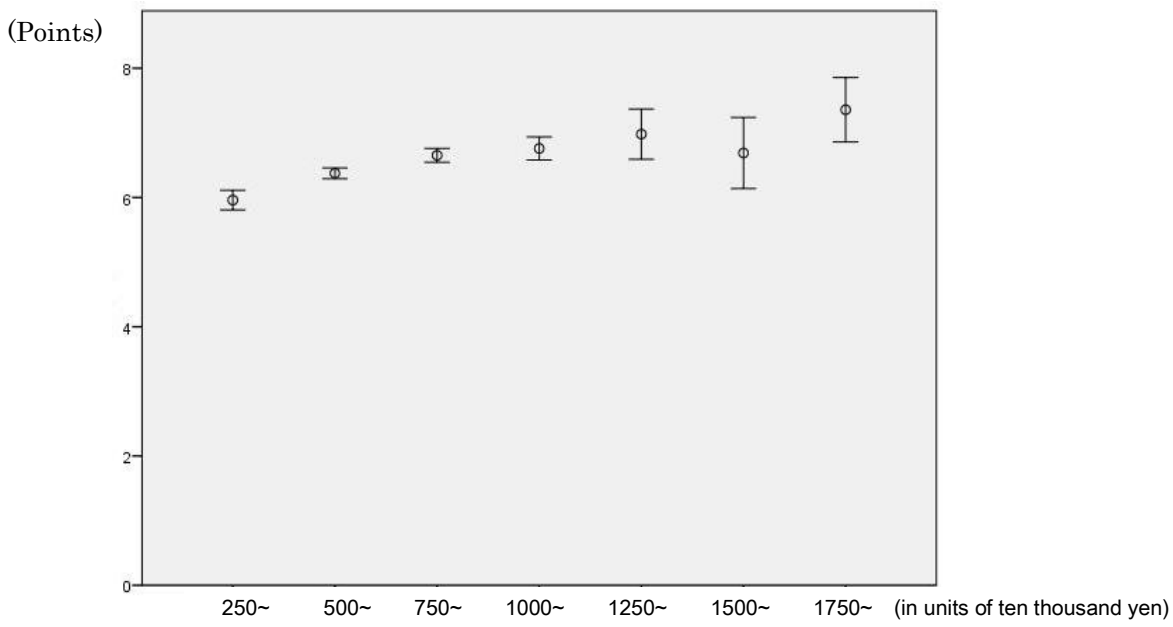
Figure 5　Job Income and Happiness (Entire Life)



Note 1: Income from work refers to the income from the respondent's primary employment over the past year. This is the amount before taxes and social insurance deductions.
Note 2: Error bars show 95% confidence interval.
Source: Produced from JHPS2012.

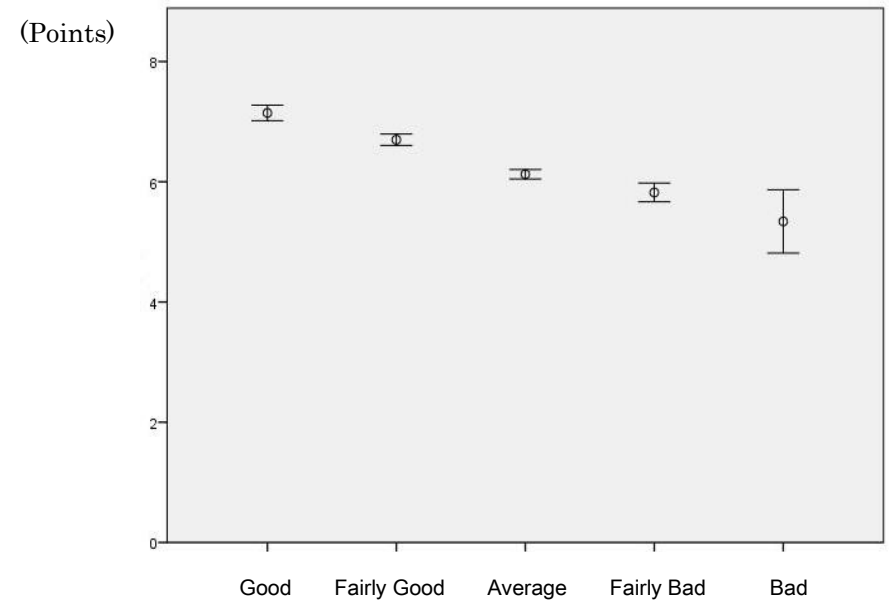
To clarify whether this happiness originates from the income obtained from the respondents' own jobs, or from the wealth of their household on the whole, a similar examination was conducted using the entire household income, which revealed a trend that happiness significantly increased in relation to an increase in household income (Figure 6). The correlation was $r = 0.14$ (N = 4,219, $p < 0.001$), and the entire household income had a marginally higher coefficient of determination for happiness than that of income obtained from the respondents' own job.

Figure 6　Household Income and Happiness (Entire Life)



Note 1: Household income refers to the take-home income for the entire household in the past year.
Note 2: Error bars represent a 95% confidence interval.
Source: Produced from JHPS2012.

Figure 7　Health and Happiness (Entire Life)



Note: Error bars show a 95% confidence interval.
Sorce: Produced from JHPS2012.

A comparison of the averages of "entire life" happiness for the groups that reported their health conditions as "good," "fairly good," "fairly bad," or "bad," demonstrated that better health conditions were related to higher levels of happiness, and that worse health conditions were related to lower levels of happiness (Figure 7). The correlation of happiness and health conditions (reversed) is $r = -0.24$ ($p < 0.001$), which is a higher correlation than income from work and household earnings.

3.3. Reasoning

It is rare in Japan for social surveys of adults to include cognitive ability indicators. There have been attempts to do so through vocabulary tests for adolescents and their parents, such as in "Occupation and Personality Research" (Kikkawa, 1998); however, in such cases the sample sizes were too small for the adults' cognitive ability to represent as a single variable on statistical analysis, and such studies never developed into a positive review explaining its relationship to households.

Alternatively, the American National Longitudinal Surveys of Youth (NLSY)[10] include a cognitive test from the National Armed Forces Qualifying Test (AFQT) in its large-scale panel surveys. The respondent's cognitive scores are included in the data set, and the variable is used for analysis in various fields of research as an intelligence quotient (IQ).

Furthermore, the Organisation for Economic Co-operation and Development (OECD) began the "Programme for the International Assessment of Adult Competencies" (PIAAC)[11] in 2011 across 24 countries around the world, including Japan, which uses a cognitive ability test for adults. This indicates a growing global interest focusing on the relationships between economics and adult cognitive abilities.

[10] National Longitudinal Survey http://www.bls.gov/nls/
[11] PIAAC http://www.nier.go.jp/04_kenkyu_annai/div03-shogai-piaac-pamph.html

Given this background, JHPS attempted to include cognitive ability indicators in their survey. In addition to the practical restriction that the problems would have to be included in a self-reported questionnaire, these problems would require no strict time limit for the participant's answer. In addition, the answers should be difficult to look up elsewhere, while the problems should not be of great burden to answer. Therefore, JHPS introduced five reasoning problems[12] (Shikishima et al. 2011) using syllogistic logic questions, to ensure reliability and validity as a test of cognitive ability in a mail survey. Syllogisms are a form of logical deductive reasoning where one concluding statement is deduced from two premise statements. It has been revealed that syllogism solving is an excellent indicator of general intelligence (Shikishima et al. 2009).

Below is a sample problem similar to the five reasoning problems introduced in JHPS. The respondent is asked to choose one of the five statements that holds true as a conclusion of the two premises.

Some cats are pets. All cats are mammals.

1. No mammal is a pet.
2. All mammals are pets.
3. Some mammals are not pets.
4. Some mammals are pets.
5. No valid conclusion.

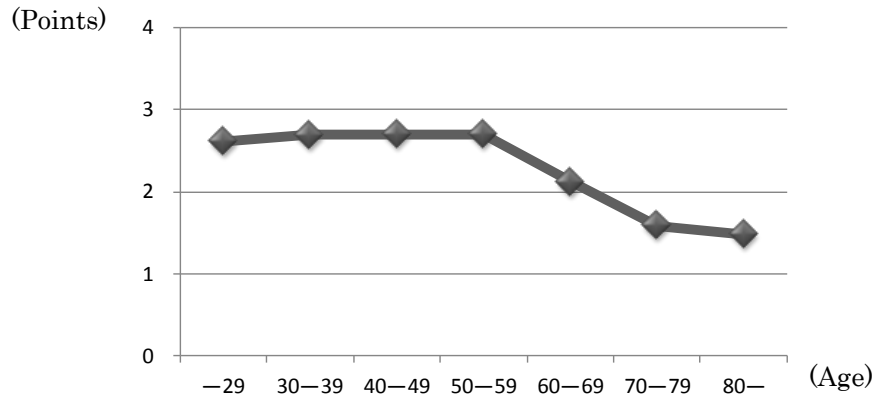
The instructions specified that responding is voluntary in addition to responding it independently without discussing it with anyone, and answering each question within a minute. Such specifications were made out of consideration for the participant's resistance to answering the extraneous reasoning questions newly introduced into the

[12] The same problems are translated into English, and archived in the PsycTESTS® database of the American Psychological Association.

household panel survey. As a result, valid answers were obtained from 2,545 subjects in the JHPS 2011 (81% response rate), and 1,640 spouses in the JHPS 2012 (79% response rate), a total of 4,185 respondents (80% response rate). To review whether there were any different attributes between respondents and non-respondents, the subjects participating in the JHPS 2011 and the spouses participating in the JHPS 2012 were divided into reasoning question participants and non-participants; this was used as the dependent variable for logistic regression analysis. Age, gender, education, and income from work were used as independent variables. Only education had a significant coefficient ($p < 0.01$), demonstrating that more respondents with high levels of education were participants, and more respondents with low levels of education were non-participants.

The reasoning score was the sum of the problems answered correctly out of five. The mean (SD) scores of the 2,052 male and 2,133 female respondents were 2.44 (1.62) and 2.35 (1.61), respectively. This indicated that the male respondents' scores were significantly higher by a 10% level. The correlation obtained from the 1,429 pairs of valid answers from both the subjects and their spouses was $r = 0.39$ ($p < 0.001$). Presently, there is no publicly disclosed value of the spousal correlation of cognitive ability in Japan; however, the spousal correlation of IQ reported in Europe and North America is generally $r = 0.4$–0.5 (Vandenberg, 1972). Considering the fact that these self-administered questions have a higher possibility for measurement errors compared to cognitive tests administered in the test setting, this value is plausible.

Figure 8　Age Differences of Reasoning Score



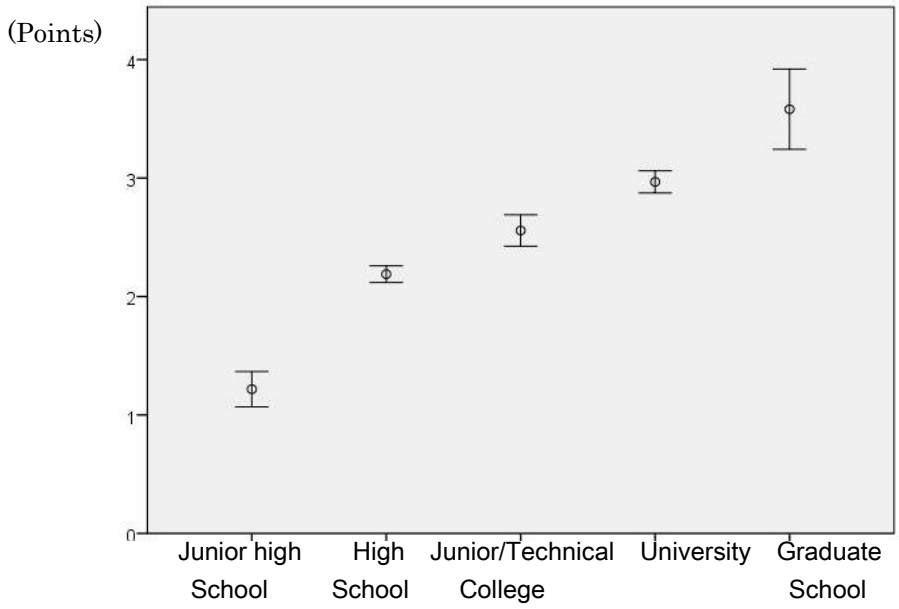
Source: Produced from JHPS2011 and JHPS2012.

Categorizing ages by decades and determining the average reasoning score for each group showed no difference in performance in individuals in their 20s–50s; however, the average began to decline from the 60s (Figure 8). Collective psychological research relying on factor analysis explains human intelligence structure as a hierarchical framework with general intelligence at the top (Spearman, 1904). At the bottom of this hierarchy are crystallized intelligence, mainly consisting of language functions typically measured by vocabulary comprehension, and fluid intelligence, which is a nonverbal function and is reflected in new problem-solving ability (Horn & Cattell, 1966). Research indicates that crystallized intelligence peaks at the age of 45–54 years, and gradually declines subsequently, while fluid intelligence peaks in the early 20s, later witnessing a rapid decline (Kaufman, 2001). The age differences in syllogism-solving level acquired from this survey can be seen as being positioned in the middle of the changes of crystallized and fluid intelligence levels, showing that the reasoning score has validity as an indicator of a more generalized cognitive ability (general intelligence), combining both intelligences.

The average reasoning scores for each group of respondents to the question in the JHPS 2009 on their highest level of schooling as “junior high school,” “high school,”

"junior college/technical college," "university," or "graduate school" were recorded. This demonstrated that the scores were notably higher as education level increased (Figure 9). The correlation between education and reasoning scores was significant at $r = 0.31$ ($p < 0.001$). Interpretation of these results requires caution, because more people with higher education levels tended to answer; however, this demonstrated that there was a clear positive correlation between levels of education and reasoning ability.

Figure 9　Education and Reasoning Score

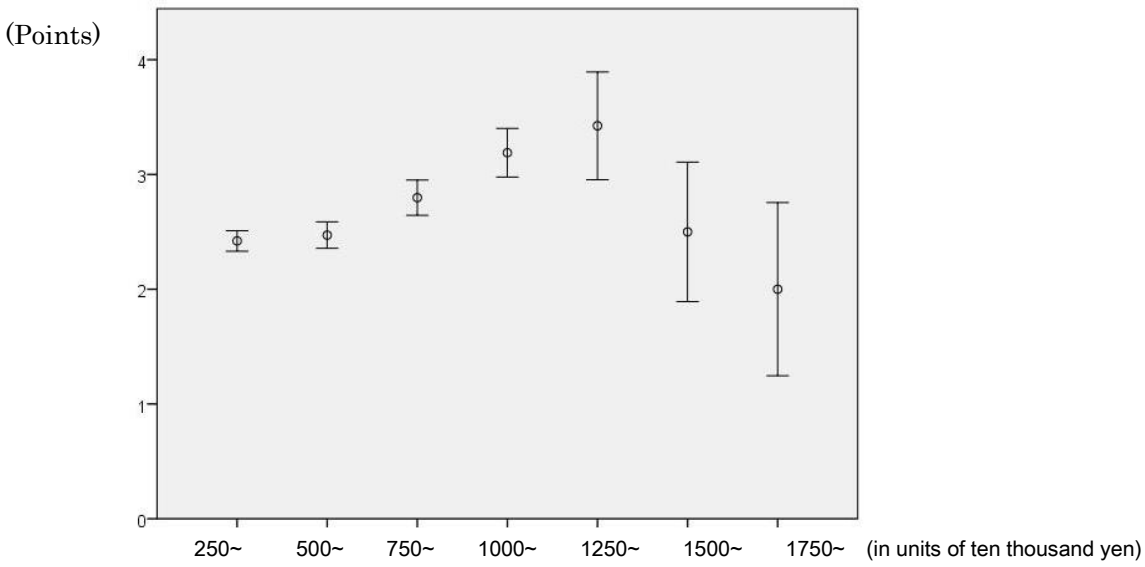


Note: Error bars show a 95% confidence interval.
Source: Produced from JHPS 2011 and JHPS 2012.

To investigate the relationship between reasoning score and employment income, the respondents who worked in the month prior to the survey completion were classified into seven levels on the basis of their income over the past year from their primary job (before taxes and social insurance deductions), and the average reasoning scores for each group was found. From the 2.5–5.0 million yen group to the 12.5–15.0 million yen group, performance increased with annual income; however, performance tended to decrease in the 15.0–17.5 million yen and above 17.5 million yen group (Figure 10). The

t-test showed that the reasoning scores significantly increased between the 5.0–7.5 million yen and 7.5–10.0 million yen groups ($p < 0.01$), and between the 7.5–10.0 million yen and 10.0–12.5 million yen groups ($p < 0.01$); however, the 15.0–17.5 million yen group scored significantly lower than the 12.5–15.0 million yen group ($p < 0.05$). With education and reasoning as well as happiness and income from work both having a linear correlation; what is the cause of the nonlinear correlation between reasoning score and income from work? Future detailed research will be necessary to explore the complex relationship between cognitive ability and income.

Figure 10　Income from Work and Reasoning Score



Note: Error bars display a 95% confidence interval.
Source: Produced from JHPS 2011 and JHPS 2012.

Section 4: Conclusion

In this paper, we used data obtained from the latest JHPS conducted in January 2012 to clarify panel retention rates and sample attrition, and explain the outlook of the survey results on a number of topics. In particular, Section 2 showed the results on "family assistance," "happiness," and "reasoning" as they are unique survey items

characteristic to JHPS. Due to page and time restraints, this has not been a detailed analysis; however, the analysis was able to obtain findings of interest that could lead to future research. We sincerely expect the results from this paper to inspire future research on these items in the broader fields including economics, sociology, and psychology.

JHPS started in 2009, and will complete its initially-scheduled five-year surveys in 2013. JHPS will continue with the addition of revisions; however, survey continuation is a extremely difficult challenge. In particular, JHPS, which has actively included novel survey items that have not necessarily been included in previous panel surveys, presents a difficult problem of continuing the survey over a long term while fulfilling an appearently opposing demands of conservative continuation and progressive improvement. As part of our nation's policy research infrastructure, we must consider what is necessary for JHPS to be both socially accepted and widely used in the future, based on the experience that has been obtained over the past five years.

Finally, we would like to mention the many people who have been involved in planning the JHPS, designing the questionnaires, administering the survey, data cleaning and consolidating/providing data, and analyzing the data over the past five years. We would like to express our heartfelt gratitude to all these people involved in this process. High quality data is the foundation of all research, and creating them t requires often unrewarding vast amount of hard work because of its "public good" nature. More attention must be given to create a better academic and social environment in Japan so that many researchers will be able to participate in building this important research infrastracture.

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