The Heterogeneity of Young Japanese Women's Life - A Consumption Perspective

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ABSTRACT

Sustainable consumption is seen as one of the recipes to reduce the ecological footprint of industrialized countries, and to foster sustainable development. In order to alter actual consumption patterns towards sustainability, we need means to predict the impacts of consumption activities. There are considerable efforts under way to develop life cycle assessment (LCA) towards such an assessment tool. These efforts have been rather successful thanks to two assumptions: First, it was assumed that it is sufficient to look at the average consumer of a product to model its use and disposal phase and second, the analysis was restricted to a world of average processes with many ceteris paribus assumptions. Here we relax some of these assumptions. In order to do so we look into the consumption patterns of young Japanese women and attempt to answer the following questions: Are young Japanese women a homogenous group of consumers? What common characteristics does this group have? And what additional variables allow for additional grouping with less heterogeneity in consumption behaviour? The results from the panel analysis showed for concerned target groups a distinguished shift in young Japanese women's consumption patterns using the Japanese Panel Survey of Consumers (JPSC) data and forming homogenous sub-groups by life events and attributes. Although considerable heterogeneity in terms of life stages, major life happenings, income and level and type of consumption has been found, the number of significant changes in consumption activities attributable to defined subgroups remains large. This suggests that consumption related panel data set is useful and needed to design programs for sustainable consumption.

INTRODUCTION

How should we alter consumption towards more sustainable consumption patterns if we do not know the effect of such alterations? Consumer research looked into how to alter consumption for a long time and established numerous sets of archetypical consumers that represent larger groups of consumers. Much of this research has been directed by the questions of how to shape a product and its advertisement to be attractive to the targeted consumer group(s). However, comparably little efforts have been made to look into the interdependency of consumption activities. Of course, the textile industry knows well that if skirts are fashionable this would affect the market for women pants. However, its impact on the tea industry that might sell more tea to cure colds is usually disregarded.

These interdependencies of consumption activities can lead to what economists may call rebound effects, i. e., the intentional change in one consumption activity may cause a series of other changes in consumption that may compensate parts or all of the initial benefit of the consumption activity (like saving money, saving time, lowering resource consumption and pollution, etc.).

This paper looks into these interdependencies of consumption and how they differ by group. These results will be used for a new assessment method that calculates the so-called CHap indicator. [1][2][3] This indicator considers the impact of consumption activities on happiness and the additional CO_2 emissions of the consumption activity itself but also the changes in CO_2 emissions for all other activities. Therefore, this paper will not only report on results that look into consumption interdependencies but also on the changes in self-reported happiness.

Within this project we focus on three consumption items: cloth dryer, personal computer, and mobile phone. It is important to understand that this choice was largely driven by the available panel-data set. The authors are well-aware that these consumption items are neither major CO_2-emitters nor suggested activities to avoid CO_2 emissions nor assumed to have a large impact on self-reported happiness. However, the data for more relevant activities, like, e. g., being a member of a reading or book club, was not available in the chosen data set. The choice of these examples must be seen as a possibility to test the feasibility of the method suggested in Hofstetter & Madjar (2003). [1] Only if this test suggests that the assessment method and its indicator CHap work it is relevant to start collecting new data that includes activities suggested to contribute to sustainable consumption.

METHODS

Used Data and Variables: The Japanese Panel Survey of Consumers (JPSC) dataset provided by the Institute for Research on Household Economics (IRHE) of Japan was used for this study. The JPSC longitudinal panel data include the variables of time-use data, consumption data, and happiness and life satisfaction, necessary for our study. The panel cohort consists of 1, 500 women from 24-34 years of age in 1993 and geographically distributed throughout the nation. The statistical software SPSS v. 12. 0J was used to perform analysis on the three most recent available data sets (1998, 1999 and 2000). [1]

Definitions of Variables: Three self-reported indices for ultimate utility — happiness, life satisfaction and life standard — were used for this analysis. According to the previous studies[4], life standard' is a life index determined mainly by economical satisfaction (i. e. income satisfaction), and life satisfaction' is a life index determined not only by economic satisfaction but also other factors as a whole, including relationship between spouse, parents and friends. In other words, 'income satisfaction' and life standard' are similar economic indices; while 'life satisfaction' is more comprehensive index. 'Happiness' is well studied and considered as even more comprehensive index as a whole. The values for these variables were measured in five scales as follows:

(1) Happiness:
    Question: Do you consider yourself happy or unhappy?
    Self-reported scores: 1 = Unhappy, 2 = Rather unhappy, 3 = Average, 4 = Rather happy, 5 = Very happy
(2) Life-satisfaction:

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[1] Toshisuke Ozawa, approved user of the JPSC data, performed the statistical analysis.

Question: Are you satisfied with your life as a whole?
Self-reported scores: 1 = Unsatisfied, 2 = Rather dissatisfied, 3 = Average, 4 = Rather satisfied, 5 = Satisfied
(3) Life standard
Question: Where do you think your current life standard falls in comparisons with other households?
Self-reported scores: l = Low, 2 = Mid-low, 3 = Average, 4 = Mid-high, 5 = High

The Approach: We reported previously how we conducted statistical analyses on variables between adopters and non-adopters of new activities. [2][3 The details of the procedure are described elsewhere.   [1][3][5] Briefly, the samples were divided into: Group NN - those that have access to the new activity in neither year (non-adopters); Group NY - those that started the new activity in concerned year (y) but not in the previous year (y-l) (adopters); Group YY - those that have access to the new activity in both years (continuous users); and Group YN - those that had access in y-l but not in y (disposers), where, "Y" and "N" denote for "Yes" and "No", reflecting whether they possess the good.

We applied the same method for major life events and attributes. All the values of previous year (y-l) were subtracted from the concerned year (y) on individual bases. This process allowed us to yield the mean values of the "true differences" based on an individual base. Then the mean values of the dependent variables were compared between adopters and non-adopters. Matched-pair t-tests were performed on the mean values to check the significant difference at $p < 0.05$ between two groups. It was expected that this analytical manner allows us to evaluate the genuine impact of the concerned life events and attributes on the shift of one's consumption patterns and happiness/life satisfaction.

Data Preparation and Analysis:
The tasks for this study were twofold: (l) linear regression analysis of the JPSC panel data to identify major factors that affect the shift of happiness and life satisfaction among life events, such as getting married, having a child, and social, economical, psychological, behavioural attributes; and (2) panel analysis of the JPSC data in order to estimate their consumption elasticities particular for those groups by classifying the sample into distinguished target groups by the life events and attributes identified in task (l). For such analyses, the JPSC data were modified and prepared. First, for refinement of the data, all the samples were restricted to the individuals who responded to the survey three years in a row between 1998 and 2000 and contain no missing values for important variables for our particular interest. All samples which do not meet the criteria were eliminated. Finally the sample size was 1, 176. The data sets of 1998-1999 and 1990-2000 were then combined, keeping the sample ID numbers. Using the combined panel data, the differences of the mean values for happiness, life satisfaction, household expenditure, possession of durable consumer goods and time-use were compared between non-adopters (NN) and adopters (NY).

RESULTS

Ten life events and attributes which may alter one's happiness as well as social, economical, and psychological status were determined to be used as standards to divide the entire sample into homogeneous sub-groups. During the process, the results of linear regression analysis, frequencies for each variable, and whether they are active or passive events were considered (see Table l). Selected results from the panel analysis for getting married, gave birth to a child, and started living in a house (l, 2 and 9 in Table 1, respectively) are shown in Table 2. From the results of the panel analysis, some characteristics are observed in the shifting of consumption patterns that are particular for homogeneous sub-group.

Table 1. Variables and frequencies for the life events and attributes chosen as standards to divide the entire sample into homogeneous sub-groups for panel analysis.

	Variable	NN	NY
(1)	Marreied and left family	2,231	57
(2)	Gave a birth to a child	2,034	149
(3)	A family member moved out for business reason	2,330	13
(4)	Started new lessons or learning	1,967	64
(5)	Took a leadership of a committee, club or organization	1,768	235
(6)	A family member had entrance exams and enrolled to a school	1,877	235
(7)	Wife – employed	772	170
(8)	Wife – Full-time position	441	32
(9)	Started living in a house	948	65
(10)	Started living in an own house	397	463

Note: NN and NY stands for adopters and non-adopters.

In terms of the indices for ultimate utility, getting married is significantly correlated with self-reported happiness, causing an increase by 0. 24 points, and giving a birth to a child and moving to a house (not necessarily an own house) significantly correlate with the increase of self-reported living standard by 0.10 and 0.17 points, respectively. These signs of tendencies are in agreement with our hypothesis, although the increase of living standard for those who gave birth needs further discussion.

In terms of household expenditure and household possession of durable consumer goods, getting married and moving to a house are the most influential life events among the ten events tested for this study. It is interesting to note that getting married and giving birth to a baby are both significantly correlated with getting a video camera, where getting married causes an increase in average household possession by 0. 21 video cameras, i. e., 21 % of the households purchased a (additional) video camera. Giving birth causes an increase by 0. 11 video cameras per household. Moreover, starting living in a house is significantly correlated with getting an automatic dishwasher and cloth dryer, increasing by 0. 15 and 0. 08, respectively. It may be attributed to more space available than previous places. However, moving to an own house alters neither indices for ultimate utility nor major consumption patterns, except for purchase of automatic dishwasher and air conditioner (data not shown). It may be attributed to great economic pressure due to purchasing of a house.

In terms of time-use patterns, getting married significantly correlates with decrease in wives' commercial working time by 209 minutes and commuting by 14 minutes and increase in house-keeping and taking care of children by 228 minutes during the week. In the weekend and holidays, getting married significantly correlates with wives' decrease of commuting by 6 minutes and increase house-keeping and taking care of children by 145 minutes.

The impact of giving a birth to a child on altering the time-use pattern of wives and husbands is prominent. For example, it correlates with the decreases of basically all the wives' activities (commuting, working, hobby, leisure and going out, sleep, eat, personal hygiene) and with increase in house-keeping and taking care of children by 308 minutes. In the weekends and holidays, wives' time for hobby, leisure and going out decreases even more than during the weekdays and the additional time is allocated to house-keeping and taking care of children by 281 minutes. Though husbands are not as affected as wives, having a new baby significantly correlates with decrease in study, increase in house-keeping, and taking care of children in weekdays. In weekends and holidays, husbands' time decreases for hobby, leisure and going out by 48. 9 minutes, and sleep, eat, personal hygiene decrease by 43 minutes.

Table 2. Selected results from the panel analysis for (1) getting married, (2) gave birth to a child, and (9) started living in a house.

	Got married or not					Gave a birth or not					Start living in a house or not				
Indicators for ultimate utility	NN (2231)		NY (57)		Significance	NN (2034)		NY (149)		Significance	NN (948)		NY (65)		Significance
	Mean	SD	Mean	SD	P<0.05	Mean	SD	Mean	SD	P<0.05	Mean	SD	Mean	SD	P<0.05
Happiness	-0.050	0.680	0.190	0.550	**	-0.040	0.670	-0.070	0.680		-0.060	0.670	-0.050	0.650	
Life Satisfaction	-0.050	0.850	0.020	0.720		-0.040	0.840	-0.130	0.890		-0.030	0.900	0.020	0.990	
Living Standard	-0.030	0.560	-0.090	0.810		-0.030	0.580	0.070	0.570	**	-0.030	0.580	0.140	0.700	**

Household expenditure for the month of Sep. (1,000 Yen)	NN (2231)		NY (57)		Significance	NN (2034)		NY (149)		Significance	NN (948)		NY (65)		Significance
	Mean	SD	Mean	SD	P<0.05	Mean	SD	Mean	SD	P<0.05	Mean	SD	Mean	SD	P<0.05
Food	2.60	29.23	29.44	26.73	**	3.24	30.03	0.28	23.86		1.81	27.09	8.00	31.40	
Housing (Rent/Mortgage)	0.24	50.62	42.75	40.03	**	0.89	48.36	-1.76	28.53		1.59	22.04	-37.66	49.33	**
Water, Gas, Electricity	0.56	11.45	14.14	13.35	**	0.85	11.85	2.56	9.56		0.89	9.24	2.14	11.67	
Furniture and Household Appliances	-0.50	18.33	-12.28	124.10	**	-0.92	27.71	-1.34	10.20		-0.33	18.37	6.00	30.27	**
Clothing and Shoes	0.71	16.99	-11.95	28.86	**	0.15	17.90	1.26	13.30		1.13	16.93	4.51	16.75	
Medical and Insurance	-0.20	23.74	2.91	10.60		0.01	21.62	-1.11	40.82		-0.62	21.89	4.72	22.19	
Transportation	4.28	67.30	9.39	26.34		4.87	65.16	-0.52	63.26		4.24	79.63	14.80	118.62	
Communication	2.46	9.09	4.79	10.17		2.56	9.26	3.01	9.55		2.59	9.55	3.40	11.54	
Education	1.52	23.69	-1.32	5.50		1.37	20.47	2.31	33.45		1.55	16.16	-2.48	18.03	
Hobby and Leisure	-0.57	26.61	0.95	15.33		-0.63	27.42	-0.72	15.25		0.43	28.97	-2.46	19.82	
Going out	-0.23	19.08	-9.67	22.75	**	-0.60	19.00	1.79	19.60		0.05	19.65	1.25	17.96	
Allowances	-0.98	23.34	20.16	24.64	**	-0.20	23.41	-1.95	28.39		0.26	23.22	-3.25	23.58	

Household possession of durable consumer good	NN (2231)		NY (57)		Significance	NN (2034)		NY (149)		Significance	NN (948)		NY (65)		Significance
	Mean	SD	Mean	SD	P<0.05	Mean	SD	Mean	SD	P<0.05	Mean	SD	Mean	SD	P<0.05
Dining Set	0.02	0.38	0.42	0.63	**	0.03	0.40	0.07	0.37		0.01	0.32	0.23	0.61	**
Cupboard	0.01	0.51	0.33	0.69	**	0.01	0.52	-0.01	0.39		-0.02	0.34	0.02	0.54	
Microwave	0.01	0.29	0.35	0.52	**	0.02	0.31	-0.01	0.23		0.01	0.25	0.03	0.35	
Refrigerator	0.01	0.39	0.16	1.07	**	0.02	0.41	-0.05	0.57		0.00	0.25	0.08	0.32	**
Automatic Dishwasher	0.01	0.21	0.00	0.27		0.01	0.20	0.01	0.20		0.00	0.19	0.15	0.40	**
Vacuum Cleaner	0.03	0.50	0.23	0.71	**	0.03	0.52	0.03	0.38		0.01	0.37	0.28	0.63	**
Laundry Machine	0.01	0.31	0.39	0.53	**	0.02	0.33	0.01	0.27		0.01	0.22	0.03	0.30	
Cloths Dryer	0.00	0.22	0.02	0.30		0.00	0.23	0.01	0.16		0.00	0.20	0.08	0.41	**
Sewing Machine	0.01	0.35	0.02	0.48		0.01	0.36	0.04	0.38		0.02	0.31	0.09	0.38	
Electric Fan	0.06	0.71	0.05	0.81		0.05	0.73	0.11	0.44		0.04	0.46	0.33	0.78	**
Air Conditioner	0.07	0.79	0.30	1.05	**	0.07	0.80	0.04	0.64		0.03	0.54	1.23	1.57	**
Fan Heater	0.03	0.65	0.00	0.93		0.02	0.66	0.17	0.53	**	0.03	0.44	0.20	0.90	**
"Kotatsu" Heater	-0.02	0.52	-0.09	0.69		-0.01	0.51	-0.05	0.59		-0.02	0.36	-0.05	0.48	
TV Set	0.05	0.73	0.32	0.98	**	0.06	0.75	0.04	0.52		0.04	0.46	0.49	0.87	**
Stereo Sound System	-0.01	0.51	0.21	0.65	**	0.00	0.52	0.04	0.45		0.01	0.45	0.00	0.53	
CD Radio Cassette Recorder	0.03	0.51	-0.14	0.64	**	0.03	0.52	-0.02	0.51		0.02	0.50	0.00	0.61	
VCR	0.01	0.64	0.23	0.78	**	0.02	0.65	0.06	0.55		0.02	0.55	0.14	0.90	
Video Camera	0.02	0.31	0.23	0.42	**	0.02	0.31	0.13	0.40	**	0.04	0.30	0.08	0.37	
Telephone	0.04	0.86	0.09	1.17		0.04	0.88	0.01	0.84		0.03	0.67	0.32	1.02	**
Bicycle	0.10	0.87	0.18	0.95		0.09	0.88	0.04	0.69		0.12	0.77	0.14	1.10	
Car	0.01	0.48	0.49	0.91	**	0.02	0.50	0.01	0.43		0.02	0.35	0.14	0.39	**
TV Game	0.10	0.69	0.37	0.77	**	0.11	0.67	0.09	0.77		0.10	0.70	0.05	0.67	
Word Processor	-0.02	0.40	-0.09	0.54		-0.02	0.41	-0.06	0.39		-0.02	0.36	0.00	0.53	
Personal Computer	0.12	0.49	0.47	0.63	**	0.14	0.50	0.06	0.42		0.11	0.49	0.18	0.53	
FAX	0.06	0.35	0.30	0.60	**	0.06	0.36	0.04	0.35		0.05	0.32	0.11	0.44	
Mobile Phone	0.21	0.65	0.60	0.70	**	0.23	0.66	0.09	0.52	**	0.18	0.62	0.32	0.79	

Time-use patterns (minutes)	NN (2231)		NY (57)		Significance	NN (2034)		NY (149)		Significance	NN (948)		NY (65)		Significance
	Mean	SD	Mean	SD	P<0.05	Mean	SD	Mean	SD	P<0.05	Mean	SD	Mean	SD	P<0.05
Wife, Working Days															
Weekdays-Commuting (work/school)	0.04	29.29	-14.16	42.20	**	-0.10	30.84	-8.34	31.86	**	-0.34	30.08	1.71	35.00	
Work	5.44	150.90	-203.32	277.74	**	2.45	154.05	-105.99	222.16	**	-1.73	163.09	1.08	243.13	
Study	-1.66	51.40	5.16	54.78		-1.71	53.10	-3.21	25.77		-1.51	48.95	-7.42	42.97	
House-Keeping and Taking Care of Children	-5.60	175.54	222.81	253.83	**	-10.60	148.58	297.62	282.88	**	8.01	204.89	23.80	253.93	
Hobby, Leisure and Going out	1.88	132.17	-1.51	192.39		6.51	134.60	-85.88	167.90	**	0.25	145.97	0.72	178.67	
Sleep, Eat, Personal Hygiene	-0.35	164.72	8.07	200.65		3.63	164.72	-89.50	186.68	**	-4.23	170.71	-14.08	158.01	
Wife Weekends/Holidays															
Weekends-Commuting (work/school)	0.45	14.80	-5.36	23.66	**	0.34	16.03	-0.01	0.16		0.04	15.25	0.00	0.00	
Work	-0.94	71.84	-13.98	81.21		-1.40	71.84	-3.65	39.11		-2.62	79.16	0.95	45.07	
Study	-1.48	53.12	-9.70	58.08		-1.89	56.47	-2.47	22.00		-3.19	49.45	-7.65	59.41	
House-Keeping and Taking Care of Children	2.79	185.94	201.23	228.88	**	-3.61	164.81	276.96	284.55	**	18.35	205.17	40.87	228.81	
Hobby, Leisure and Going out	-1.77	194.49	-146.91	236.56	**	1.10	194.40	-153.56	216.01	**	-13.66	205.06	-13.54	187.41	
Sleep, Eat, Personal Hygiene	0.61	192.22	-22.39	300.03		5.49	194.11	-119.46	203.54	**	1.01	194.21	-16.35	226.21	
Husband, Working Days															
Weekdays-Commuting (work/school)	-1.15	47.79	N/A	N/A	N/A	-1.50	48.67	-1.60	38.79		-1.60	45.99	3.17	49.17	
Work	-0.10	125.18	N/A	N/A	N/A	-1.54	125.74	-0.44	110.23		2.27	121.74	-26.62	168.69	
Study	0.84	34.51	N/A	N/A	N/A	1.92	33.33	-6.16	34.94	**	1.05	37.78	-2.25	37.06	
House-Keeping and Taking Care of Children	-0.45	70.15	N/A	N/A	N/A	-1.04	67.96	25.20	85.16	**	1.95	60.51	8.26	129.94	
Hobby, Leisure and Going out	3.54	110.52	N/A	N/A	N/A	4.48	111.44	-4.09	113.01		3.25	99.42	16.92	117.71	
Sleep, Eat, Personal Hygiene	-1.43	125.84	N/A	N/A	N/A	-0.82	123.36	-18.78	146.26		-5.82	128.75	13.75	122.38	
Husband, Weekends/Holidays															
Weekends-Commuting (work/school)	0.12	12.41	N/A	N/A	N/A	0.26	9.00	-0.83	31.09		0.36	18.58	-0.08	0.55	
Work	-0.53	84.37	N/A	N/A	N/A	-1.55	84.34	1.70	91.97		0.43	99.34	-9.23	56.22	
Study	0.68	62.65	N/A	N/A	N/A	2.92	57.39	-15.26	115.33	**	-0.17	59.61	14.88	68.15	
House-Keeping and Taking Care of Children	-1.02	168.13	N/A	N/A	N/A	-8.24	151.22	99.91	231.20	**	12.38	164.38	-7.98	234.01	
Hobby, Leisure and Going out	-0.28	238.73	N/A	N/A	N/A	1.89	229.04	-46.99	286.43	**	-12.07	231.76	41.31	288.65	
Sleep, Eat, Personal Hygiene	1.27	232.30	N/A	N/A	N/A	4.92	229.27	-37.74	261.41	**	-0.61	218.65	-36.83	264.37	

CONCLUSIONS

The results from the panel analysis of the Japanese Panel Survey of Consumers (JPSC)
data by forming homogenous sub-groups by life events and attributes clearly indicated distinguished shifts of young Japanese women's consumption elasticities particular for concerned target groups. Major life events, such as getting married, giving birth to a child, start working, which alter the persons social status, have major contributions to time-consumption patterns, and getting married and moving to a house, which alter physical place of living, have major impacts on possession of durable goods and expenditure. In order to increase the resolution and robustness of this evaluation method, further study is necessary by conducting the same type of analysis using more detailed longitudinal panel data. Once such a methodology has been established, it will be made possible to evaluate the impacts of "sustainable consumption" activities on consumption patterns considering the interdependencies of consumption activities.

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