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Overview of the Japan Child Panel Survey 2012

Chizuru Shikishima*

【Abstract】

The Japan Child Panel Survey (JCPS) is a parent-child panel survey that began in 2010 as a supplementary survey to the Japan Household Panel Survey (JHPS) and the Keio Household Panel Survey (KHPS). The survey subjects chosen were those parents among the JHPS or KHPS participants who had children enrolled in elementary or junior high school, as well as those parents' children. In 2012, JCPS conducted its third survey (JCPS 2012) on children extracted from the households of JHPS participants. A total of 493 children participated in this survey. The cooperation rate per household was 57.5%. The continuation rate from the first survey (JCPS 2010) was 70.3%. No difference was observed among the mean academic ability test scores measured in the JCPS 2010, 2011, and 2012.. In comparison with data collected in the West, scores for children's behavioral problems measured in JCPS were higher. Prosocial scores were lower. In addition, the tendency for children's QOL to decline when they enrolled in higher grades appeared more prominent in JCPS. The children's inclinations to vote in the future were correlated with their interest in political and social issues. The children's ownership rates for rooms, study desks, and mobile phones noted in the JCPS 2012 increased when children enrolled in higher grades. Children's current and time of birth heights and weights were confirmed to be statistically representative in comparison with a large public dataset. The incidence of obesity among elementary and junior high school children was 1.4% calculated by BMI and 6.5% based on a calculation of standard weights by heights. The performance of an analysis on the JCPS dataset in relation to the rich household information collected by JHPS and KHPS will help us understand the relationships that exist between children's growth and their family backgrounds in a detailed and dynamic manner. We also discuss problems inherent in JCPS.

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comparison with a large public dataset. The incidence of obesity among elementary and junior high school children was 1.4% calculated by BMI and 6.5% based on a calculation of standard weights by heights. The performance of an analysis on the JCPS dataset in relation to the rich household information collected by JHPS and KHPS will help us understand the relationships that exist between children's growth and their family backgrounds in a detailed and dynamic manner. We also discuss problems inherent in JCPS.

Section 1. Introduction

The Japan Child Panel Survey (JCPS) is a parent-child panel survey that was initiated in 2010. It served as a supplementary survey to the Japan Household Panel Survey (JHPS) and the Keio Household Panel Survey (KHPS). The survey subjects were parents of children enrolled in elementary or junior high school, as well as those parents' children.

As the nation's interest in the relationships that exist between children's academic abilities and family backgrounds increases, the trend of discussions in sociology and economics is to posit that children's academic abilities and educational achievements are dictated by the socioeconomic backgrounds of their households (e.g, Mimizuka, 2007; Ojima & Below, 2010; Kariya, 2011). The Japanese general public is becoming increasingly aware of educational inequality and its reproductivity. However, with respect to Japan, the majority of these discussions have primarily depended on either cross-sectional surveys conducted in schools or on the results of social survey that relied on retrospective data based on adult samples. The majority of these discussions did not rely on both types of data. Although a large amount of data related to children's academic abilities has been collected, a significant amount of information related to family backgrounds has also been amassed. However, up to this time, these two datasets have not been properly linked.

Alternatively, beginning with Heckman et al. (2000), who noted the importance of non-cognitive skills to the training of human resources, researchers in the fields of economics and sociology have begun to study children's attainment and adaptation of social skills. However, at the present time, studies related to the formation of non-cognitive skills in Japanese children have solely been

conducted from psychological viewpoints. No active examinations have been conducted to discover the relationship that exists between children's socioeconomic backgrounds and their achievement of social skills.

In a number of economic, sociological, and psychological studies conducted in other countries that relied on large-scale panel surveys, researchers made detailed examinations of factors that contribute to the formation of children's cognitive and non-cognitive abilities, as well as aspects in children's family backgrounds that contribute to children's non-adaptability. For example, studies were conducted using panel data collected from children of the National Longitudinal Surveys of Youth or the Panel Study of Income Dynamics in the United States (e.g, Korenman, Miller, & Sjaastad, 1995; McLeod & Shanahan, 1996; Brooks-Gunn & Duncan, 1997; Duncan, Brooks-Gunn, & Klebanov, 1994). In Japan, the provision of empirical knowledge related to the relationship that exists between children's outcome and their household characteristics has become increasingly important. Studies must now follow the same households collected from non-biased samples in which the entire nation is considered a population. To gain a better understanding, both the cognitive and non-cognitive abilities of children should be measured and the details of family socioeconomic information should be gathered simultaneously.

Therefore, JCPS is attempting to incorporate tests that measure the cognitive and non-cognitive abilities of the children of subjects selected for household panel studies. Use of this design will help researchers discover the dynamic reciprocal relationships that exist between family backgrounds and children's development.

JCPS has conducted survey every other year on the JHPS and KHPS samples. JCPS has asked for

the cooperation of households that contain children of elementary or junior high school age. For the first 2010 survey, (JCPS 2010), subjects drawn from the JHPS 2010 were asked to cooperate. For the second 2011 survey (JCPS 2011), subjects of the KHPS 2011 were asked to cooperate. For the latest third 2012 survey (JCPS 2012), subjects of the JHPS 2012 were asked to cooperate.

This paper begins with an overview of the JCPS 2012. Section 2 provides an outline of the survey and a description of the responses. Section 3 provides an explanation of the academic ability test and its use as a cognitive ability scale. Results for sociality, adaptability, and citizenship as they were measured on a non-cognitive ability scale will also be discussed. Furthermore, this section focuses on the variables of study hours, educational environments, and physiques. With respect to some of these variables, this section provides a comparison of these results with the results collected from the JCPS 2010 and 2011, large-scale public surveys, or statistics collected in the West. In Section 4, some issues related to JCPS and possibilities for future development will be discussed.

Section 2. Outline and Responses to the JCPS 2012

The JCPS2012, a supplementary survey to JHPS, was conducted by extracting subjects (parents) whose children began to attend elementary (1st through 6th grade studnets) or junior high school (7th through 9th grade children) in March 2012 (i.e., children born between April 2, 1996 and April 1, 2005) from individuals who participated in the JHPS 2012 (the fourth survey). The subjects of the JCPS 2012 consisted of selected parents and their children. The survey was conducted between

March and April 2012,[3] following the completion of the JHPS 2012. Survey forms were collected from 315 households. In August 2012, survey cooperation was again requested from households that failed to state whether they were willing to cooperate with JCPS. The goal was to improve the response rate. As a result, survey forms were retrieved from an additional 27 households.

Households that served as subjects of the JCPS 2012 were identified by their children's dates of birth. Families provided this information in response to a question contained in JHPS that inquired about the composition of family members. Corresponding families were asked to participate in the JCPS 2012 by surveyors during retrieval of questionnaires for the JHPS 2012. Families were asked to return confirmation forms that stated whether or not they were willing to participate in the JCPS 2012.

The potential number of children who could cooperate in the JCPS 2012 was 888. Their birth dates determined that they were first to ninth graders during the 2012 academic year based on information that appeared in the family composition section of the JHPS questionnaire. Of these children, 490 children responded to and returned children's forms of the JCPS 2012. A total of 493 parents (136 fathers, 342 mothers, 15 unknown) responded to and returned the parent forms of the JCPS 2012. The response rate for households, which included three cases in which only the parent forms were returned, equaled 57.5%. The response rate per child equaled 55.5%. Similar values were obtained in both the JCPS 2010[4] and JCPS 2011. These values are listed in Table 1.

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[3] With respect to instances in which the survey forms were returned in April or after the time that children had advanced to the next grades, the children were considered members of the grades they attended until March.

[4] Yamashita, Nakamura, Akabayashi, Naoi, and Shikishima (2011) discussed the relationship that exists between cooperation with

Table 1. Households and children surveyed in JCPS

Survey year	Subject sample	Children's birth dates	Number of target households	Number of cooperative households	Response rate by household	Number of target children	Number of cooperative children	Response rate by child
2010	JHPS	1994/4/2 - 2003/4/1	644	312	48.4%	959	467(461,466)	48.7%
2011	KHPS	1995/4/2 - 2004/4/1	730	434	59.5%	1126	662(659,660)	58.8%
2012	JHPS	1996/4/2 - 2005/4/1	595	342	57.5%	888	493(490,493)	55.5%

Note: The number of children's forms and the number of parents' forms retrieved appear in parentheses.

Source: Based on JCPS 2010, JCPS 2011, JCPS 2012, JHPS 2009, KHPS 2010, and JHPS 2011.

Table 2. Children surveyed in the JCPS 2012 listed by grade

Grade	Number of target children			Number of children who participated			Response rate		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
1st	53	36	89	25	22	47	47.2%	61.1%	52.8%
2nd	40	54	94	25	30	55	62.5%	55.6%	58.5%
3rd	56	48	104	43	29	72	76.8%	60.4%	69.2%
4th	35	41	76	22	25	47	62.9%	61.0%	61.8%
5th	58	59	117	37	31	68	63.8%	52.5%	58.1%
6th	51	50	101	23	25	48	45.1%	50.0%	47.5%
7th	57	57	114	26	31	57	45.6%	54.4%	50.0%
8th	45	36	81	28	19	47	62.2%	52.8%	58.0%
9th	63	49	112	31	21	52	49.2%	42.9%	46.4%
All	458	430	888	260	233	493	56.8%	54.2%	55.5%

Source: Based on the JCPS 2012 and JHPS 2011.

Furthermore, the number of children and the response rates for the JCPS 2012 were organized by grades. These figures are shown in Table 2. With respect to children's graduation grades, such as the 6th grade and the 9th grade, the response rate was low: 50% and below. However, response rates of between 50% and 70% were observed for other grades. No apparent differences in response rates

the JCPS 2010 and household attributes.

were observed between genders. With respect to the number of children who participated from single households, 206 households had one child that participated, 121 households had two children that participated, and 15 households had three children that participated.

The children enrolled in the 1st through the 7th grades at the time of the JCPS 2010 were enrolled in the 3rd through the 9th grades at the time of the JCPS 2012. If they participated in both surveys, they formed a continuous sample. When the continuation rates by grade were calculated to determine the number of children who participated in the JCPS 2010 that also participated in the JCPS 2012, the continuation rates of children who participated during their enrollment in the 7th grade in 2010 and enrollment in the 9th grade during the later survey was low: 57.9%. However, with respect to all other grades, the continuation rates ranged between 66.0% and 76.3%. The overall continuation rate was 70.3% (Table 3).

Table 3. Continuation rates between the JCPS 2010 and JCPS 2012

Grade		Continuing	
In 2010	In 2012	Number of children	Rate
1st	3rd	47	74.6%
2nd	4th	33	75.0%
3rd	5th	47	74.6%
4th	6th	31	66.0%
5th	7th	43	69.4%
6th	8th	29	76.3%
7th	9th	33	57.9%
Total		263	70.3%

Source: Based on the JCPS 2010 and JCPS 2012.

Table 4. Participation patterns for the JCPS 2010 and JCPS 2012 and participants' attributes

	JCPS 2010 cooperation, JCPS 2012 non-cooperation n=111	JCPS 2010 cooperation, JCPS 2012 cooperation n=263	JCPS 2010 non-cooperation, JCPS 2012 cooperation n=128	F value
Children's genders (male: 1; female: 2)	1.51	1.48	1.44	.49
JHPS subjects' genders (male: 1; female: 2)	1.42	1.51	1.50	1.09
Number of children	2.19	2.34	2.13	3.77 **
Children's birth orders	1.60	1.62	1.56	.22
Fathers' ages (as of 2010)	42.40	42.20	42.73	.30
Mothers' ages (as of 2010)	40.70	40.31	40.89	.56
Fathers' academic backgrounds (university or higher: 1; non-university	.28	.40	.33	2.54 *
Mothers' academic backgrounds (university or higher: 1; non-university	.12	.13	.13	.08
Mothers' employment as of 2010 (employed: 1; unemployed: 0)	.67	.59	.63	1.06
Mothers' employment as of 2012 (employed: 1; unemployed: 0)	.64	.73	.75	2.11
2010 household incomes (10,000 yen)	667.73	639.96	649.72	.37
2012 household incomes (10,000 yen)	716.55	670.16	656.65	1.23

Note: ** and * indicate that the coefficient is statistically significant at 5% and 10% levels, respectively.

Source: Based on the JHPS 2010, JHPS 2012, JCPS 2010, and JCPS 2012.

Children enrolled in the applicable school grades during both the JCPS 2010 and JCPS 2012 who participated at least once (children enrolled in the 3rd through 9th grade levels during the 2012 school year) were divided into three groups: a group that participated in the JCPS 2010 that did not participate in the JCPS 2012 (111 children); a group that participated in both the JCSP 2010 and JCPS 2012 (263 children); and a group that did not participate in the JCPS 2010 but did participate in the JCPS 2012 (128 children). Following this division, the differences in sample attributes were examined. The mean value per group was calculated based on the children's genders, genders of parents who served as JHPS subjects, the number of children per household (the number of siblings including the subject children), the birth order of each child, parents' ages, parents' educational attainment, mothers' employment status during the 2010 and 2012 survey periods, and household

incomes for 2010 and 2012 (Table 4). A one-way analysis of variance (ANOVA) showed that, in groups that participated in both surveys, the number of children was significantly higher ($p < .05$). The fathers' educational attainment was significantly higher ($p < .10$). However, no other significant differences were observed in other attributes.

The JCPS survey form consisted of two sections: the children's form and the parents' form. The children's form included children's basic academic ability tests in the subject areas of arithmetic/mathematics, Japanese, and reasoning. The form also included questionnaires related to schools, studies, and quality of life (QOL). Although the questions related to mathematics and Japanese tests differed for each grade, the reasoning tests were the same for children enrolled in the 1st through 3rd grades and children enrolled in the 4th through 9th grades. With respect to academic ability tests, the same batteries were used for each of the JCPS 2010, 2011, and 2012 (The test question development process was detailed in Shikishima, Naoi, Yamashita, and Akabayashi, 2013). With respect to questionnaire items, the same questions related to school and studies were used for children enrolled in the 1st through 3rd grades and children enrolled in the 4th through 9th grades. Questions related to QOL were introduced for children enrolled in grade 3 and above. Questions related to citizenship were introduced for children enrolled in grade 6 and above. Children were asked to answer questions by themselves. The children had to complete the academic ability test within 20 minutes. The children were asked to complete the survey forms by themselves after completing the test. They then were asked to give the completed forms to their parents.

The parents' form was completed by the parents. The same questionnaire was used by parents of children enrolled in all grades. Parents were asked to respond to questions related to educational environments, childrearing, and children's sociality. The parents were asked to complete a form for

each of their children. These slips were mailed to households that agreed to participate in both surveys. Once parents completed the forms, they returned them by mail.

Section 3. Summary of JCPS 2012 Results

1 Cognitive abilities

(1) Academic ability test

Descriptive statistics were calculated based on scores per grade collected for the mathematics, Japanese (questions differed by grade), and reasoning tests (questions asked were the same for children enrolled in the 1st through the 3rd grade, and for children enrolled in the 4th grade and higher). The statistics for the JCPS 2010, 2011, and 2012, respectively, are shown in Table 5. The test scores for all subjects enrolled in all grades showed no differences in mean scores across the three surveys at the 5% significance level. Thus, no differences in the levels of academic abilities caused by differences that occurred during survey years were discovered.

No differences were observed in the mean scores between children enrolled in the 1st, 2nd, and 3rd grades for test scores for reasoning in the JCPS 2012 ($F_{(2, 170)}$=1.98, ns). The test scores for reasoning for children enrolled in the 4th grade and higher revealed that only the scores of 4th grade children were significantly lower than the other grades ($F_{(5, 311)}$=3.34, $p < .01$). However, no significant differences were observed between the scores of children enrolled in the 5th through 9th grades ($F_{(4, 265)}$=1.38, ns).

In response to the following question: "Did you try hard in this test?" that appeared on children's questionnaire, 91.3% of the children stated: "Yes."

Table 5. Mathematics, Japanese, and reasoning test scores listed by grade and survey year

Grade	Survey year	N of cases	Mathematics				Japanese				Reasoning			
			Min	Max	Mean	S.D.	Min	Max	Mean	S.D.	Min	Max	Mean	S.D.
1st	2010	62	1	14	12.09	2.03	2	20	18.45	2.66	0	4	2.40	1.55
	2011	58	7	14	12.41	1.65	7	20	18.19	2.64	0	4	2.67	1.33
	2012	47	9	14	12.36	1.58	13	20	18.65	1.68	0	4	2.96	1.38
2nd	2010	44	12	19	17.07	2.13	7	16	12.85	2.72	0	4	3.24	1.13
	2011	72	11	19	16.99	2.16	5	16	12.92	2.73	0	4	2.76	1.28
	2012	55	7	19	16.49	2.93	3	16	12.55	3.23	0	4	2.78	1.46
3rd	2010	63	6	19	16.29	2.34	8	18	14.88	2.38	0	4	3.24	1.03
	2011	90	6	19	16.22	2.50	5	18	15.06	2.87	0	4	3.14	1.20
	2012	71	8	19	16.46	1.99	2	18	15.24	2.92	0	4	3.24	1.10
4th	2010	47	2	10	7.83	1.91	1	13	10.39	2.45	0	4	1.87	1.41
	2011	75	1	10	7.59	2.08	5	13	10.16	2.23	0	4	2.29	1.58
	2012	47	4	10	7.60	1.78	4	13	10.04	2.28	0	4	2.06	1.34
5th	2010	62	2	9	6.98	2.03	5	13	10.45	2.11	0	4	2.39	1.42
	2011	74	0	9	6.18	2.60	0	13	9.92	2.71	0	4	2.55	1.39
	2012	66	0	9	6.58	2.19	5	13	10.70	1.88	0	4	2.45	1.36
6th	2010	38	0	10	6.12	2.70	2	13	8.99	3.30	0	4	2.45	1.43
	2011	83	0	10	6.80	2.24	0	13	9.80	3.11	0	4	2.58	1.30
	2012	48	0	10	7.35	2.07	3	13	10.25	2.27	0	4	2.79	1.18
7th	2010	57	0	10	6.49	2.50	0	13	10.32	2.50	0	4	2.67	1.16
	2011	67	1	10	6.43	2.32	3	13	9.37	2.48	0	4	2.48	1.24
	2012	57	0	10	6.39	2.66	4	13	9.86	2.33	0	4	2.68	1.34
8th	2010	46	0	11	7.61	2.78	2	14	9.55	2.56	0	4	2.51	1.16
	2011	84	0	11	6.94	3.55	0	15	9.53	2.98	0	4	2.52	1.10
	2012	47	0	11	7.02	3.37	2	15	9.68	2.95	0	4	2.96	1.04
9th	2010	42	0	12	7.33	4.12	4	14	10.82	2.49	0	4	2.55	1.15
	2011	56	0	12	7.70	3.60	5	15	11.03	2.24	0	4	2.66	1.21
	2012	52	0	12	7.37	3.61	4	15	10.98	2.30	0	4	2.83	1.06

Source: Based on the JCPS 2010, JCPS 2011, and JCPS 2012.

When correlations between the scores of the three tests included in the JCPS 2012 were computed, the correlation coefficient for children enrolled in the 1st and 5th grades between mathematics and Japanese was lower than .40. However, with respect to other grades, the coefficient was between .54 and .63. This demonstrated a sufficient positive correlation (Table 6). A positive

correlation coefficient at the .30-level between mathematics and reasoning existed for children enrolled in the 1st through 3rd grades, and at the .20-level for children enrolled in the 7th and 9th grades. Positive correlation coefficients that ranged between .30-.40-levels between Japanese and reasoning were observed for children enrolled in the 1st through 3rd grades, and at the .20-level for children enrolled in the 7th and 8th grades.

Table 6. Correlations between mathematics, Japanese, and reasoning test scores

Grade	Mathematics-Japanese	Mathematics-Reasoning	Japanese-Reasoning
1st	.36 **	.30 **	.47 ***
2nd	.57 ***	.34 **	.34 **
3rd	.54 ***	.35 ***	.43 ***
4th	.56 ***	.17	.19
5th	.30 **	.20	-.06
6th	.56 ***	.11	.08
7th	.63 ***	.24 *	.26 *
8th	.63 ***	.17	.29 **
9th	.57 ***	.29 **	.16

Note 1: Based on Pearson's correlation coefficient.

Note 2: ***, **, and * indicate that the coefficient is statistically significant at 1%, 5%, and 10% levels, respectively.

Source: Based on the JCPS 2012.

2. Non-cognitive abilities

(1) Sociality

Children's sociality was assessed based on responses provided by parents on the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) for each child enrolled between the 1st and 9th grades. SDQ is a Likert-style psychometric scale that asks parents to rate children's difficulties in the

areas of "emotional symptoms", "conduct problems", "hyperactivity/inattention", and "peer relationship problems". These areas are measured on a 5-point scale. In addition, "prosocial behavior" was measured on an additional 5-point scale. This questionnaire has been employed by the Ministry of Health, Labour, and Welfare as a continuous variable scale to screen children for problematic behaviors and to discover mild developmental disorders [6] (Matsuishi et al., 2008).

The SDQ data collected in the JCPS 2012 were allocated among the normal range, borderline range, or critical range, as advocated by Matsuishi et al. (2008). Their research was based on data collected in elementary schools from 2,899 parents of children between the ages of 4 and 12 years. Then, the proportion of frequency distribution for each range was calculated (Table 7). This is not a detailed comparison because the age groups of the child subjects were not the same. More than 80% of the children were categorized into the normal range for the following dimensions: "emotional symptoms", "conduct problems", "hyperactivity/inattention", and "peer relationship problems". Child subjects who fell within the borderline and clinical ranges amounted to less than 10% of the children in each category. Therefore, the cutoff point was confirmed to be appropriate. However, with respect to "prosocial behavior", only about two-thirds of all cases fell within the normal range. The frequency of cases that fell within the borderline range was high. Approximately 20% of the child subjects also fell within the clinical range. This indicates the possibility that the screening standard may have been too strict (Figure 1). Similar results were also been obtained from the JCPS 2011 data (Shikishima, Yamashita, & Akabayashi, 2012).

[6] http://www.mhlw.go.jp/bunya/kodomo/boshi-hoken07/h7_04d.html

Table 7. Screening based on the Japanese standard score cut-off for each dimension of children's sociality

	Normal range		Borderline range		Clinical range	
	Score	Corresponding percentage	Score	Corresponding percentage	Score	Corresponding percentage
Emotional symptoms	0−3	84.0 (84.3)	4	7.0 (7.2)	5-10	9.0 (8.5)
Conduct problems	0−3	82.2 (84.3)	4	9.0 (8.6)	5-10	8.8 (7.1)
Hyperactivity/inattention	0−5	83.6 (83.6)	6	6.8 (6.8)	7-10	9.6 (9.7)
Peer relationship problems	0−3	87.1 (90.1)	4	5.7 (5.5)	5-10	7.2 (4.4)
Total difficulties	0−12	78.7 (80.6)	13−15	10.7 (9.9)	16-40	10.7 (9.5)
Prosocial behavior	6-10	62.9 (71.2)	5	17.2 (15.5)	0-4	19.9 (13.3)

Note: Cutoff standards are based on a study conducted by Matsuishi et al. (2008). The numbers enclosed in parentheses represent data collected from children between the ages of 4 and 12 years old reported by Matsuishi et al. (2008).

Source: Based on the JCPS 2012 and Matsuishi et al.(2008).

Figure 1. Frequency distribution of prosocial behavior scores and Japanese screening standards
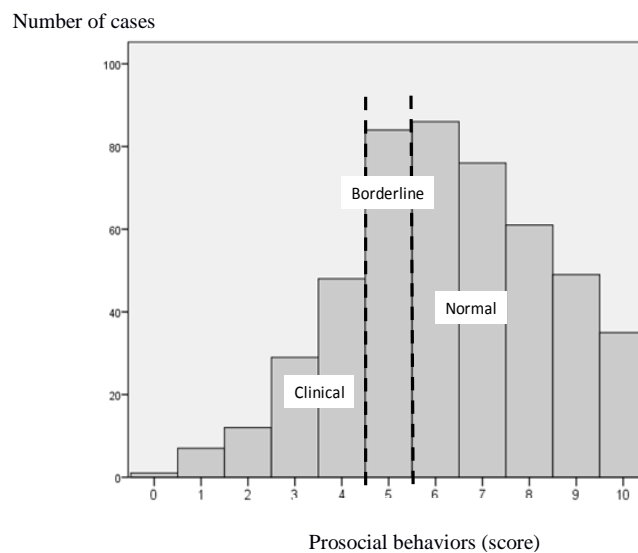
Source: Based on the JCPS 2012.

In the 2001 National Health Interview Survey (NHIS) conducted by the National Center for Health Statistics (NHIS), a part of the United States Center for Disease Control and Prevention (CDC), responses related to SDQ were solicited from parents of children aged 18 years and younger. The mean values and the standard deviations of those scores were then categorized by the genders of child subjects aged between 8 and 10 years (male: 1,026; female: 1,038) and child subjects aged between 11 and 14 years old (male: 1,426; female: 1,344). [7] It was impossible to avoid the existence of differences in concepts measured that resulted from translations because versions written in different languages were used. However, when this data was compared with data collected from JCPS-applicable age subjects, scores for both countries in the dimension of difficulties were consistently higher for males than for females, and consistently higher for children enrolled in higher grades than for children enrolled in lower grades. The individual differences tended to be very high. However, a tendency was demonstrated for JCPS subjects to have slightly higher mean values than subjects collected from American NCHS data (Figure 2). In addition, with respect to prosocial behavior, scores for both countries demonstrated a tendency for females to score higher than males. However, scores for subjects in the American NCHS tended to have higher mean values than subjects in the JCPS.

Figure 2. Comparisons between JCPS and American NCHS mean values by gender for sociality dimensions of children enrolled in the 2nd through 4th grades and for children enrolled in the 5th through 8th grades

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[7] Normative SDQ data collected from the USA on http://www.sdqinfo.org/USNorm.html
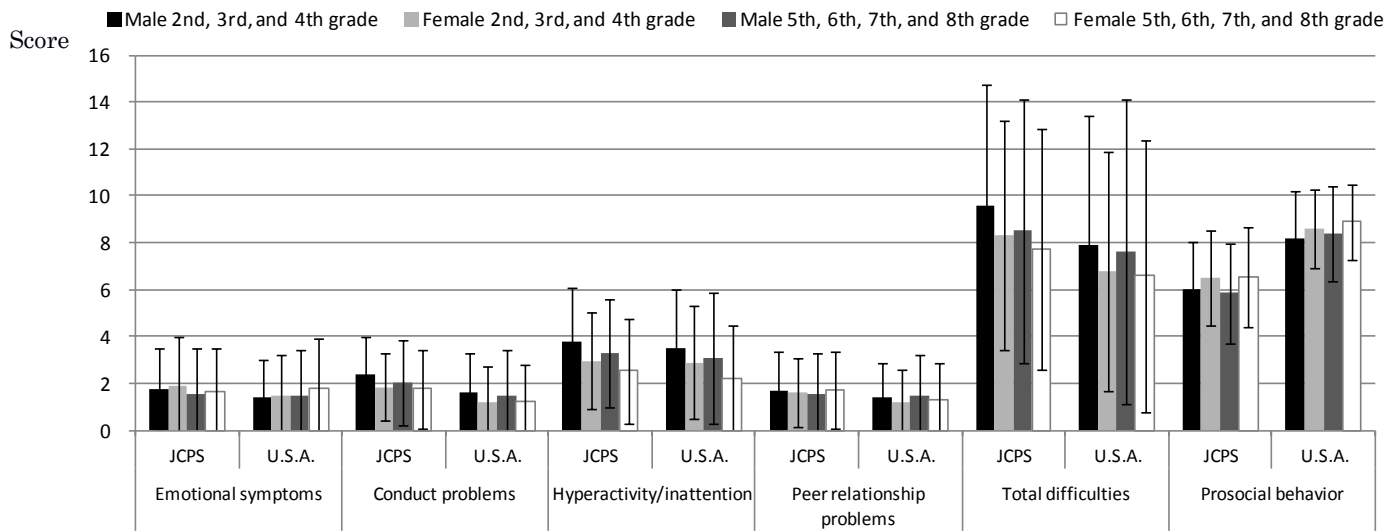
Note: The error bar indicates the standard deviations.

Source: Based on the JCPS 2011, JCPS 2012, and "Normative SDQ Data from the USA" shown on the SDQ homepage.

(2)　Adaptability

The adaptability of children enrolled in the 3rd grade and higher was measured based on their self-reports by the use of the elementary school children's edition and the junior high school children's edition (Matsuzaki, et al.,2007) of "KINDL[R]" (Ravens-Sieberer et al., 2006), a QOL scale for children developed by Bullinger et al. (1994) in Germany. KINDL[R] multilaterally measures QOL based on six subscales: "physical health", "emotional well-being", "self-esteem", "family", "friends", and "school". KINDL[R] is a 24-item Likert-style psychometric scale that measures each of six areas by the use of four items. The total scores represent children's QOL scores. Figure 3 illustrates the changes in the mean values for each dimension per grade when the levels of adaptability were converted to scores based on 1 through 100.

Figure 3. Changes observed for each adaptability dimension by school grade

Score

Legend	
◆	Physical health
■	Emotional well-being
▲	Self-esteem
✕	Family
✳	Friends
●	School
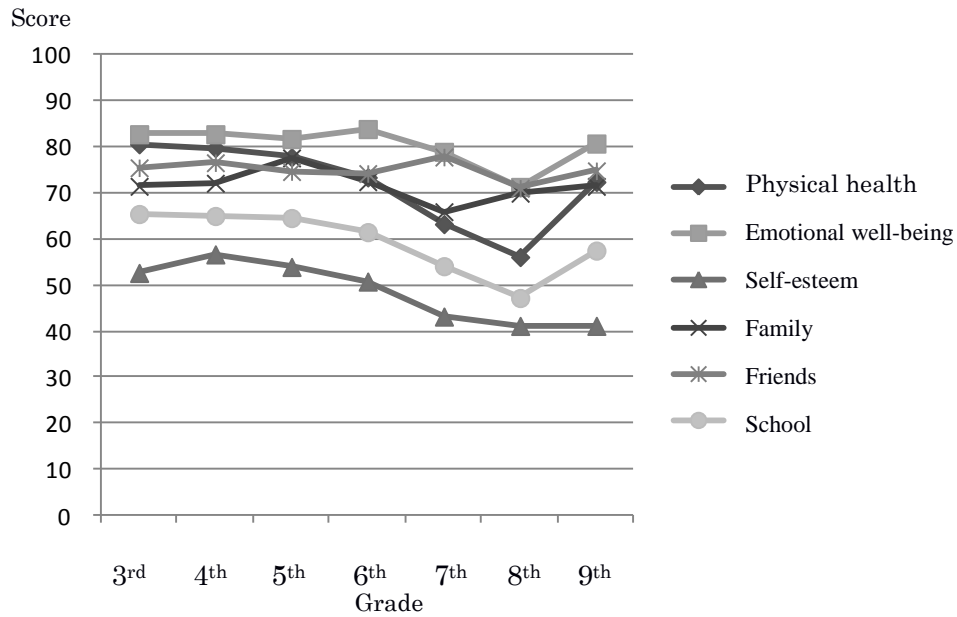
Although scores decreased for children enrolled in the 6th through 8th grades, scores tended to recover for children enrolled in the 9th grade. A similar trend was seen with QOL (Figure 4). The results of the JCPS 2011 (Shikishima et al., 2012) and another large-scale school survey (Shibata, Matsuzaki, & Nemoto, 2008) confirmed that a trend for adaptability appeared to decline as children progressed through the academic years. However, no recovery was seen for children enrolled in the 9th grade. This could be attributed to the fact that, because the JCPS 2012 was conducted during March and April, the possibility exists that 9th grade children may have temporarily experienced heightened satisfaction because they had decided on their future courses. The JSPCS 2011 was conducted during April and May of the following academic year.

Figure 4. Changes in QOL by school grade
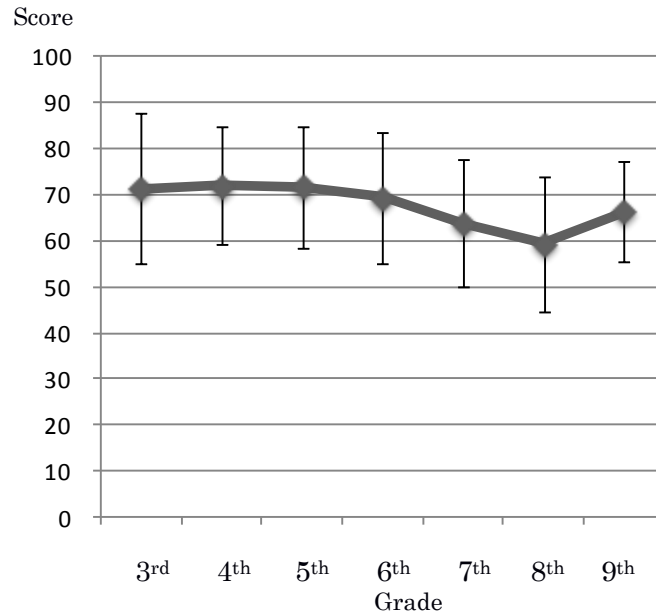
Note: The error bar indicates the standard deviations.
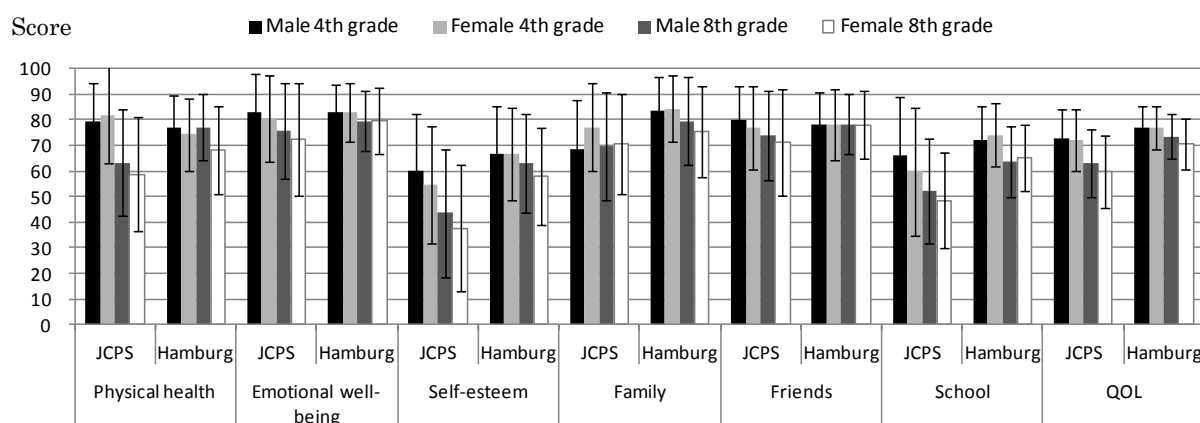
Source: Based on the JCPS 2012.

Is this decline in adaptability based on children's advancement during the academic year a tendency particular to Japan? Mean scores and standard deviations for each gender for each dimension of adaptability and QOL (the total score) for 918 4th grade children (mean age: 9.7) and for 583 8th grade children (mean age: 14.1), who were surveyed during a health check conducted in a school in Hamburg, Germany, and published in the KINDL[R] manual[8], were compared with data for corresponding school grades collected by the JCPS 2011 and 2012 (Figure 5). A number of differences were notable: Different language versions were used (i.e., Japanese and German versions) and differences existed in methodologies (i.e., the JCPS child subjects were a random household sample selected throughout Japan; the Hamburg survey reviewed children that attended a

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[8] KINDL[R] available on http://kindl.org/

specific school). However, a similar declining trend in scores in several dimensions was observed in the grades of children enrolled in higher grades in Germany. Nevertheless, prominently low scores were observed for Japanese junior high school children of both genders. In particular, Japanese junior high school children demonstrated low adaptability in "physical health", "self-esteem", and "school" areas.

Figure 5. Comparison between mean values of adaptability dimensions by gender for children enrolled in the 4th grade through 8th grades in the JCPS and Hamburg survey

Note: The error bar indicates the standard deviations.

Source: Based on the JCPS 2011, JCPS 2012, and the KINDL[R] manual.

(3)   Citizenship

Sixth grade and junior high school children were asked to rate the extent to which the following two social attitudes applied to them: "I will always vote during elections when I become an adult;" and "It is important to stay informed about political and social issues." Table 8 displays the frequency distribution for these two items.

Table 8. Two-dimensional citizenship cross-tabulation

		I will always vote during elections when I become an adult.				
		I don't agree.	I slightly don't agree.	I slightly agree.	I agree.	Total
It is important to stay informed about political and social issues.	I don't agree.	11	4	8	2	25
	I slightly don't agree.	6	14	10	4	34
	I slightly agree.	5	18	44	17	84
	I agree.	4	5	18	29	56
Total		26	41	80	52	199

Source: Based on the JCP 2012.

With respect to children's inclinations to vote in the future, the percentage of children who stated, "I agree" or "I slightly agree," equaled 66%. This value approximately matched the voting rate for adults in national elections held in recent years. The percentage of children who stated, "I agree," or "I slightly agree," with respect to the importance of staying informed about political and social issues equaled 70%. This value equaled more than twice the number of children who stated, "I don't agree," or "I slightly don't agree" (Table 8).

The cross-tabulation of the two items revealed that children who demonstrated strong inclinations to vote in the future tended to place a great deal of importance on staying informed about political and social issues. On the other hand, children who demonstrated weak inclinations to vote in the future tended to place limited importance on staying informed about political and social issues (Table 8). The correlation coefficient between the two attitudes equaled .43 ($p < .001$, Spearman's rank correlation coefficient).

3. Study hours

Figure 6 illustrates the distribution of study hours that parents stated their children engaged in outside of school on normal days (hours spent at cram schools and with personal tutors were included in study hours). The distributions are organized in groups of three grades. During elementary school, study time for the majority of children equaled about 30 minutes. For one-third of the children enrolled in junior high school, study time equaled about 1 hour. The number of children enrolled in junior high school who studied for two or more hours increased by almost 40%. However, children who rarely studied also increased by 17%. As children enrolled in advanced grades, the centralized tendency decreased and prominent individual differences in study hours depended on individual children.

Figure 6. Distribution of study hours
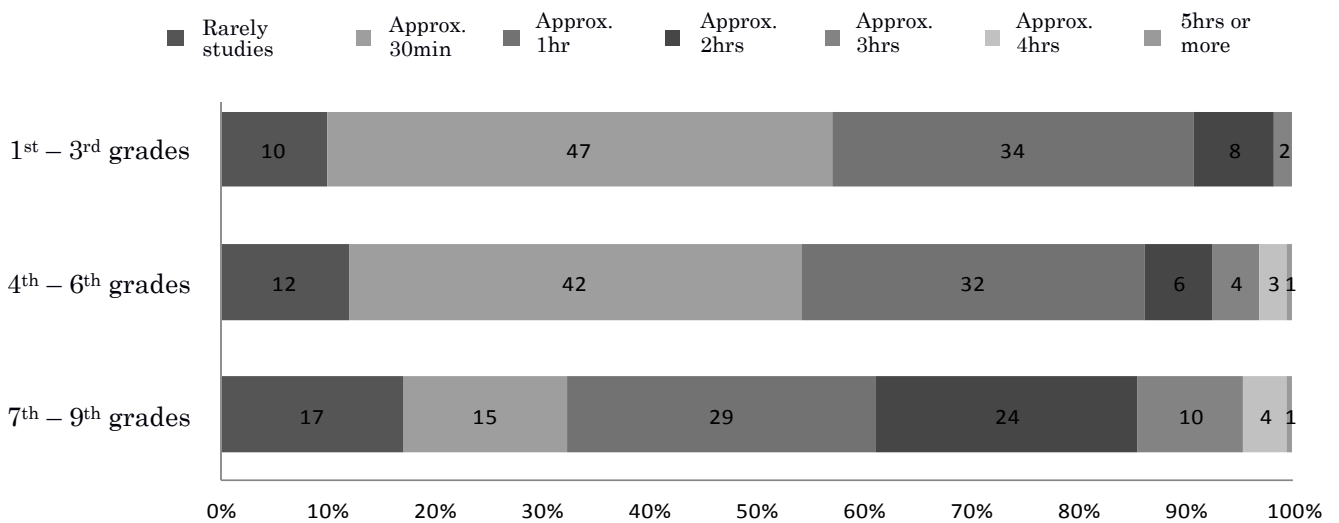
Source: Based on the JCPS 2012.

4. Educational environment

To assess children's educational environments, the survey asked parents whether their children studied in their own rooms and whether they owned study desks. The subjects were divided into three groups: 1st through 3rd grade children, 4th through 6th grade children, and junior high school children. Figure 7 shows the frequency distribution of their responses to the following three options: "I have my own room," "I share a room (with my sibling);" and "no." The same questions were asked for study desks as well. Distributions are displayed in percentages. The rate of children who possessed their own rooms was less than half among elementary school children. The rate was 60% for junior high school children. However, if the rates of children who shared rooms with their siblings were included, the values were high: 78% of lower elementary school children had their rooms and 90% of junior high school children had their rooms. The ownership ratio of personal study desks was between 70% and 80% for elementary school children. However, for junior high school children, the ownership ratio increased to 95%.

An analysis of variance (ANOVA) was conducted to discover whether a difference occurred in study hours (Figure 6) based on whether a child had a personal room, shared a room, or did not have a room. No significant difference was observed in any of the three groups of school grades ($F_{(2, 169)}$=.68, *ns*; $F_{(2, 156)}$=.86, and *ns*; $F_{(2, 147)}$=.05, *ns*, respectively).

Figure 7. Children's ownership rates for personal rooms/study desks
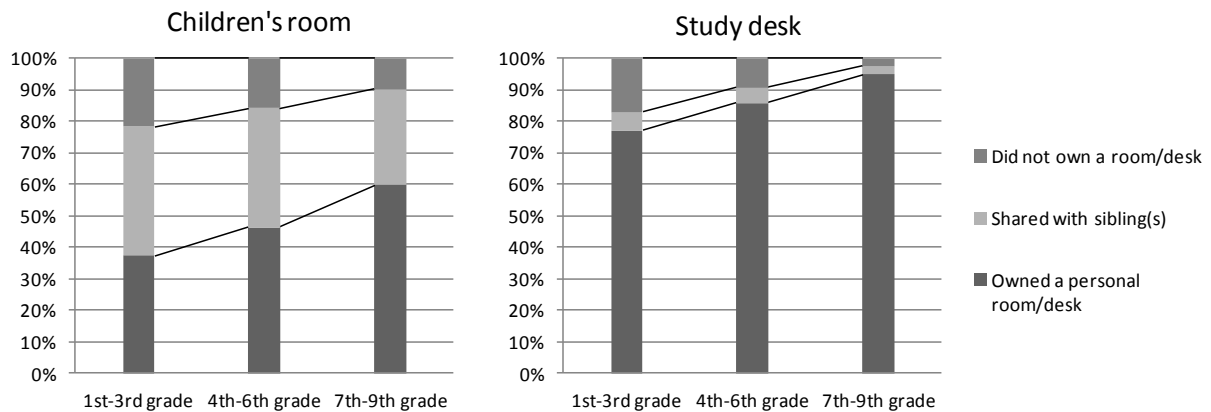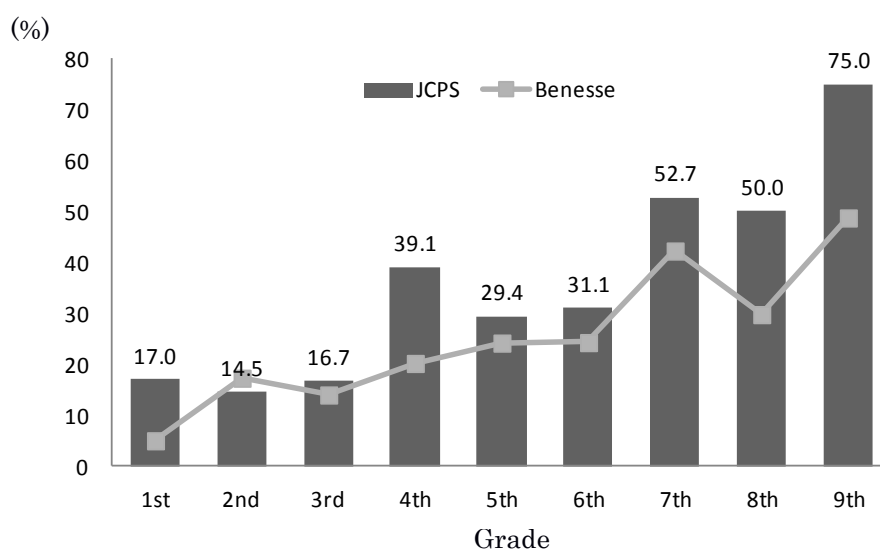

Source: Based on the JCPS 2012.

Ownership rates for personal mobile phones were calculated by grade and compared with information obtained in a survey conducted in August 2012[9] of 2,614 parents of elementary through high school students that was published on the Benesse education information website. Figure 8 displays both datasets. The results of the JCPS 2012 revealed that 16% of 1st through 3rd grade children, 33% of 4th through 6th grade children, and 60% of junior high school children owned mobile phones. When children entered higher grades, the ownership rate increased significantly. This tendency to increase resembles the results of the Benesse survey. However, although JCPS placed 4th grade children' ownership at 39%, the Benesse survey placed it at 20%. For 9th grade children, JCPS placed the ownership rate at 75%. Alternatively, the Benesse survey placed it at 49%. Thus, JCPS demonstrated higher ownership rates. One possible reason for this difference may relate to the month when the surveys were conducted. The Benesse survey was conducted in August, during the middle of the academic year. The JCPS 2012 was conducted during and after March, at

[9] http://benesse.jp/blog/20121004/p2.html

the end of the school year or in the beginning of the following school year. According to the Benesse survey, the most common reason for ownership of a mobile phone was "to advance to a higher grade or to enter a more advanced school." Tenth grade students who attended high school showed ownership rates of 93%.

Figure 8. Changes in personal mobile phone ownership by grade

Source: Based on the JCPS 2012 and information published on the Benesse educational information site.

5. Physique

Parents provided children's current heights and weights. The mean values for each grade and gender were calculated. These results are shown, along with the results of the School Health Examination Survey (conducted between April and June 2012 on 4.9% of all infants, schoolchildren, and students in Japan by the Ministry of Education, Culture, Sports, Science, and Technology) in

Figures 9 and 10. Although the data was collected from the same school grades, because the survey periods differed by almost one year between JCPS and School Health Examination Survey, the school grades shown on the graph for the School Health Examination Survey were increased by one year to match the school grades used in JCPS.

Almost no differences between genders were observed in both the heights and weights of elementary school children. However, values were greater for male junior high school children in JCPS. Values continued to increase even when these children enrolled in the 9th grade. A tendency was observed for differences between genders to increase.

Because the survey periods for JCPS and the School Health Examination Survey for school ages in which growth was rapid did not match, it is impossible to make a close comparison of both sets of statistics. However, the values for heights were extremely close. With respect to weights, children in the JCPS sample for junior high school children weighed slightly less.

Figure 9 Changes in height by grade

Figure 10. Changes in weight by grade
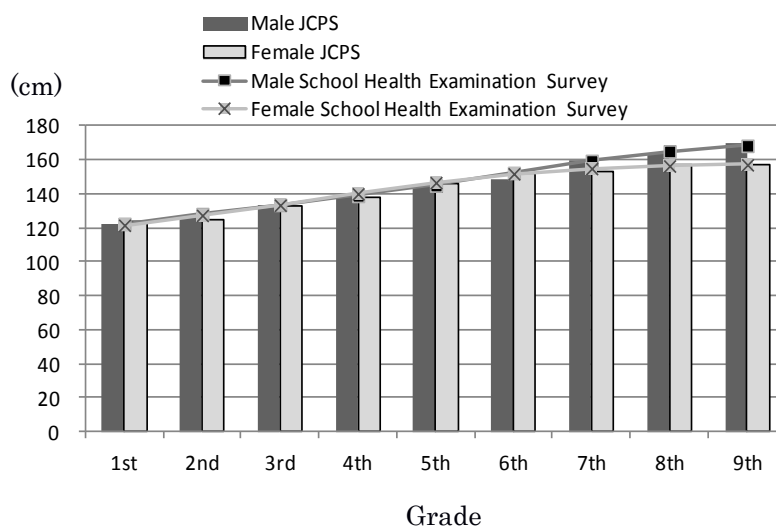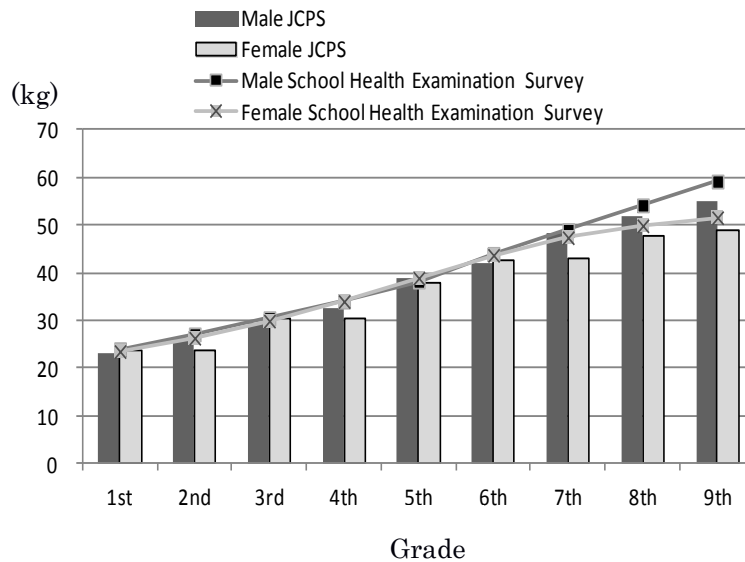
Source: Based on the JCPS 2012 and the Ministry of Education, Culture, Sports, Science, and Technology's School Health Examination Survey (data collected from 2nd through 10th grade students).

Figure 11 presents Body Mass Index (BMI) results calculated by equating weights (kg) and heights $(m)^2$ for each grade, as well as mean values for each gender. As children advanced grades, they demonstrated a tendency to gain weight. However, values that surpassed 25, the standard used to measure adult obesity, occurred infrequently. That value equaled 1.4% (male: 1.9%; female: 0.9%) for all samples.

Figure 11. Changes in BMI listed by grade
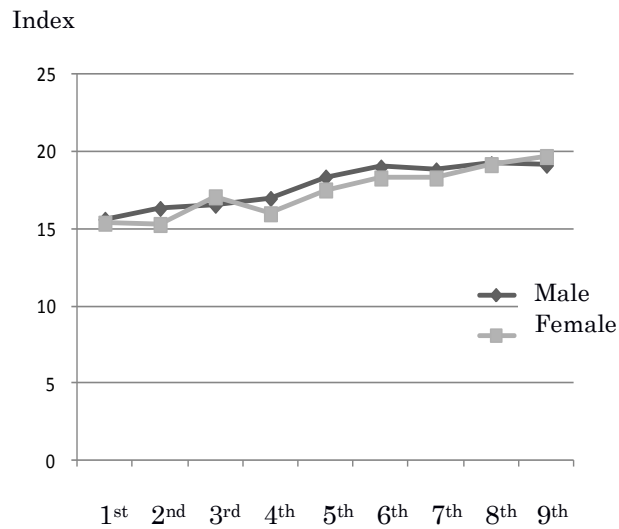
Index

Source: Based on the JCPS 2012.

Although many different types of indices, other than BMI, can be used to assess childhood obesity, the index introduced by the Ministry of Education, Culture, Sports, Science, and Technology beginning in academic year 2006 as a nationwide unified method[10] that could be used to determine obesity trends for school children and students relies on the following equation to calculate obesity levels by age, gender, and height.

Obesity level (%) = (measured weight (kg) – standard weight[11] by height (kg))/standard weight by height (kg)*100.

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[10] Published in the "Health Examination Manual for School Children" (Created by the Japanese Society of School Health and supervised by the Ministry of Education, Culture, Sports, Science, and Technology).

[11] This is calculated by the use of a standard formula that uses two coefficients assigned to age and gender from the measured height.

Then, values between 20% and 30% are classified as "slight obesity," values between 30% and 50% are classified as "medium obesity," and values of 50% and above are classified as "advanced obesity." The obesity levels for individuals were calculated by the use of data obtained from the JCPS 2012 and the frequency distribution presented in Figure 12. The occurrence rate of slight obesity was 4.0%, 2.3% for medium obesity, and 0.2% for advanced obesity. The occurrence rate of obesity in its broadest term was 6.5% of all samples (male: 7.1%; females: 5.9%).

Figure 12. Obesity level distribution calculated from standard weights by heights
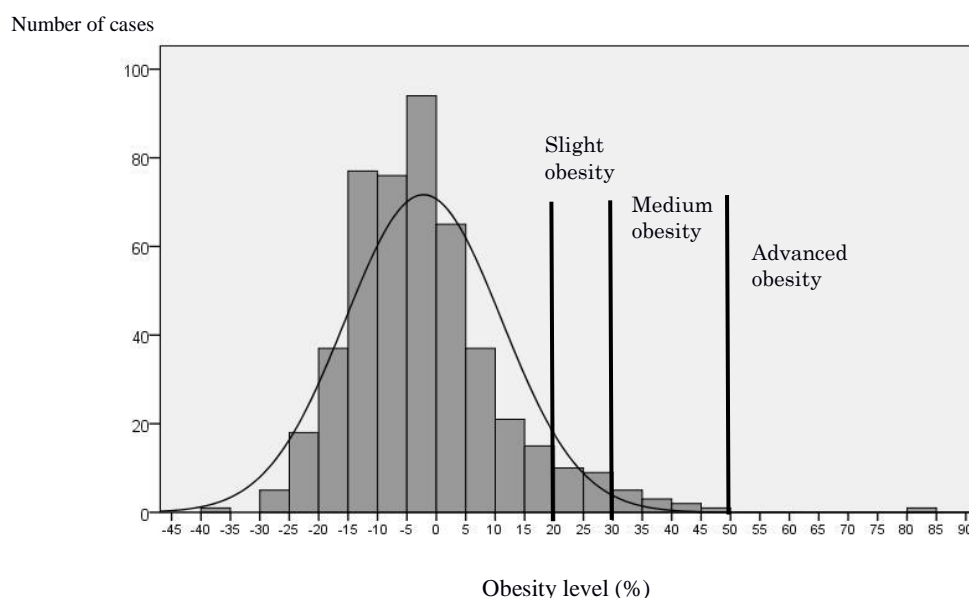
Source: Based on the JCPS 2012.

Parents were asked to provide their children's heights and weights at time of birth after they referred to material such as maternity health record books. The mean values were calculated for each gender (Table 9). The average heights for children in the JCPS 2012 were 49.3cm for males and 48.6cm for females. These values were extremely close to the values included in the Ministry of

Health, Labour, and Welfare's Longitudinal Survey of Babies in 21st Century results[12] (i.e., 49.2cm

for males and 48.7cm for females). In addition, the mean weight for males was 3,104g and 2,965g

for females. These values were close to the values released by the Ministry of Health, Labour, and

Welfare (i.e., male: 3,076g; females: 2,990g).

Table 9. Children's heights and weights at time of birth

	Male		Female	
	JCPS 2012	Longitudinal Survey of Babies in 21st Century	JCPS 2012	Longitudinal Survey of Babies in 21st Century
Height (cm)	49.3	49.2	48.6	48.7
Weight (g)	3104	3076	2965	2990

Source: Based on the JCPS 2012, and the Ministry of Health, Labour, and Welfare's Longitudinal Survey
of Babies in 21st Century.

Section 4 Conclusion

Beginning in 2010, JCPS conducted parent-child surveys three times. However, no differences

were observed in children's academic ability levels measured during each survey. Furthermore, the

JCPS 2010 and 2012 included the children of JHPS participants. The cooperation/non-cooperation

pattern for the two surveys and for sample attributions revealed that households that possessed high

cooperative levels tended to contain more children. In addition, the analysis clarified that these

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[12] http://www.mhlw.go.jp/toukei/saikin/hw/syusseiji/tokubetsu/kekka03.html

households demonstrated stronger tendencies for fathers' educational attainment to be high. However, no relationship was found among mothers' employment, mothers' educational attainment, household incomes, parents' ages, parents' genders and children's genders, and children's birth orders. Furthermore, when ownership rates for mobile phones, children's current heights and weight, and children's heights and weights at time of birth were compared with large-scale public statistics, the results confirmed that the statistics obtained from JCPS were representative. On the other hand, with respect to children's non-cognitive abilities, differences were observed between this survey and Western and Japanese levels obtained from published school research. Future research should investigate the causes of these differences.

JSPC adopted a two-layer structure to extract households from the household panel survey that included elementary and junior high school children. It then followed up with the selected parents and children for the purposes of supplementary research. In so doing, JSPC dynamically captured the relationship that exists between changes in household characteristics and children's growth. This research design created an unparalleled valuable dataset that would not have been gathered from a single survey. However, some limitations can be found in this design.

First, the present format requires that existing household panel survey participants respond voluntarily to an additional survey. Therefore, many subjects might feel burdened by the expectation that they cooperate with overlapping research surveys. One pressing task would be to improve the cooperation rate, which was not high for the past three surveys.

Furthermore, participating households were limited to JHPS or KHPS samples. Therefore, even if all corresponding children had participated, the maximum participants for each single survey would

have amounted to approximately 1,000 (Table 1) or, approximately, 100 participants per grade (Table 2). This represents a small sample. Because mathematics and Japanese academic ability tests that reflect government curriculum guidelines differ for each grade, comparisons of test scores must be limited to participants within the same grades. Efforts must be made to increase the number of samples and to ensure statistical power that can withstand quantitative data analysis. Efforts could include combining school surveys or supplementing them with randomly selected child samples.

Furthermore, the current design involves a biennial survey in which subject children's ages were limited to students enrolled in the 1st through 9th grades. Therefore, the continuous sample represents only a portion of this entirety. Hence, even if subjects continue to cooperate in the research, the survey effectively ends when these children enter 8th or 9th grade. No method has been determined to discover outcomes related to these children in the future. It would be desirable to transfer these subjects from the children's panel survey to an adolescent panel survey to allow researchers to follow these subjects.

Yet, although JCPS has many issues, it is likely that it will continue to receive additional attention, because it is a rare data source that allows interdisciplinary research that might provide valuable resources to the fields of economics, sociology, psychology, and educational science.

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