

Research of the relationship among living conditions
and physical strength motor abilities of young
children in Japan

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Research of the relationship among living conditions and physical strength motor abilities of young children in Japan

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Abstract

The purpose of this study was to investigate young children's living condition. Also, analyze the relationships between living conditions and physical strength motor abilities of young children. The subjects were 136 young children (73 boys and 63 girls) aged 4-6 enrolled in two Nursery school in Kyoto and the living condition were completed by children's parents.

The results were as follows: (1) over 50% of young children went to bed after 21:00 p.m., over 60% slept less than 10 hours, (2) the rate of eating breakfast (82.1%~100%), but the low rate of defecation in the morning (7.7%~45.8%), (3)"Feeling sleepy" before leave for school (7.1%~30.8%), (4) 53.8%~85.7% of young children playing outside less than 30 minutes. (5) For the correlation analysis, there was a significant negative correlation between bed time and sleeping hours ($r = -0.45$ of girls, $r = -0.57$ of boys), it means children went to bed late then the sleeping hours will decrease; there was a significant correlation between play time and outdoor play time for boys ($r = 0.35$), but for girls, the play time has a significant correlation between TV/Video watching time ($r = 0.49$). Finally, for the girls in kyoto, there was a significant negative correlation between both hands grip strength and breakfast time, that means children breakfast time late then the both hands grip strength will be lower level.

In conclusion, living condition is related to each factor of life rhythm and the living condition of young children became in the bad living circle- go to bed late, less sleeping hours, lack of physical activities, and the time of watching TV increased with age. However, there had no significant correlation between defecation time and the other living condition factors in this study. Therefore, for the future study can add the interview with parents to find out the reasons of no defecation in the morning of children.

Key words: living condition, young children, physical strength, motor abilities, sleeping hours

Introduction

The Health Science Social Welfare's laboratory of young children at Waseda University (Dr. Maehashi) has conducted a study on Japanese children's living conditions since the beginning of 2003. Now, it is not only the Japanese children as the research object, but also the Taiwan-based Asian circle as the research center to investigate young children's living conditions.

As we know, today, the young children attending to the school who uses cars increased, and the amount of steps of young children's daily life decreases dramatically. This study aimed to look at the relations between living conditions and physical strength motor abilities of young children. Moreover, to find and to propose what should be concerned in the kindergarten and what should parents and teachers consider.

According to previous studies have figured out is that the living condition is related to each factor of life rhythm and the living condition of Japanese and Taiwanese young children became in the bad living circle- go to bed late, wake up late, less sleeping hours, skipping breakfast, lack of physical activities, and the time of watching TV increased with age (Yu, Chou, Maehashi, 2013; Maehashi, Hasegawa, Matsuo, Izumi, Ishii, Oka, & Itagaki, 2012). That means, when young children's sleeping cycle collapse, eating cycle collapse and cause skipping breakfast and the lack of evacuation. Thus, complaining of drowsiness and feeling of sluggishness and vitality in the morning declines which leads to the weakening of autonomic nervous system and the day and night cycle starts to collapse. Besides, the hormone cycle also collapse and physical condition becomes poor. Since there is close relationship mind and body, physical unusualness are directly connected to mental unstableness. Therefore, to solve those problems, adults need to be more sincerely and it is necessary to feel the importance of young children's original life cycle from infancy.

Methods

This study used a purposive sampling to select 136 young children (73 boys and 63 girls) aged 4-6 enrolled in two Nursery schools in Kyoto (OOI Hoikuen and Chiyokawa Hoikuen). First, informed the principle of Nursery school and parents to explain the purpose of this research. After them consenting to participant in this study, then the living condition questionnaire was filled out by young children's parents during December 2018 to January 2019. The questionnaire contains of bed time, wake up time, breakfast time, dinner time, sleeping hours, and playing hour etc. Then, for all the young children, physical strength assessments evaluated the child's ability to

grip the handgrip as maximal strength as they can. Another physical strength measure assessed the child's ability to jump over the pass 5 times and record how much time they spend. And there are another three assessments evaluated the child's motor abilities including 25m dash, standing broad jump and tennis ball throw.

The data analysis was used the OCR software to check, modify and make graphic of the questionnaires. Then, the Statistical Package for the Social Science 16.0 Japanese Version was used to analyze all the data in this study. The level of significance for acceptance or rejection for this study was set at the 0.01 level ($p < 0.01$). The statistical methods employed for data processing include Descriptive statistics, and Pearson product-moment correlation coefficient.

Results

1. Living activities time and motor abilities

The results of living activities time and motor abilities on 4 to 6-year-old young children in Kyoto as shown in Table 1.

Table 1 Physique, physical strength and motor ability of Japanese young children in Kyoto

age items	4 years old (N=37)		5 years old (N=74)		6 years old (N=25)	
	Boys (N=24)	Girls (N=13)	Boys (N=35)	Girls (N=39)	Boys (N=14)	Girls (N=11)
Height (cm)	104.4±4.1	103.4±4.8	107.9±4.5	106.9±4.7	110.4±3.9	115.5±3.6
Weight (kg)	17.0±2.5	17.1±2.8	17.9±2.0	17.7±2.2	19.1±3.1	20.7±3.2
Bedtime	21:20±31	21:13±30	21:22±35	21:26±26	21:24±41	21:15±31
Wake up time	6:58±31	6:53±27	6:59±31	7:02±29	6:48±34	6:34±26
Sleeping hours	9:38±28	9:40±34	9:36±35	9:35±29	9:24±41	9:18±13
Breakfast time	7:20±28	7:12±28	7:20±31	7:21±27	7:14±29	6:51±30
Defecation time	13:21±359	13:37±327	11:52±347	14:24±361	16:06±309	14:00±361
Play time	2:51±58	2:20±80	1:58±58	2:30±54	2:30±65	1:51±57
Outdoor play time	38±29	43±42	19±22	26±34	39±26	34±37
TV/Video watching time	1:35±64	1:25±58	1:40±66	1:29±46	2:02±72	50±27

Dinner time	18:49±35	18:39±33	18:49±34	18:54±27	19:05±21	18:50±26
Both hands grip Strength (kg)	13.7±2.9	13.1±3.8	15.2±2.5	15.0±2.7	17.1±3.1	19.4±2.7
Jumping over the pass (second)	19.8±4.9	20.51±5.0	19.2±8.0	17.3±4.2	16.3±4.8	16.6±3.7
25m dash (second)	8.0±1.2	8.2±1.0	7.1±1.3	6.9±0.7	6.5±0.4	6.2±0.4
Standing broad jump (cm)	82.5±11.0	78.4±20.1	91.0±14.9	91.2±12.6	103.1±15.3	102.0±12.1
Tennis ball throw (m)	5.5±1.7	4.0±1.3	5.5±2.5	5.0±1.2	6.3±2.3	6.2±1.4

2. Body type

The Kaup's index was shown in Figure 1-1 and Figure 1-2. The percentage of young children in normal status for 4-year-old boys were 66.7%, the 4-year-old girls were 76.9%, 5-year-old boys were 60%, 5-year-old girls were 66.7%, 6-year-old boys were 42.9%, and the 6-year-old girls were 72.7%.

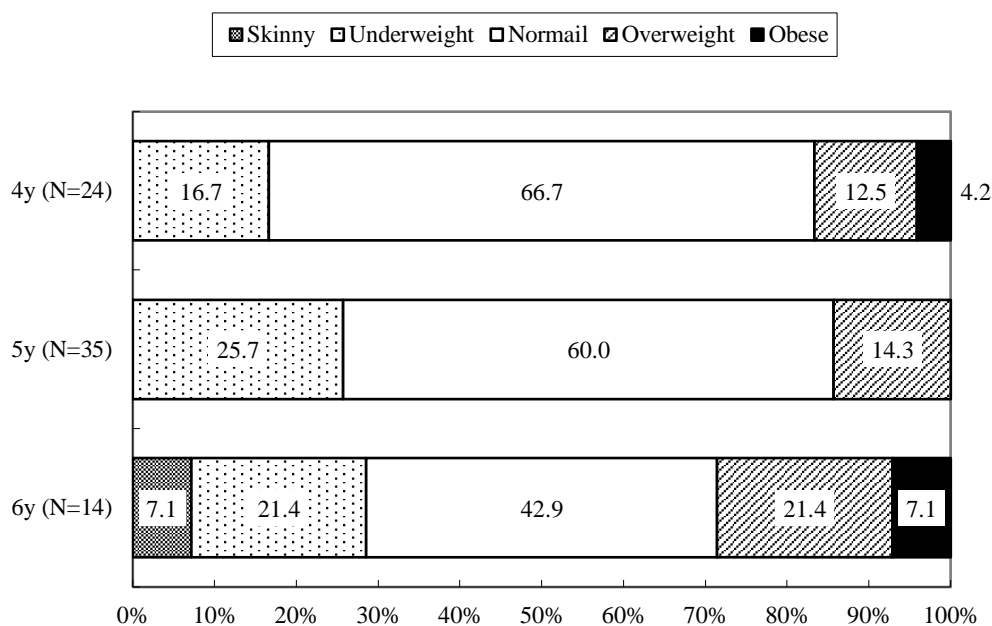


Figure 1—1 The percentage of Kaup's index (boys)

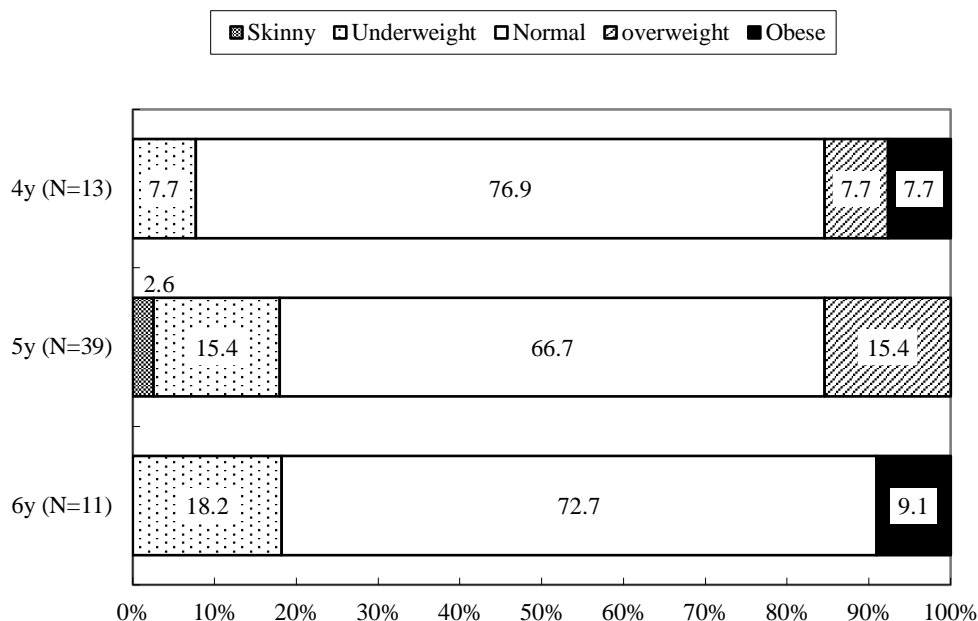


Figure 1—2 The percentage of Kaup's index (girls)

3. Bed time

The average bedtime for boys was from 21:20 p.m. (4-year-old) to 21:24 p.m. (6-year-old), and the average bedtime for girls was from 21:13 p.m. (4-year-old) to 21:26 p. m. (5-year-old).

According to Figure 2-1 and Figure 2-2, the percentage of boys went to bed after 21:00 p.m. were from 42.9% (5-year-old) to 64.3% (6-year-old), and girls were from 45.5% (6-year-old) to 59% (5-year-old).

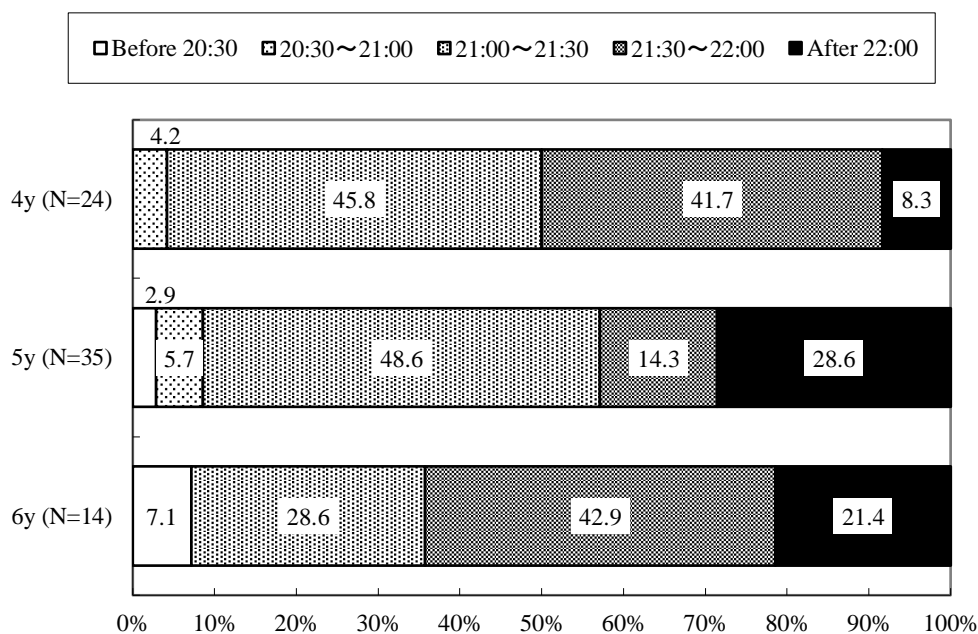


Figure 2—1 The percentage of bedtime (boys)

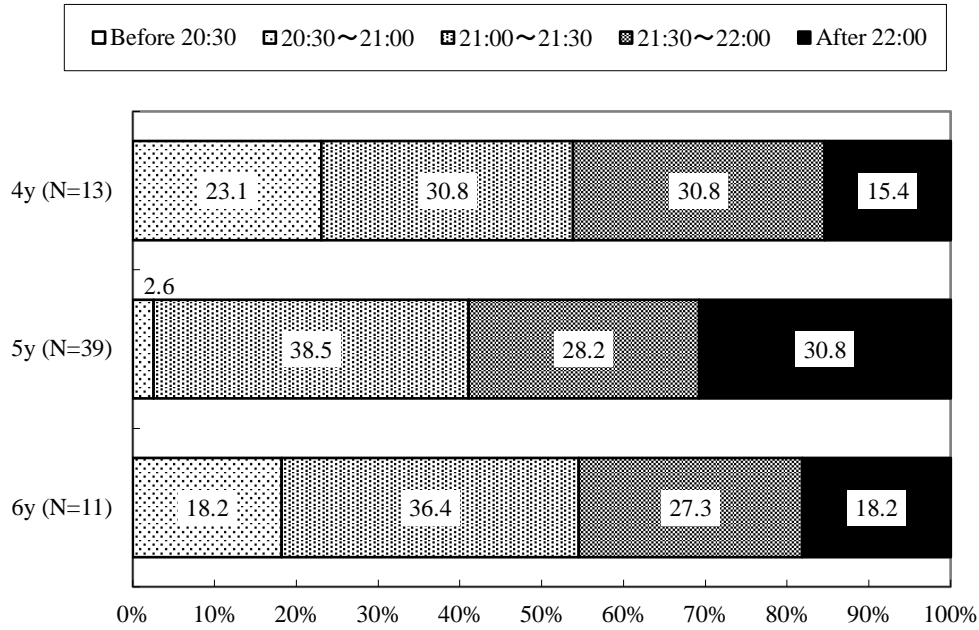


Figure 2—2 The percentage of bedtime(girls)

4. Sleeping hours

The average sleeping hours for boys were from 9 hours 24 minutes (6-year-old) to 9 hours 38 minutes (4-year-old), and the average sleeping hours for girls were from 9 hours 18 minutes (6-year-old) to 9 hours 40 minutes (4-year-old).

Also, the percentage of sleeping hours less than 10 hours were 70.9% of 4-year-old boys, 68.6% of 5-year-old boys, 78.6% of 6-year-old boys, 61.6% of 4-year-old girls, 69.3% of 5-year-old girls, and 100% of 6-year-old girls (Figure 3-1 and Figure 3-2).

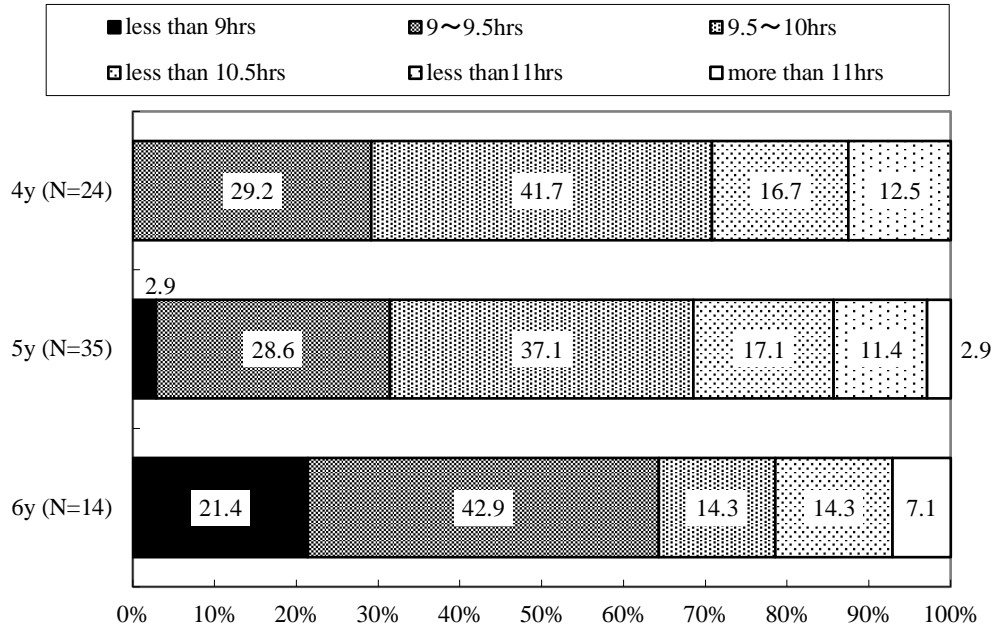


Figure 3—1 The percentage of sleeping hours (boys)

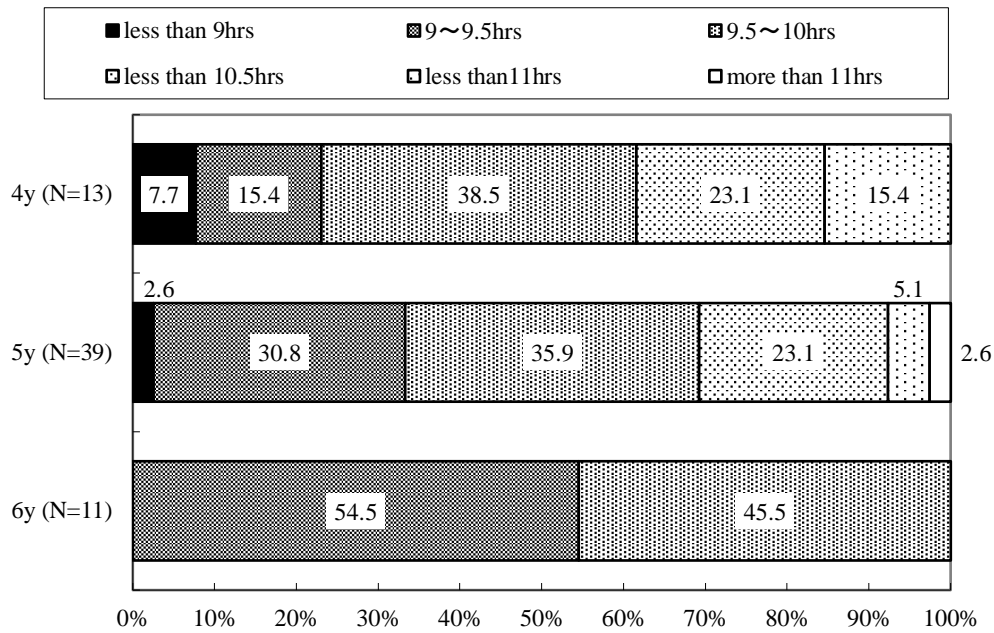


Figure 3—2 The percentage of sleeping hours (girls)

5. Wake up time

The average wake up time for boys was from 6:48 a.m. (6-year-old) to 6:59 a.m. (5-year-old), and the average wake up time for girls was 6:34 a. m. (6-year-old) to 7:02 a. m. (5-year-old).Also, the percentage of after 7:00 a.m. in the morning for 4-year-old boys were 62.5% , 4-year-old girls were 69.2% , 5-year-old boys were 62.8%, 5-year-old girls were 69.2%, 6-year-old boys were 50%, and 6-year-old girls

were 36.4% (Figure 4-1, Figure 4-2).

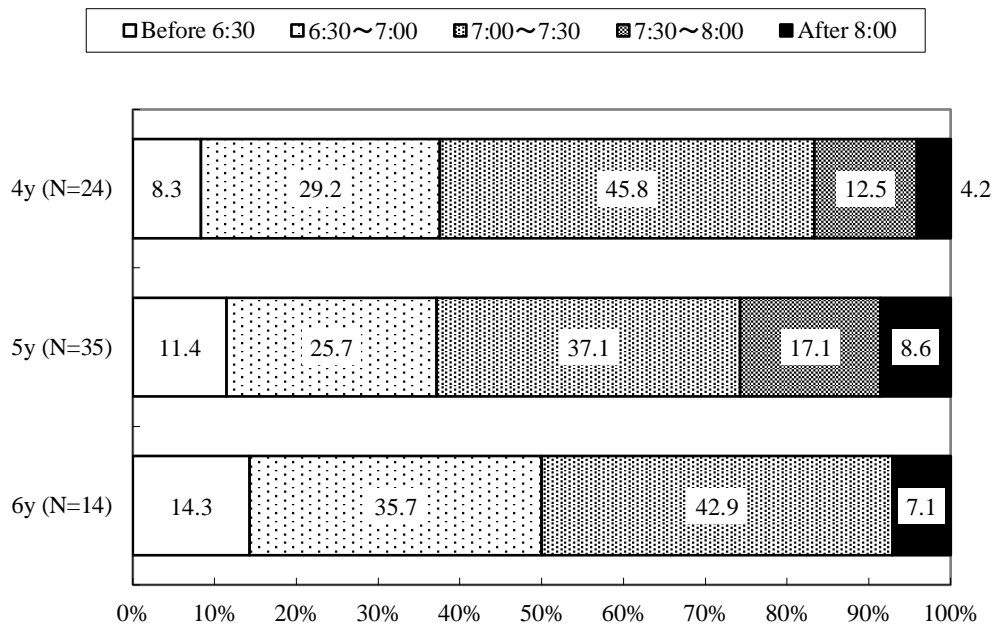


Figure 4—1 The percentage of wake up time (boys)

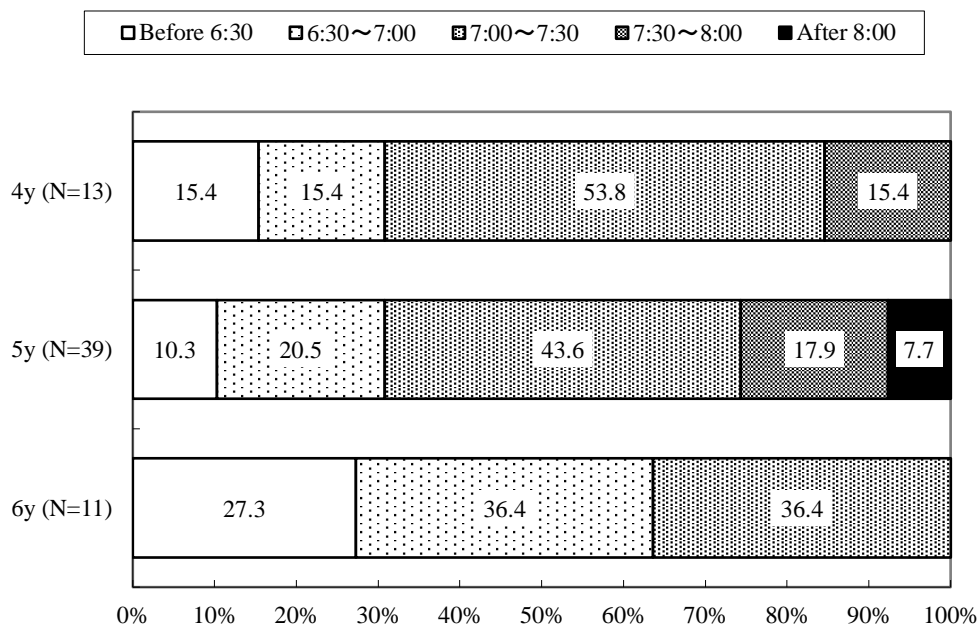


Figure 4—2 The percentage of wake up time (girls)

6. Way to get up

The way to get up in the morning of young children used to "get up by self" and "mostly get up by self", the percentage for 4-year-old boys were 41.7%, for 4-year-old girls were 30.8%, for 5-year-old boys were 22.8%, for 5-year-old girls

were 28.2%, for 6-year-old boys were 42.8%, for 6-year-old girls were 27.3% (Figure 5-1 and Figure 5-2).

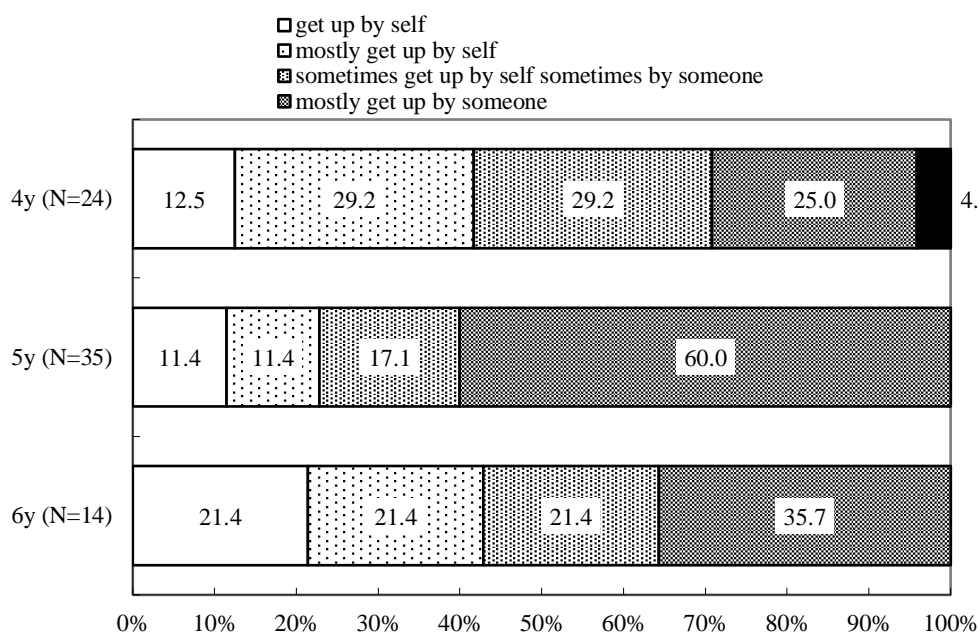


Figure 5—1 The percentage of way to get up (boys)



Figure 5—2 The persentahe of way to get up (girls)

7. Mood when get up

The mood of getting up in the morning of young children were "always feeling very good" and "mostly feeling good", the percentage of 4-year-old boys were

62.5% , 4-year-old girls were 38.5% 5-year-old boys were 62.9%, 5-year-old girls were 66.6%, 6-year-old boys were 85.7%, 6-year-old girls were 72.8%. (Figure 6-1 and Figure 6-2).



Figure 6—1 The percentage of mod when get up (boys)

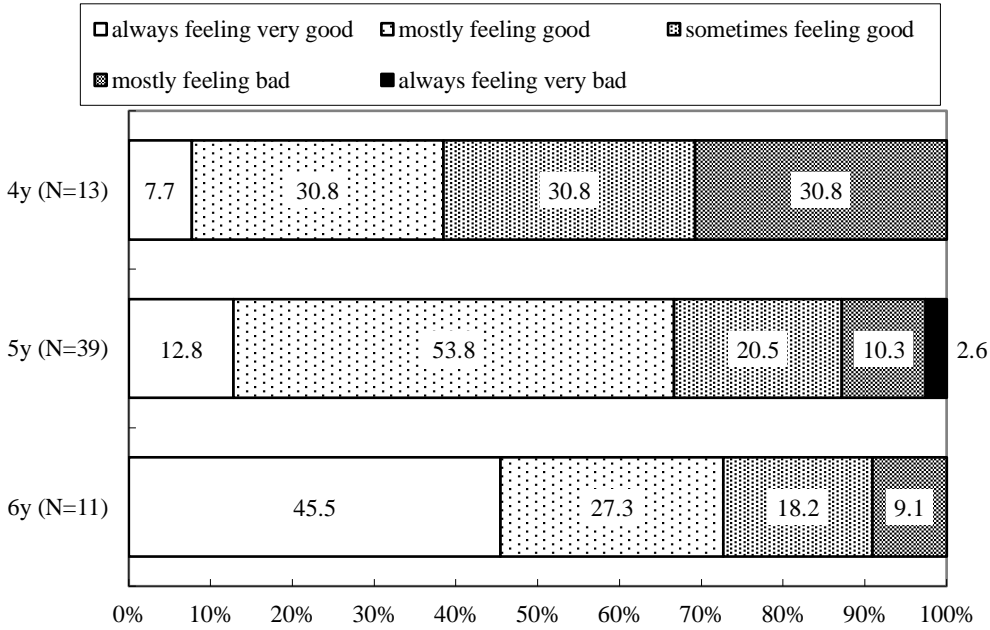
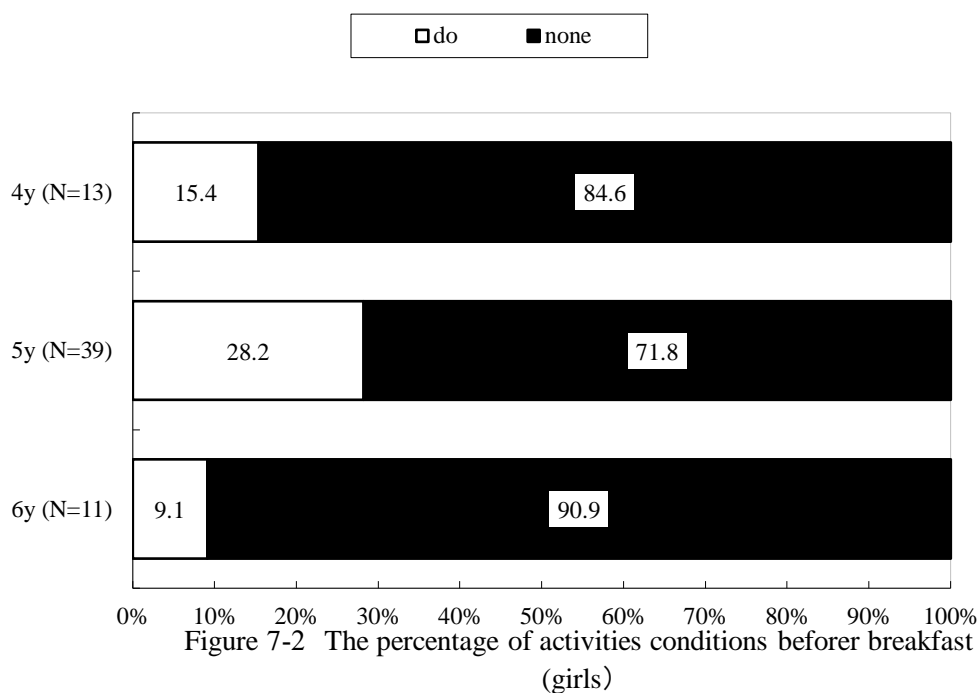
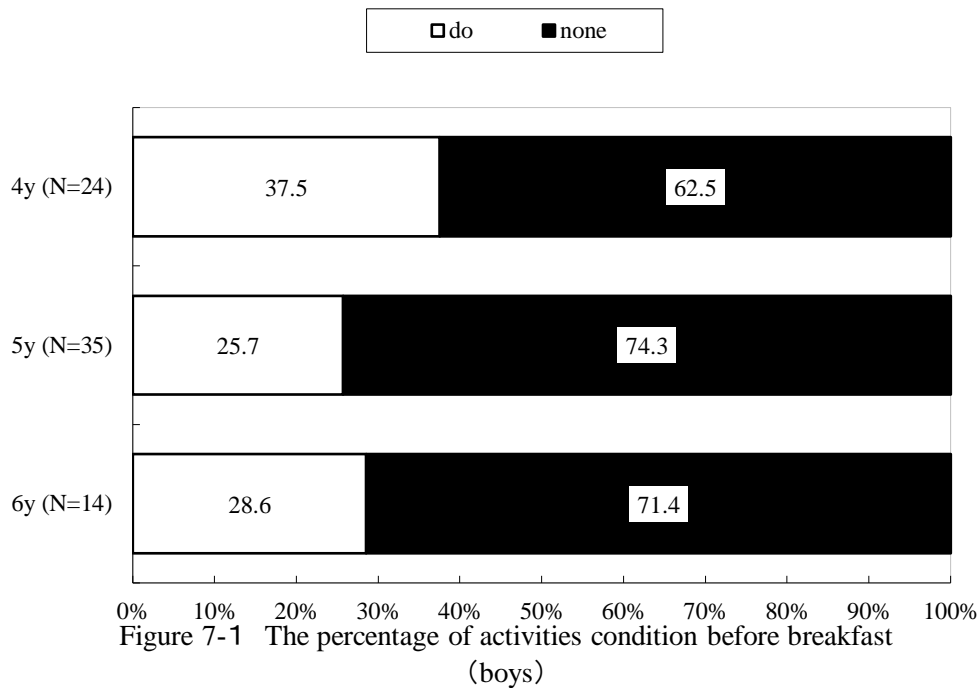


Figure 6—2 The percentage of mood when get up (girls)

8. Activities condition before eating breakfast

The percentage of young children "do" activities before eating breakfast of 4-year-old boys were 37.5%, 4-year-old girls were 15.4%, 5-year-old boys were 25.7%, 5-year-old girls were 28.2% 6-year-old boys were 28.6%, 6-year-old girls were 9.1% (Figure 7-1 and Figure 7-2).



9. Activities before eating breakfast

The top one activity before eating breakfast of young children was "watching TV or video", and the percentage of 4-year-old boys were 20.8%, 4-year-old girls were 7.7%, 5-year-old boys were 11.4%, 5-year-old girls were 25.6% 6-year-old boys were 21.4%. But only "playing with toys" rank top one for 6-year-old girls were 9.1%. (Table 2).

Table 2 Activities before eating breakfast

age	Boys	Girls
4 years-old	Watching TV or Video (20.8%) Playing with toys (16.7%)	Watching TV or Video (7.7%) Playing with toys (7.7%)
5 years-old	Watching TV or Video (11.4%) Playing with toys (8.4%)	Watching TV or Video (25.6%)
6 years-old	Watching TV or Video (21.4%) Others (14.3%)	Playing with toys (9.1%)

10. Breakfast time

The average time of eating breakfast of boys were 7:14 a.m. (6-year-old) to 7:20 a.m. (4 and 5-year-old), and average time of eating breakfast of girls were 6:51 a. m. (6-year-old) to 7:21 a. m. (5-year-old). The percentage of eating breakfast after 8:00 in the morning of 4-year-old boys were 8.4%, 4-year-old girls were 7.7%, 5-year-old boys were 14.3%, 5-year-old girls were 10.3%, 6-year-old boys were 7.1%, 6-year-old girls were 0% (Figure 8-1 and Figure 8-2).

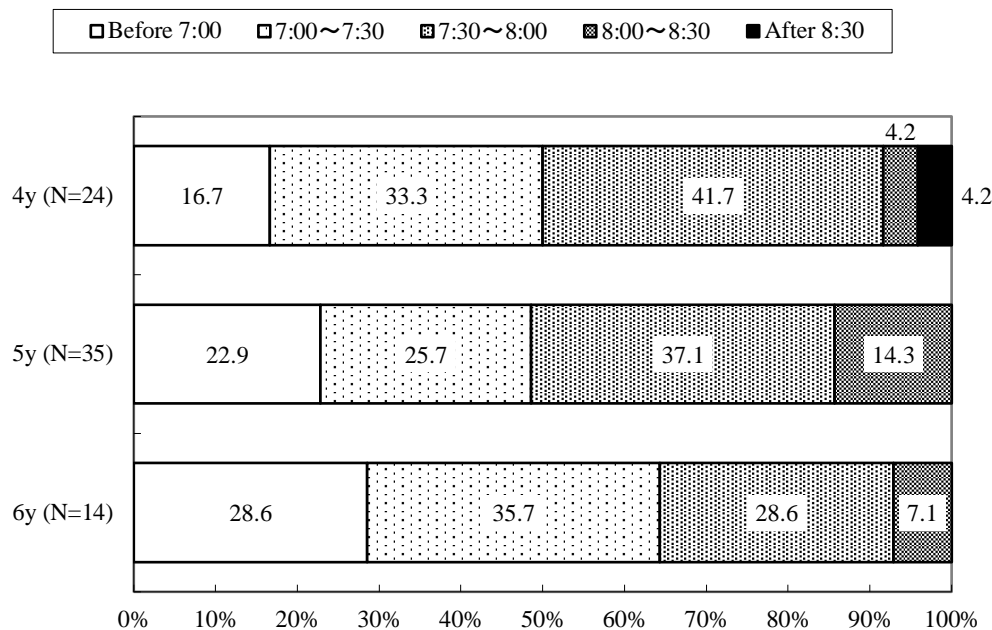


Figure 8—1 The percentage of eating breakfast (boys)

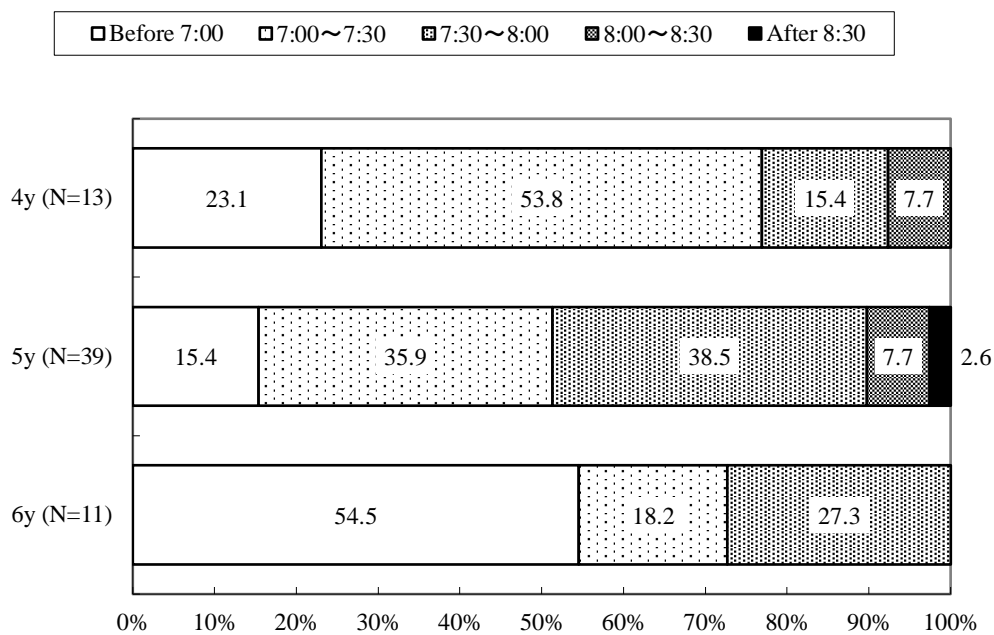


Figure 8—2 The percentage of eating breakfast (girls)

11. Breakfast intakes

The results of breakfast intakes indicated that the percentage of "eat breakfast every day" of 4-year-old boys were 83.3%, 4-year-old girls were 100%, 5-year-old boys were 97.1%, 5-year-old girls were 82.1%, 6-year-old boys were 92.9%, 6-year-old girls were 90.9% (Figure 9-1 and Figure 9-2).

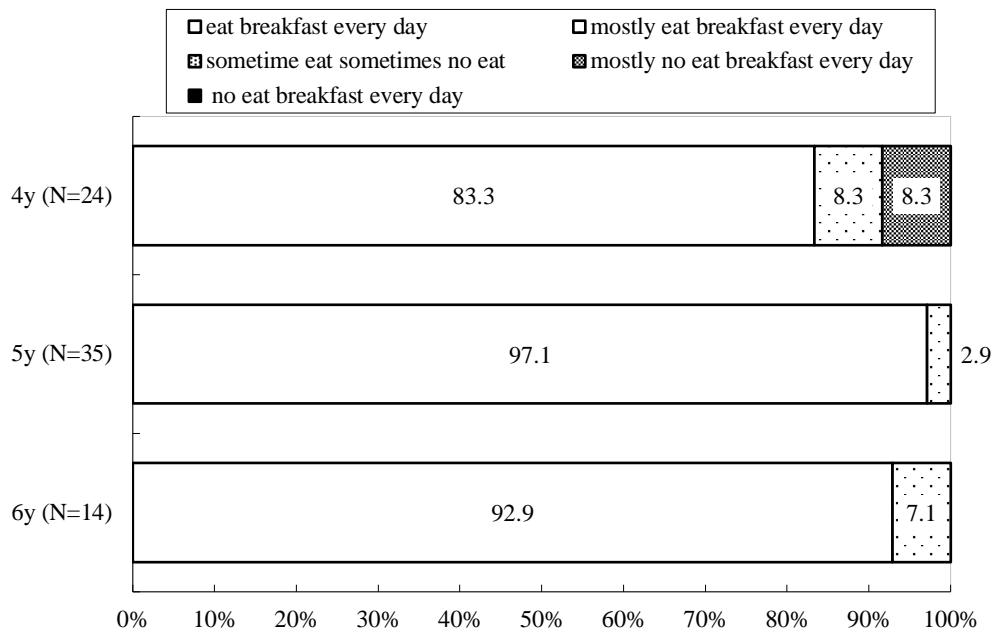


Figure 9—1 The percentage of breakfast intakes (boys)

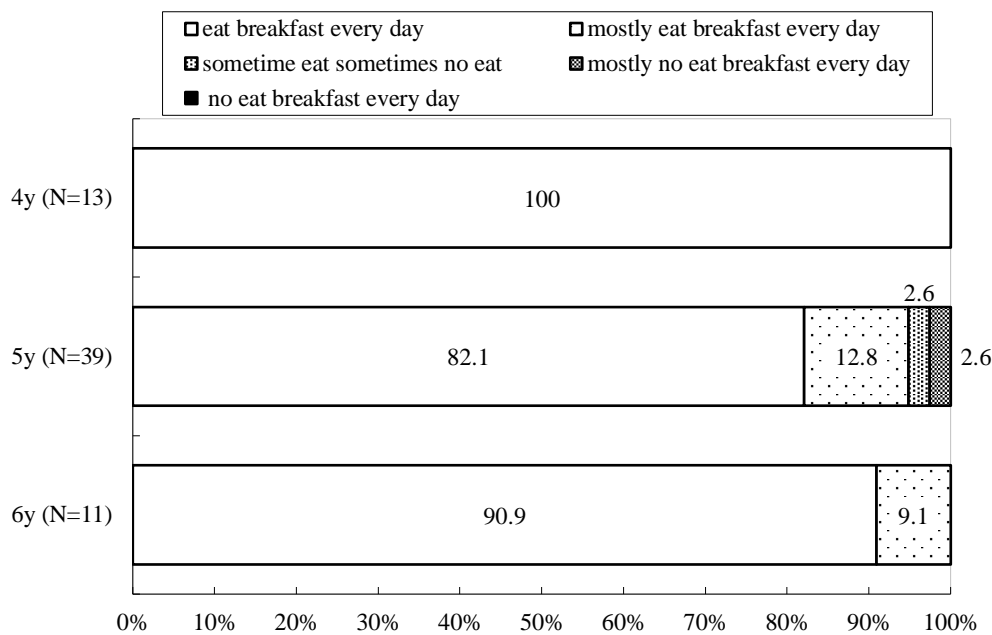
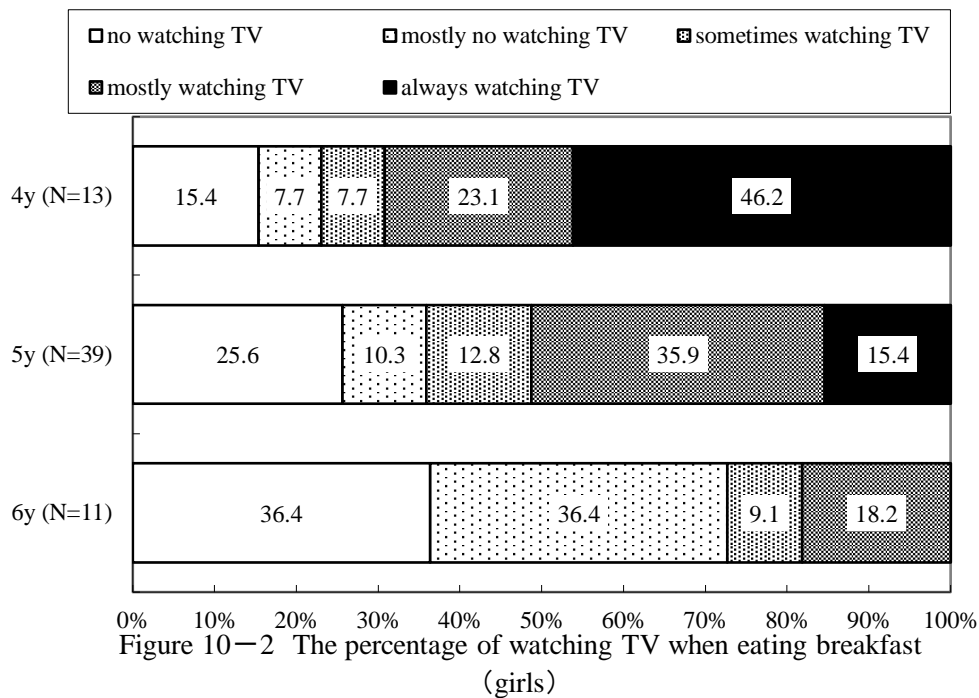
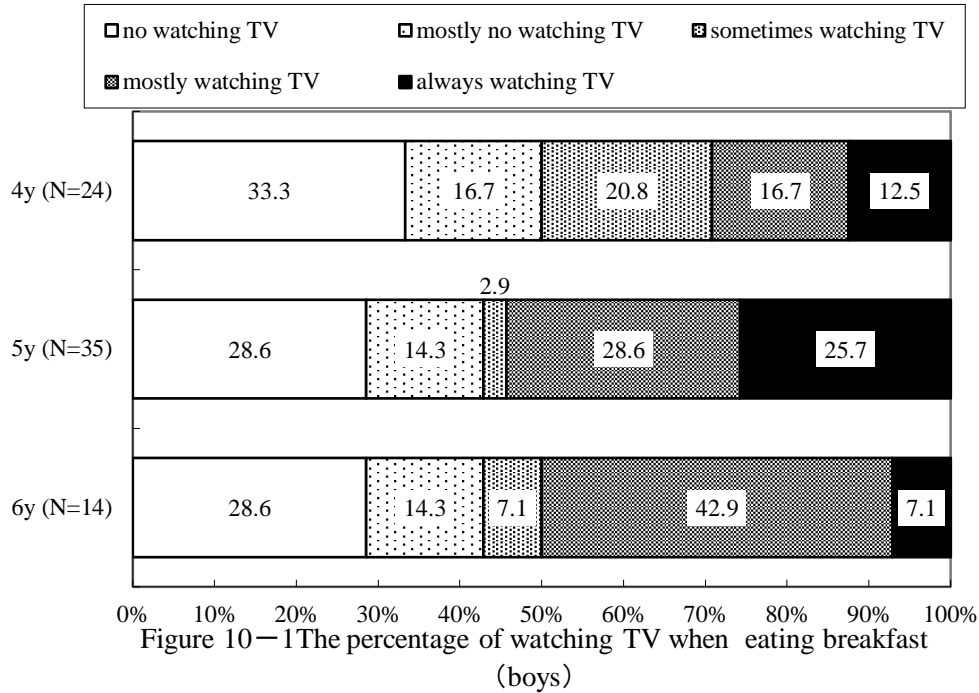


Figure 9—2 The percentage of breakfast intakes (girls)

12. What children do during eating breakfast

The percentage of "always watching TV when eating breakfast" and "mostly watching TV when eating breakfast" of young children were 29.2% of 4-year-old boys, 69.3% of 4-year-old girls, 54.3% of 5-year-old boys, 51.3% of 5-year-old girls, 50% of 6-year-old boys, 18.2% of 6-year-old girls (Figure 10-1 and Figure 10-2).



13. Place of eating breakfast

According to the results showed that the percentages of young children who eat breakfast "at home" were 95.8% of 4-year-old boys. Moreover, all of the 4 year-old girls, 5-year-old boys and girls, 6-year-old boys and girls eat breakfast "at home" were 100% (Figure 11-1, Figure 11-2).

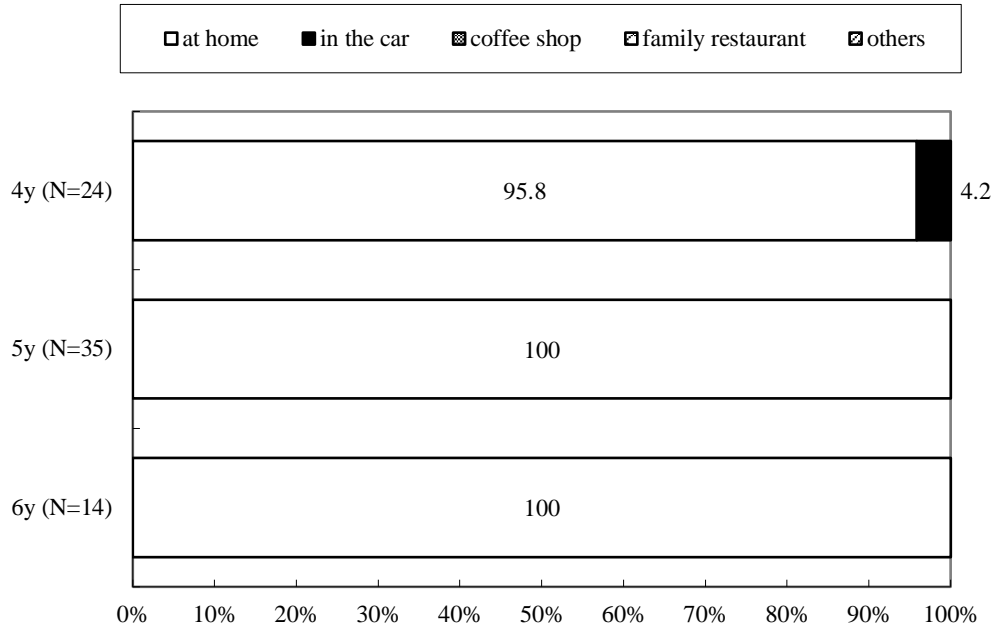


Figure 11—1 The percentage of place of eating breakfast (boys)

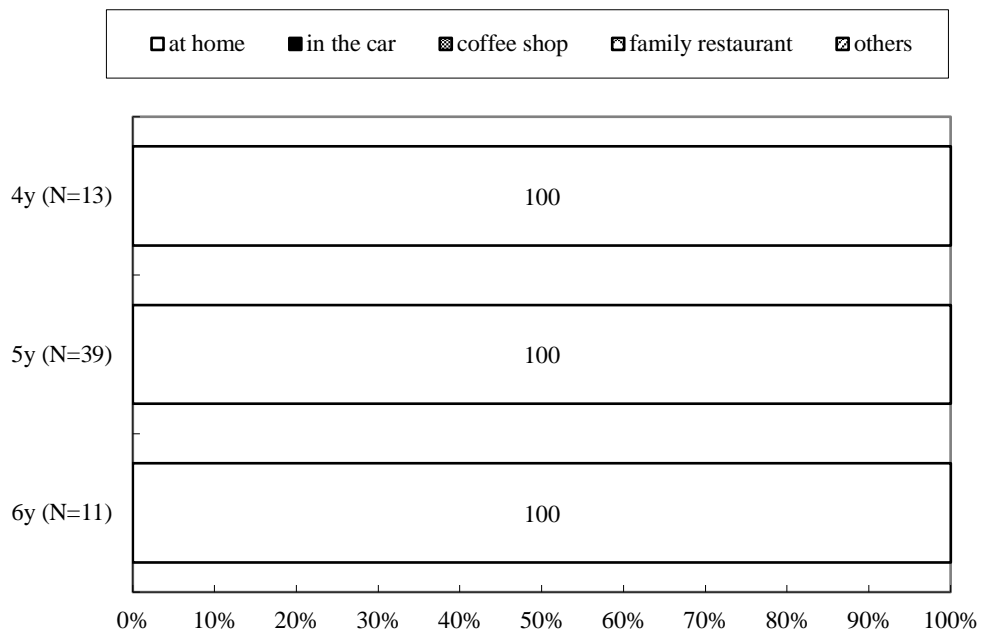


Figure 11—2 The percentage of place of eating breakfast (girls)

14. Defecation time

The defecation time of young children were "every morning" and "mostly every morning" of 4-year-old boys were 45.8%, 4-year-old girls were 7.7%, 5-year-old boys were 22.8%, 5-year-old girls were 20.5%, 6-year-old boys were 21.4%, 6-year-old girls were 9.1% (Figure 12-1 and Figure 12-2).

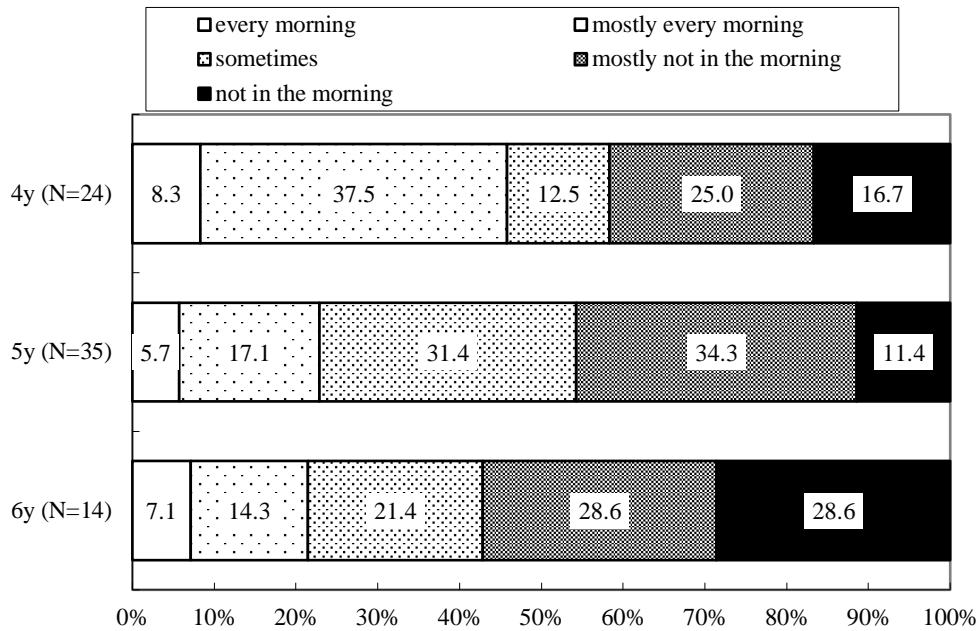


Figure 12—1 The percentage of defecation time (boys)

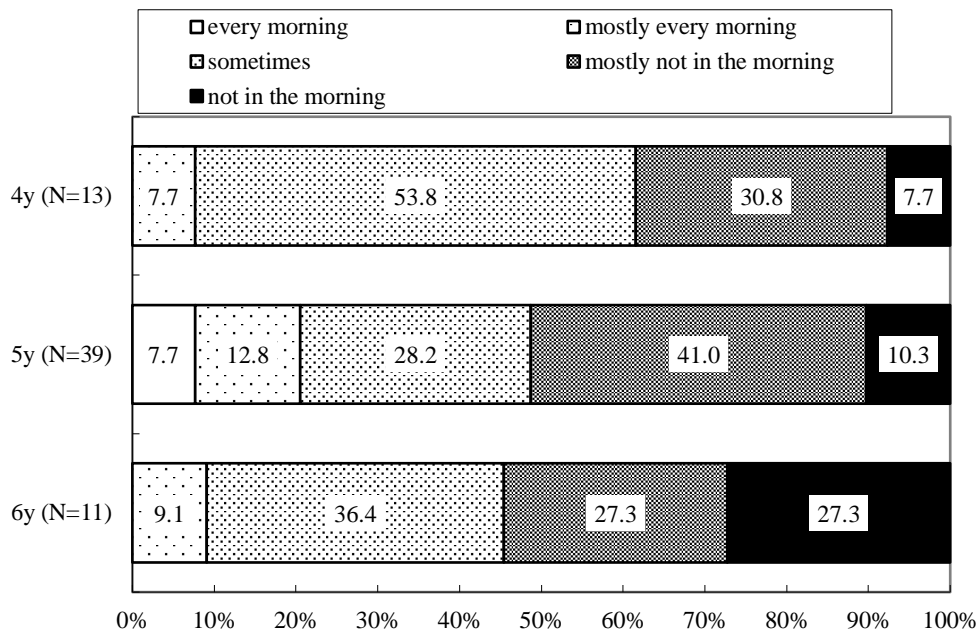


Figure 12—2 The percentage of defecation time (girls)

15. Time to go to school

The percentage of going to school after 8:00 in the morning of young children were 66.7% of 4-year-old boys, 61.6% of 4-year-old girls, 68.5% of 5-year-old boys, 71.8% of 5-year-old girls, 78.6% of 6-year-old boys, 27.3% of 6-year-old girls (Figure 13-1, Figure 13-2).

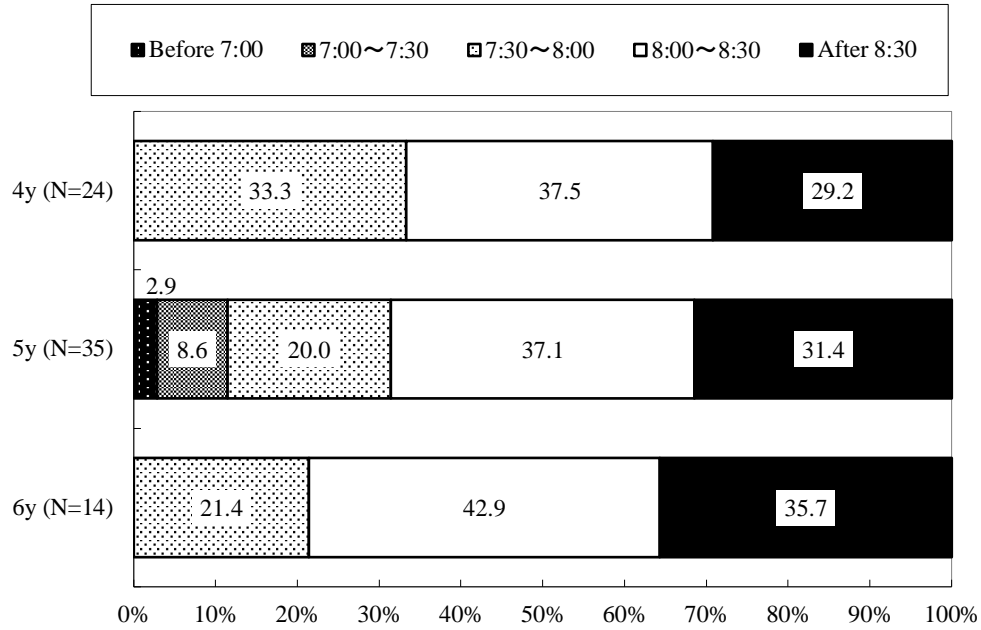


Figure 13—1 The percentage of time to go to school (boys)

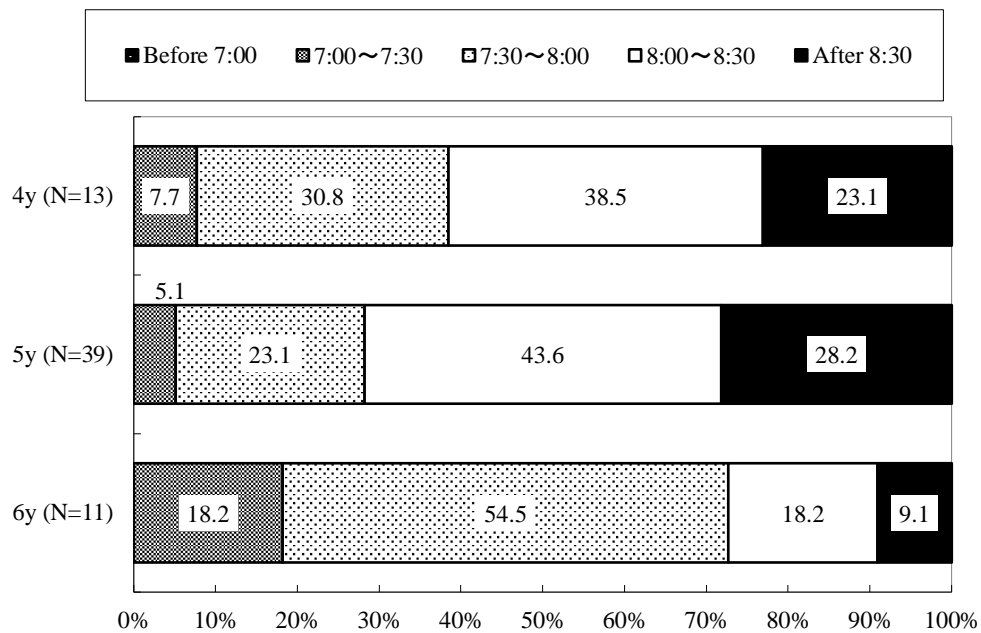


Figure 13—2 The percentage of time to go to school (girls)

16. Fatigue symptoms before children leave for school

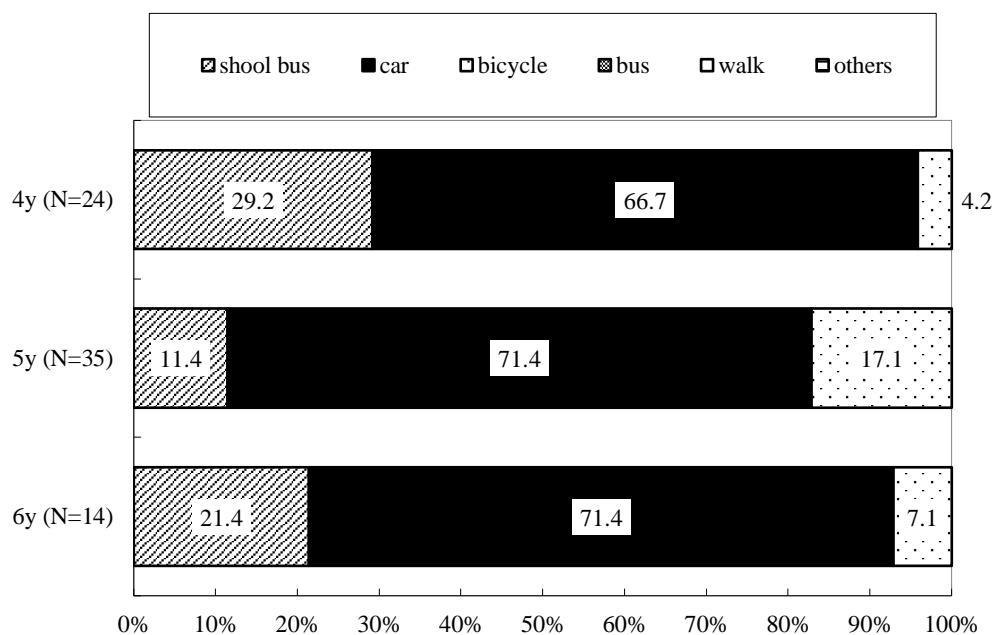
The results showed that the top one fatigue symptom in the morning was "feeling sleepy" of the 4 to 6-year-old young children in Kyoto. Also, the percentage of 4-year-old boys were 20.8%, 4-year-old girls were 30.8%, 5-year-old boys were 14.3%, 5-year-old girls were 12.8%, 6-year-old boys were 7.1%, and 6-year-old girls were 9.1% (Table 4).

Table 4 Fatigue symptoms in the morning (top two)

age	Boys	Girls
4 years-old	Feeling Sleepy (20.8%) Feeling like yawning (12.5%)	Feeling Sleepy (30.8%)
5 years-old	Feeling Sleepy (14.3%) Feeling like lying down (5.7%)	Feeling Sleepy (12.8%)
6 years-old	Feeling Sleepy (7.1%) Feeling like lying down (7.1%)	Feeling Sleepy (9.1%)

17. Way to go to school

The main way to go to school of young children were "by school bus" and "by car" were 95.9% of 4-year-old boys, 100% of 4-year-old girls, 82.8% of 5-year-old boys, 94.8% of 5-year-old girl, 92.8% of 6-year-old boys, 100% of 6-year-old girl (Figure 14-1, Figure 14-2).

**Figure 14—1 The percentage of way to go to school (boys)**

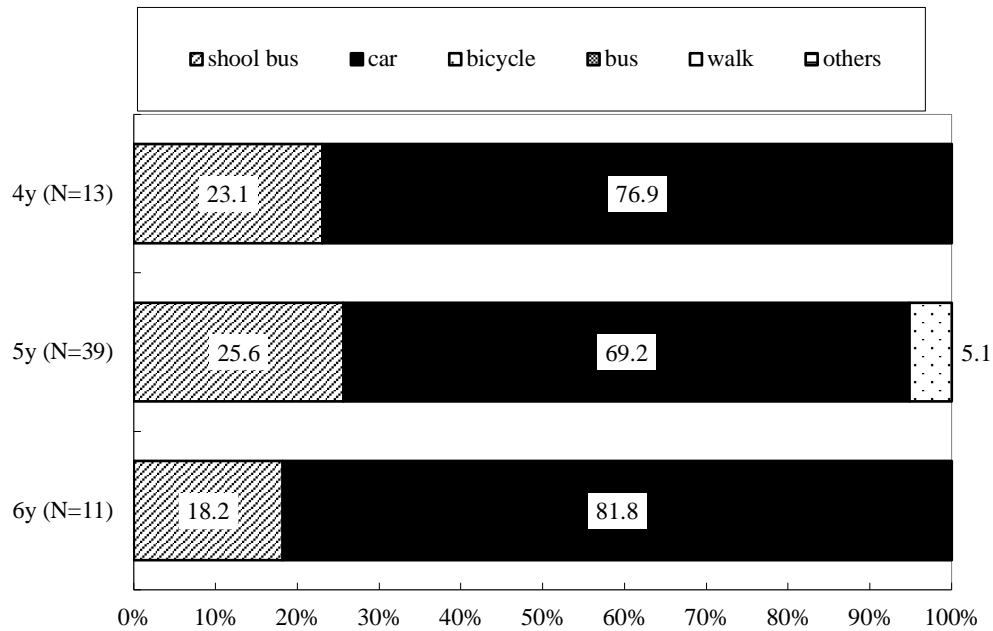


Figure 14—2 The percentage of way to go to school (girls)

18. Outdoor play Time

The average play time for boys were from 1 hours 58 minutes (6-year-old) to 2 hours 51 minutes (4-year-old), and the average play time for girls were from 1 hours 58 minutes (6-year-old) to 2 hours 30 minutes (5-year-old).

According to the results showed that the time of playing outside after school of young children were "less than 30 minutes". The percentage of 4-year-old boys were 56.5%, 4-year-old girls were 53.8%, 5-year-old boys were 85.7%, 5-year-old girls were 76.9%, 6-year-old boys were 57.1%, 6-year-old girls were 63.6% (Figure 15-1 and Figure 15-2).

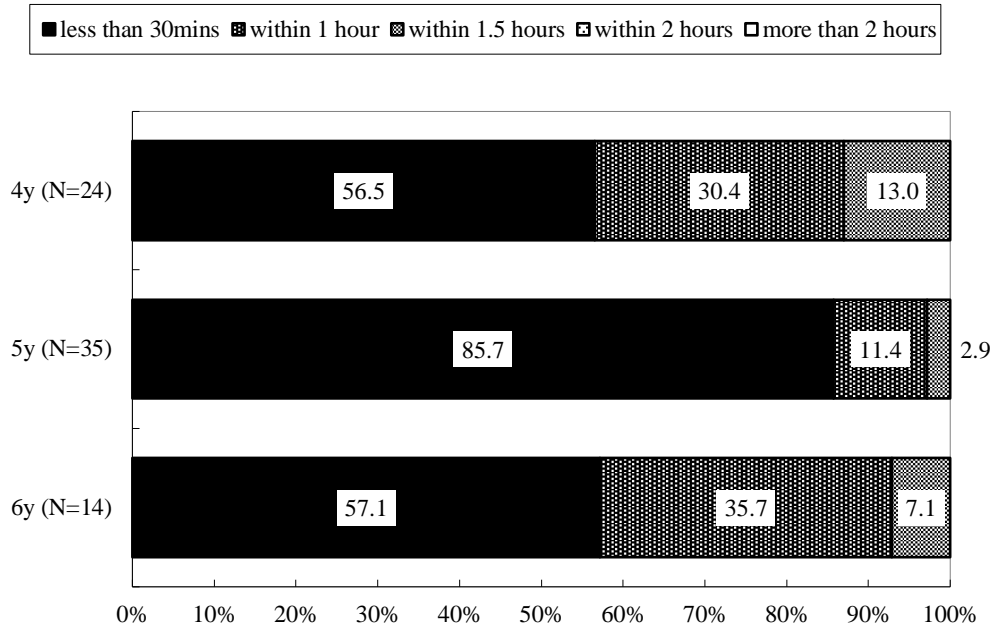


Figure 15—1 The percentage of outdoor play time (boys)

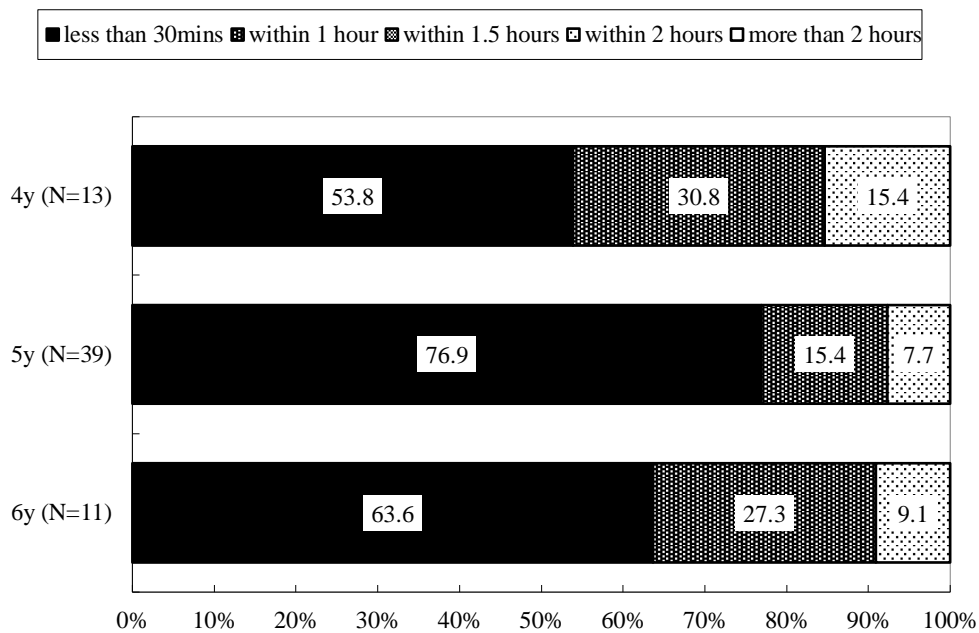


Figure 15—2 The percentage off outdoor play time (girls)

19. Activities after school

For 4 to 6 years old boys in Kyoto, "watching TV or video" ranked first place of activities after school, the percentage were 66.7% (4 years old boys), 54.3% (5-year-old boys), 85.7% (6 year-old boys). "Drawing" ranked first of activities after school of 4 to 6 years old girls, the percentage was 61.5% (4 years old girls), 74.4% (5-year-old girls), 46.6% (6 year-old girls) as shown in Table 5.

Table 5 Activities after school (top three)

age	Boys	Girls
4 years-old	Watching TV or video (66.7%) Playing with brick (37.5%) Role playing game (37.5%)	Drawing (61.5%) Watching TV or video (46.2%) House playing (46.2%) Playing with dolls (46.2%)
5 years-old	Watching TV or video (54.3%) Playing with brick (40.0%) Role playing game (34.3%)	Drawing (74.4%) House playing (61.5%) Watching TV or video (53.8%)
6 years-old	Watching TV or video (85.7%) Drawing (42.9%) Playing with brick (42.9%) Role playing game (42.9%)	Drawing (72.7%) House playing (54.5%) Riding bicycle (45.5%)

20. Place of playing

According to the results, the main playing place was "at home" of 4 to 6 young children, the percentage of 4-year-old boys was 100%, 4-year-old girl was 92.3%, 5-year-old boys was 94.3%, 5-year-old girls was 89.7%, 6-year-old boys was 100%, 6-year-old girl was 100% (Table 6).

Table 6 Place of playing (top three)

age	Boys	Girls
4 years-old	Home (100%) Courtyard (41.7%) Park (37.5%)	Home (92.3%) Park (38.5%) Courtyard (38.5%)
5 years-old	Home (94.3%) Park (45.7%) Courtyard (25.7%)	Home (89.7%) Park (43.6%) Road (28.2%)
6 years-old	Home (100%) Courtyard (35.7%) Park (28.6%) Road (28.6%)	Home (100%) Road (36.4%) Park (27.3%)

21. Cram school

The results showed that the percentage of 4 to 6 year-old young children did not go to cram school were 83.3% (4-year-old boys), 76.9% (4-year-old girls), 68.6% (5-year-old boys), 48.7% (5-year-old girls), 57.1% (6-year-old boys), and 27.3% (6-year-old girls) as shown in Figure 16-1 and Figure 16-2.

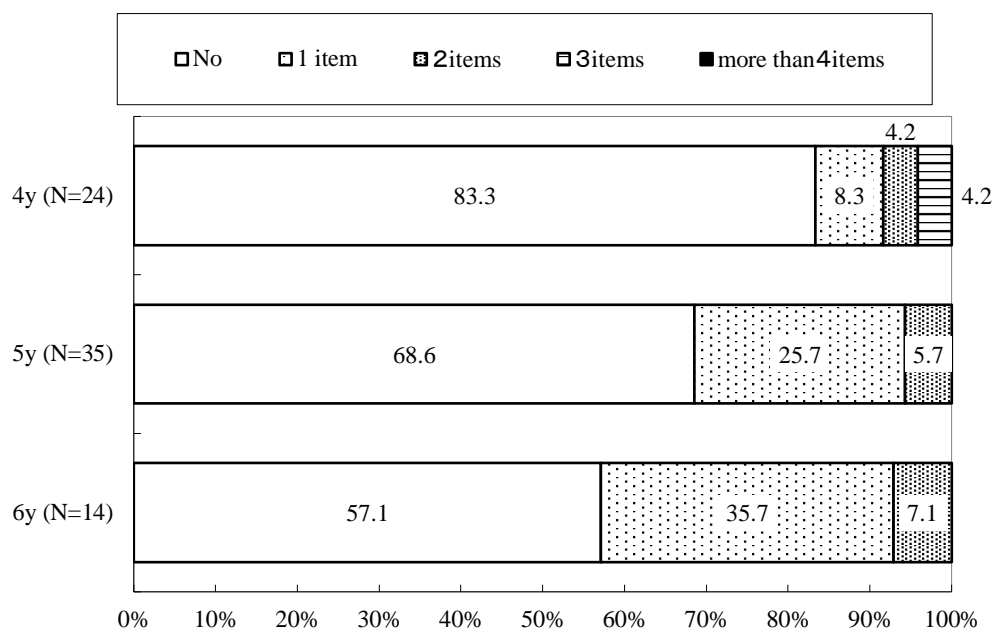


Figure 16—1 The percentage of go to cram school (boys)

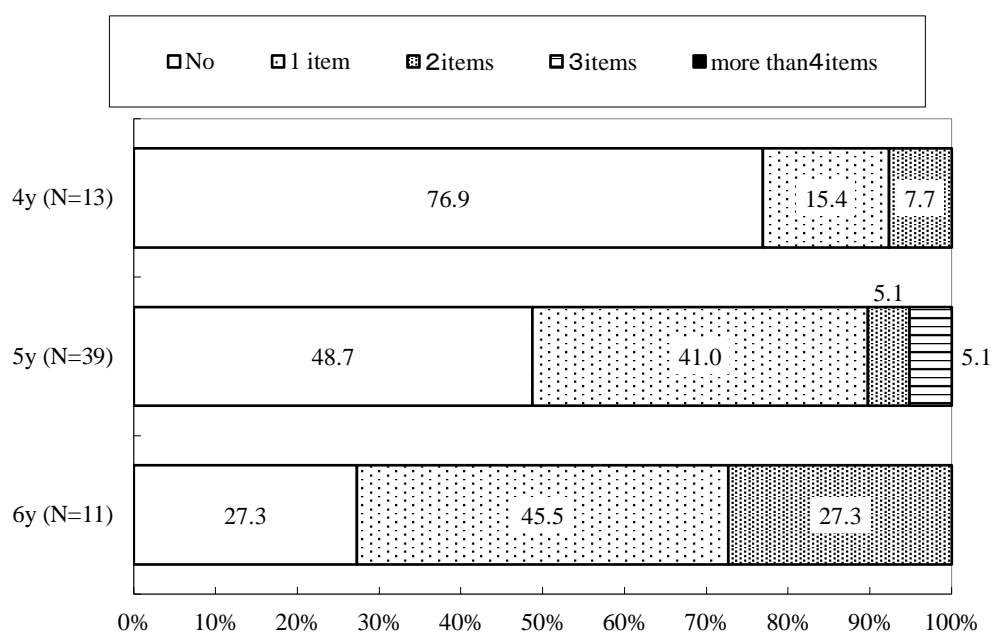


Figure 16—2 The percentage of go to cram school (girls)

22. Tutorial projects

The top two tutorial project of 3 year-old boys were 10.8% of "English", 8.1% of "drawing ", and the top one of 3-year-old girls was "ballet or dance " (9.2%), then the second projects were "swimming", "English" and "drawing" (4.6%). Both 4 and 5 year-old young children the top one tutorial project were "drawing", the percentage were 12.6% of 4 year-old boys, 18.7% of 5-year-old boys, 21.3% of 4 year-old girls,

and 23.9% of 5-year-old girls. Also the top one tutorial project of 6 year-old girls were "drawing" (32.6%). The top one tutorial project of 6-year-old boys were "mathematics" (22.5%) as shown in Table 7.

Table 7 Tutoring projects (top two)

age	Boys	Girls
4 years-old	Swimming (12.5%) English (8.3%)	Gymnastics (15.4%) Swimming (7.7%) Piano (7.7%)
5 years-old	Gymnastics (14.3%) English (11.4%)	Swimming (15.4%) Gymnastics (10.3%)
6 years-old	Swimming (14.3%) English (14.3%)	Piano (45.5%) English (27.3%)

23. Dinner time

The average dinner time for boys were 18:49 p.m. (4 and 5-year-old) to 19:05 p. m. (6-year-old), and the average dinner time for girls were 18:39 p.m. (4-year-old) to 18:50 p. m. (6-year-old). The percentage of dinner time of young children after 19:00 were 4-year-old boys (54.2%), 4-year-old girls (46.2%), 5-year-old boys (51.5%), 5-year-old girls (66.7%), 6-year-old boys (85.7%), and 6-year-old girls (54.6%) as shown in Figure 17-1 and Figure 17-2.

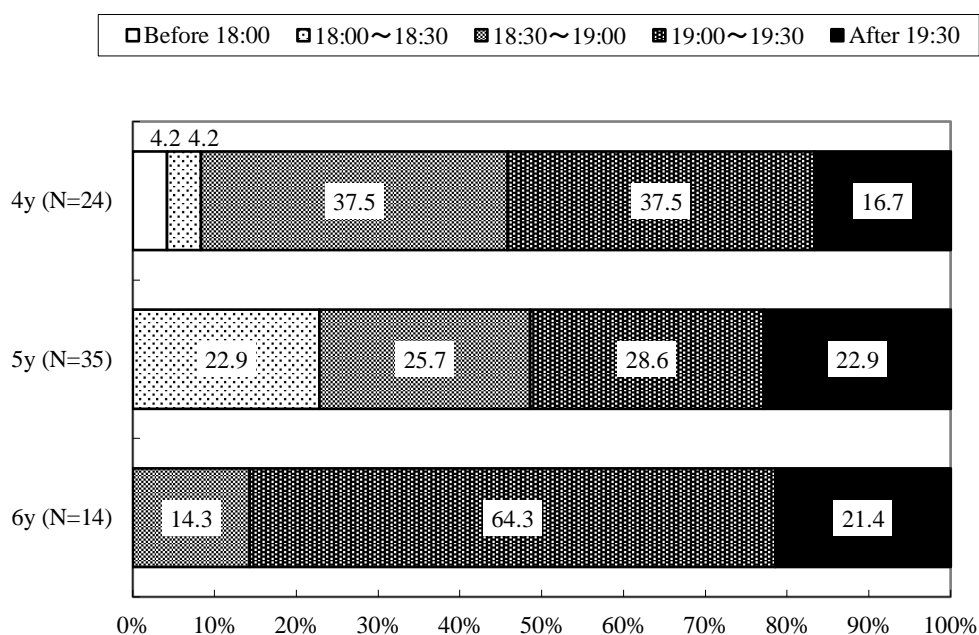


Figure 17—1 The percentage of dinner time (boys)

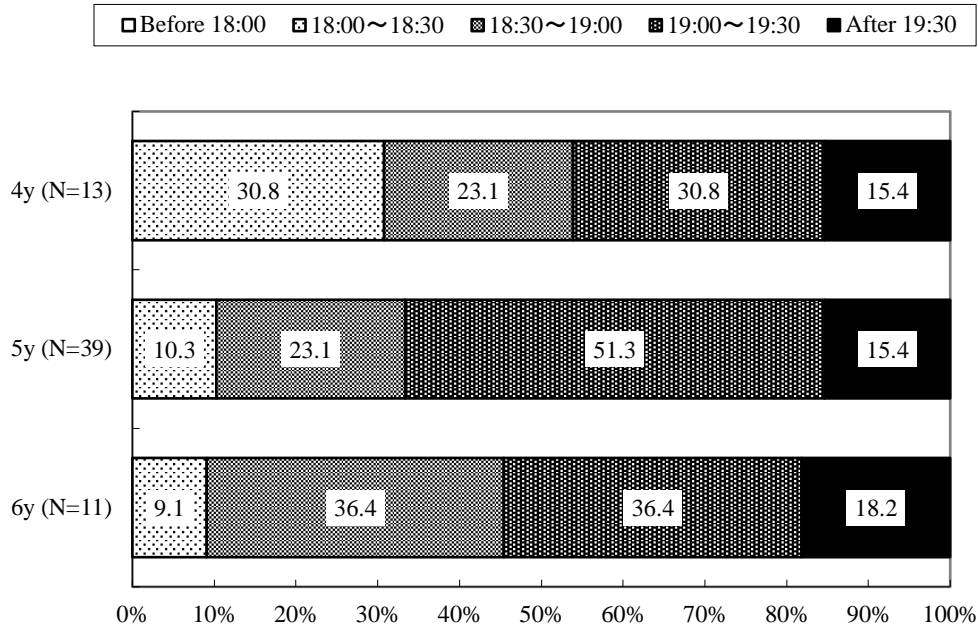


Figure 17—2 The percentahe of dinner time (girls)

24. Eating condition which parents worry about

According to the results showed the top one eating condition of 3-year-old boys and girls , and 4-year-old boys were "playing when eating", the percentage of 3-year-old boys were 47.4%, 3-year-old girls were 46.2%, 4-year-old boys were 50.0%. But "watching TV when eating" became the top one eating condition of 4-year-old girls (49.7%), 5-year-old boys (47.4%), 5-year-old girls (44.9%), 6-year-old boys (47.6%), and 6-year-old girls (50%) as shown in Table 8.

Table 8 Eating condition which parents worry about (top two)

age	Boys	Girls
4 years-old	Playing when eating (50%)	picky eater (61.5%)
	Watching TV when eating (25%)	Watching TV when eating (30.8%)
5 years-old	Watching TV when eating (42.9%)	Watching TV when eating (35.9%)
	Playing when eating (42.9%)	Playing when eating (30.8%)
6 years-old	picky eater (50%)	Watching TV when eating (27.3%)
	Watching TV when eating (35.7%)	Playing when eating (18.2%)

25. Snacks intakes before bedtime

Before bedtime, the percentage of 3 to 6 year-old young children "eat snacks every day" and "eat snacks often" were 8.3% (4-year-old boys), 23.1% (4-year-old girls), 20% (5-year-old boys), 15.4% (5-year-old girls), 21.4% (6-year-old boys), and 18.2% (6-year-old girls) as shown in Figure 18-1 and Figure 18-2.

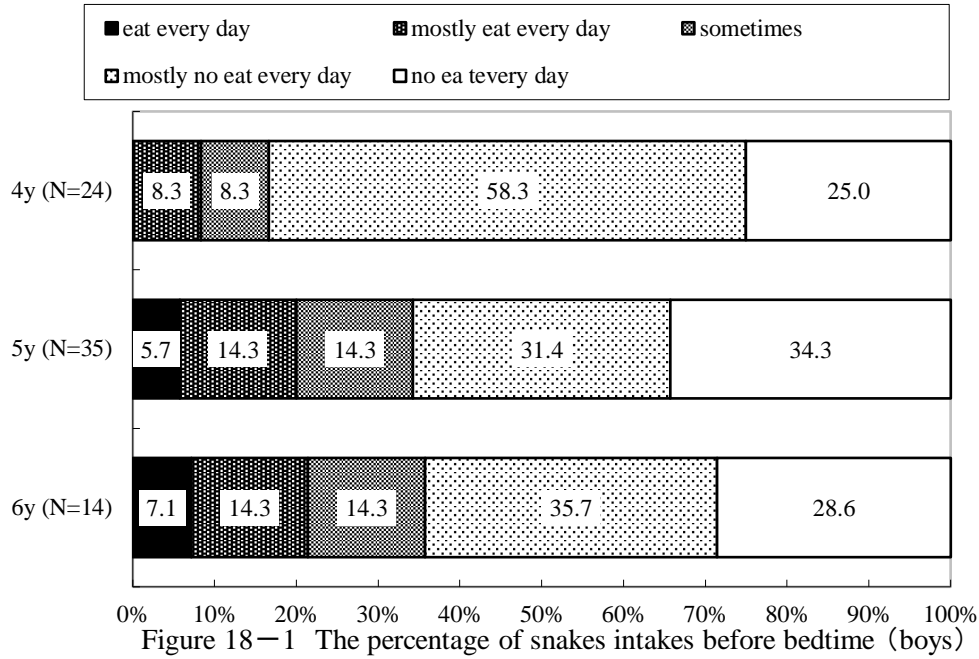


Figure 18—1 The percentage of snakes intakes before bedtime (boys)

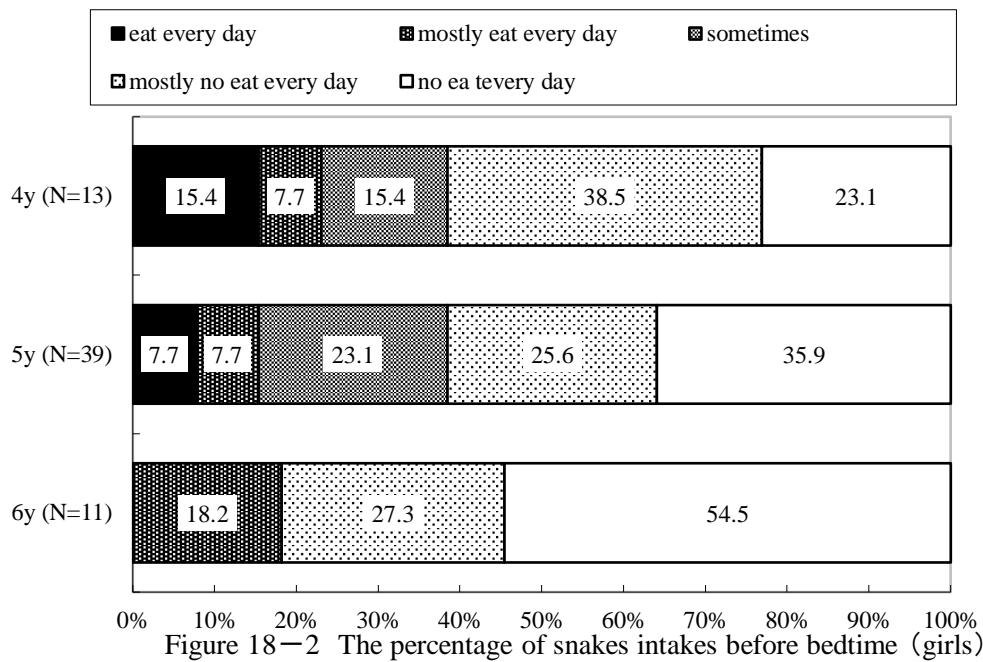


Figure 18—2 The percentage of snakes intakes before bedtime (girls)

26. Activities after 22:00 p.m.

The activities after 22:00 p.m. for 4-year-old boys and girls were "Watching TV or video" ranked the top one, the percentage were 12.5% (4-year-old boys), 15.4% (4-year-old girls). Also, for 6-year-old boys and 5-year-old girls were "playing with brothers or sisters" ranked the top one, the percentage were 14.3% (6-year-old boys), 15.4% (4-year-old girls). Moreover, for 4 to 6 years-old girls, the activities after 22:00 p.m. were "Watching TV or video" ranked the top one as shown in Table 9.

Table 9 Activities after 22:00 (more than 10%)

Age	Boys	Girls
4 years-old	Watching TV or video (12.5%)	Watching TV or video (15.4%)
5 years-old	Keep awaking do nothing (11.4%)	Playing with toys (15.4%) Playing with brothers/sisters (15.4%) Watching TV or video (10.3%)
6 years-old	Playing with brothers/sisters (14.3%) Playing with father (14.3%)	Watching TV or video (18.2%)

27. Both hands grip strength

The average of both hands grip strength for boys were 13.7 kg of 4-year-old, 15.2 kg of 5-year-old and 17.1 kg of 6-year-old, and the average of both hands grip strength for girls were 13.1 kg of 4-year-old, 15.0 kg of 5-year-old and 19.4 kg of 6-year-old.

28. Jumping over the pass

The average time of jumping over the pass was 19.8 seconds of 4-year-old boys, 19.2 seconds of 5-year-old boys, and 16.3 seconds of 6-year-old boys. Also, the average time of jumping over the pass for girls was 20.5 seconds (4-year-old), 17.3 seconds (5-year-old), and 16.6 seconds (6-year-old).

29. 25m dash

The average time of 25m dash was 8.0 seconds of 4-year-old boys, 7.1 seconds of 5-year-old boys, and 6.5 seconds of 6-year-old boys. Also, the average time of 25m dash for girls was 8.2 seconds (4-year-old), 6.9 seconds (5-year-old), and 6.2 seconds (6-year-old).

30. Standing broad jump

The average distance of standing broad jump was 82.5 cm of 4-year-old boys, 91.0 cm of 5-year-old boys, and 103.1 cm of 6-year-old boys. Also, the average distance of standing broad jump for girls was 78.4 cm (4-year-old), 91.2 cm (5-year-old), and 102.0 cm (6-year-old).

31. Tennis ball throw

The average distance of ball throwing was 5.5 m of 4-year-old boys, 5.5 m of 5-year-old boys, and 6.3 m of 6-year-old boys. Also, the average distance of ball throwing for girls was 4.0 m (4-year-old), 5.0 m (5-year-old), and 6.2 m (6-year-old).

32. Correlation between the living condition factors and motor abilities

The relative between living condition factors of 136 young children in Kyoto, the results were as follows: there was a significant correlation between bed time and wake up time both boys ($r = 0.46$) and girls ($r = 0.50$); there was a significant correlation between breakfast time and wake up time both boys ($r = 0.89$) and girls ($r = 0.93$) as shown in Figure 19-1 and Figure 19-2.

Furthermore, there was a significant correlation between bedtime and dinner time for boys ($r = 0.35$), but there was no significant correlation for girls. Moreover, there was a significant correlation between play time and outdoor play time for boys ($r = 0.35$), but for girls, the play time has a significant correlation between TV/Video watching time ($r = 0.49$).

The relative between living condition factors and motor abilities of 136 young children in Kyoto, the results were as follows: only for the girls in kyoto, there was a significant negative correlation between both hands grip strength and breakfast time ($r = -0.32$).

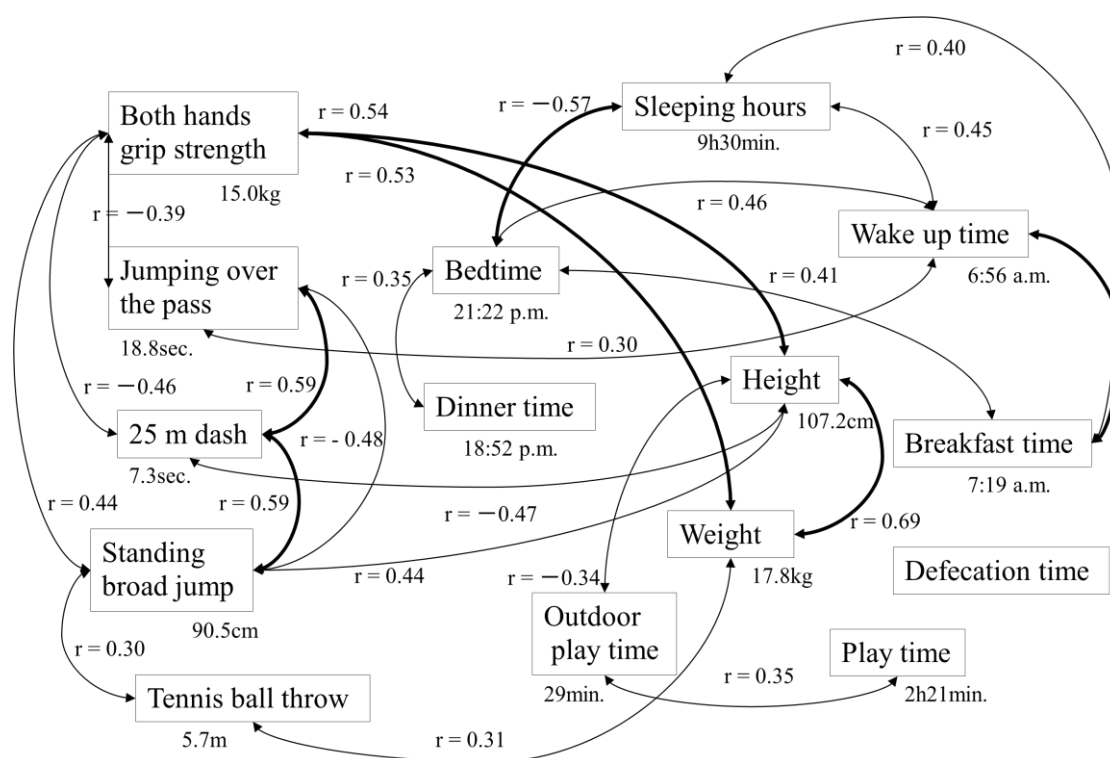


Figure 19-1 Correlation of living factors and motor ability of Japanese young children in Kyoto (Boys N=73)

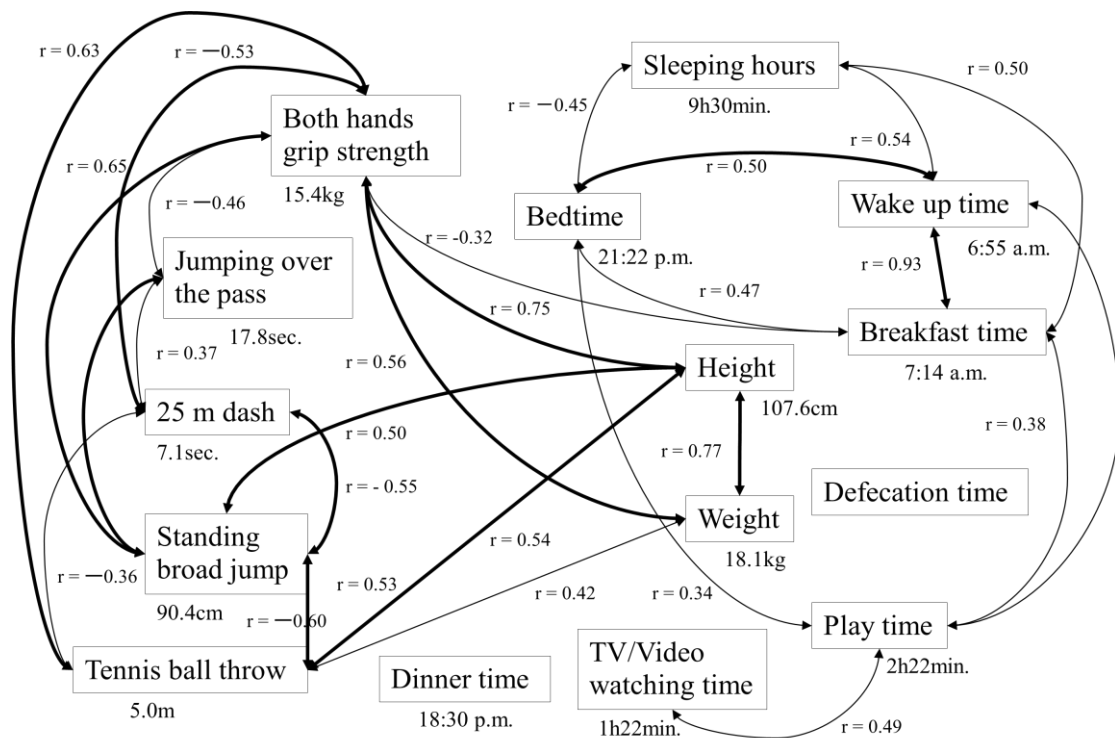


Figure 19-2 Correlation of living factors and motor ability of Japanese young children in Kyoto (Girls N=63)

Discussion

The results of this study indicated that there had over 50% young children went to bed after 21:00 p.m., and slept less than 10 hours per day. Moreover, the percentage increased with age, it means that the older children, the less sleeping hours. Also, there had a significant negative correlation between bed time and sleeping hours ($r = -0.45$ of girls, $r = -0.57$ of boys), it means children went to bed late then the sleeping hours will decrease. However, young children lack of sleeping hours which lead to the weakening of autonomic nerve system and the hormone secretion status deteriorated, low attention ability, and physical condition becomes poor (Matsuo & Maehashi, 2010).

The average of playing time of 4 to 6-year-old young children was 2 hours per day, and the time of playing outside of more than 50% young children were less than 30 minutes. Also, according to the correlation results indicated that there was a significant correlation between play time and outdoor play time for boys ($r = 0.35$) it means the more play time young boys have and outdoor play time also increased, but for girls, the play time has a significant correlation between TV/Video watching time

($r=0.49$), that means the more play time young girls have and the TV/Video watching time also increased. In other words, young girls spend more time on watching TV/video than young boys. As we know, sedentary behaviors (predominantly screen time) impact on the weight status of children (Stralen, Velde, & Nassau, 2012). Research evidence suggests that helping young children establish an active lifestyle can prevent them from overweight and obesity (Epstein, Roemmich, & Robinson, 2008). Hence, parents and children can have more interactive time and also can be active simultaneously.

Finally, the relative between living condition factors and motor abilities of 136 young children in Kyoto, the results were as follows: only for the girls in Kyoto, there was a significant negative correlation between both hands grip strength and breakfast time ($r=-0.32$), it means children breakfast time late then the both hands grip strength will be lower level. Furthermore, there had a significant correlation between bed time and wake up time. The results showed that the bed time late then the wake up time late. It is important to notice the time of daily life for young children. Therefore, parents or the caregivers should help children back to the basic life rhythm - go to bed early, wake up early, and sleeping at least 10 hours.

In the meantime, in this study, there had no significant correlation between the living conditions and motor abilities of young children. Therefore, we recommend that to increase the participants in the future study. In addition, the results of defecation time showed that there only had 7.7% (4 year-old girls) to 45.8% (4 year-old boys) defecated every morning or mostly every morning. Which means, there were about 60% of young children didn't defecate in the morning. When defecation was not done in the morning, children will go to school with uncomfortable feeling and with heavy extra left inside their body then decrease of exercise quantity (Maehashi, Hasegawa, Matsuo, Izumi, Ishii, Oka, & Itagaki, 2012). However, there had no significant correlation between defecation time and the other living condition factors in this study. Therefore, for the future study can add the interview with parents to find out the reasons of no defecation in the morning of children.

Conclusion

The results of 4 to 6 years old young children in Kyoto were as follows: (1) over 50% of young children went to bed after 21:00 p.m., over 60% slept less than 10 hours, (2) the rate of eating breakfast (82.1%~100%), but the low rate of defecation in the morning (7.7%~45.8%), (3) "Feeling sleepy" before leave for school (7.1%~30.8%), (4) 53.8%~85.7% of young children playing outside less than 30 minutes. (5) For the correlation analysis, there was a significant negative correlation

between bed time and sleeping hours ($r = -0.45$ of girls, $r = -0.57$ of boys), it means children went to bed late then the sleeping hours will decrease; there was a significant correlation between play time and outdoor play time for boys ($r = 0.35$), but for girls, the play time has a significant correlation between TV/Video watching time ($r = 0.49$). Finally, for the girls in Kyoto, there was a significant negative correlation between both hands grip strength and breakfast time, that means children breakfast time late then the both hands grip strength will be lower level.

In conclusion, living condition is related to each factor of life rhythm and the living condition of young children became in the bad living circle- go to bed late, less sleeping hours, lack of physical activities, and the time of watching TV increased with age. However, there had no significant correlation between defecation time and the other living condition factors in this study. Therefore, for the future study can add the interview with parents to find out the reasons of no defecation in the morning of children.

Acknowledgements

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